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INITIAL DISTRIBUTION SYSTEM EVALUATION GUIDANCE MANUAL

FOR THE FINAL STAGE 2 DISINFECTANTS AND DISINFECTION BYPRODUCTS RULE

CHAPTER 7

http://www.epa.gov/safewater/disinfection/stage2/compliance.html

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7.0 Standard Monitoring

This chapter covers:

Standard monitoring is one year of increased distribution system monitoring to find locations with high total trihalomethane (TTHM) and haloacetic acid-five (HAA5) concentrations. Results from standard monitoring will be used in conjunction with results from Stage 1 compliance monitoring to select Stage 2 compliance monitoring locations. Any system can conduct standard monitoring to meet the IDSE requirements of the Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR).

If you have not already done so, you should complete the **flowchart** in Exhibit 2.3 of this guidance manual. Depending on your system size and available data, you may have another option for complying with IDSE requirements. The flowchart will help you select the most appropriate IDSE option for your system and will direct you to a 2-page ***Requirements Summary Sheet*** for your schedule. You will also be directed to the ***Standard Monitoring Requirements - Attachment*** sheet containing detailed requirements for standard monitoring and Stage 2 compliance monitoring (e.g., number of samples and sampling frequency). You should keep these sheets handy as you work through this chapter.

This chapter provides guidelines on how to select standard monitoring sites, prepare a standard monitoring plan, conduct standard monitoring, select Stage 2 DBPR compliance monitoring sites, and prepare the IDSE report. Appendices H and I support this chapter by providing example standard monitoring plans and reports. Guidance for standard monitoring is also available in the EPA manual, *Initial Distribution System Evaluation Guide for Systems Serving < 10,000 People.* This guide is specifically targeted to small systems and contains an example monitoring plan and report for a small surface water system.

It is important that **consecutive and wholesale systems** communicate with each other throughout the IDSE process. If you are a consecutive or wholesale system, refer to **Appendix D** for specific issues that you should consider.

IMPORTANT: Results from IDSE standard monitoring **should not** be used to determine compliance with maximum contaminant levels (MCLs) of the Stage 1 DBPR. Results must, however, be included in the range of levels that you report in your Consumer Confidence Report. During the entire IDSE period, you **must** continue to monitor according to your Stage 1 DBPR monitoring plan and comply with Stage 1 DBPR MCLs at your Stage 1 sites.

7.1 Selecting Standard Monitoring Sites and Preparing Your Standard Monitoring Plan

Every system that conducts IDSE standard monitoring **must** prepare and submit a Standard Monitoring Plan. You should submit the plan to the Information Processing and Management Center (IPMC) for review by EPA or your state. See Section 1.4 of this guidance manual for information on how to submit your plan to the IPMC.

This section contains EPA's recommended technical approach for selecting standard monitoring sites. It also contains the recommended approach for selecting the peak historical month and scheduling standard monitoring. Lastly, this section provides guidance on completing the IDSE standard monitoring plan.

EPA has developed a **Standard Monitoring Plan Form (Form 6)**, presented in Section 7.1.3 and available electronically as part of the **IDSE Tool.** You are not required to use this form; however, if you choose not to use it, refer to Exhibit 7.1 for a list of the minimum elements you must include in your standard monitoring plan. The IDSE Tool is available on EPA's website at http://www.epa.gov/safewater/disinfection/stage2.


IDSE Tool

Exhibit 7.1 Required Elements of Your Standard Monitoring Plan

- The population served by your system
- Your system type (subpart H or ground water)
- A distribution system schematic showing
  - entry points
  - sources
  - storage facilities
  - locations and dates of all projected standard monitoring and Stage 1 DBPR compliance samples
- Peak historical month
- Justification of standard monitoring site selection and a summary of data you relied on to justify standard monitoring site selection

7.1.1 Recommended Approach for Selecting Standard Monitoring Sites

You are required to select **up to four types** of standard monitoring sites for the IDSE:

- near entry point
- average residence time
- high TTHM
- high HAA5

Before you continue reading this chapter of the manual, you should use the IDSE Standard Monitoring Table in the ***Standard Monitoring Requirements - Attachment*** sheet from Chapter 2 to determine how many of each type of site is required for your system. Remember that IDSE standard monitoring requirements (i.e., the number of monitoring sites and sampling frequency) are based on the population served by your individual system, not the largest population in your combined distribution system.

EPA's recommended **8-Step technical approach** for selecting standard monitoring sites is summarized below and depicted graphically in Exhibit 7.2. The remainder of this section contains detailed guidance for each of these eight steps.

1. **Gather water quality data and system operating information** including Stage 1 and historic DBP data from the last several years. You may also want to use advanced tools (e.g., hydraulic model, tracer study data) if available.

2. Use data sources and tools to select **near entry point sites**.

3. Use data sources and tools to select **candidate average residence time sites**. Try to identify at least twice as many candidate sites as are required for standard monitoring.

4. Use data sources and tools to select **candidate high TTHM sites**. Try to identify at least twice as many candidate sites as are required for standard monitoring.

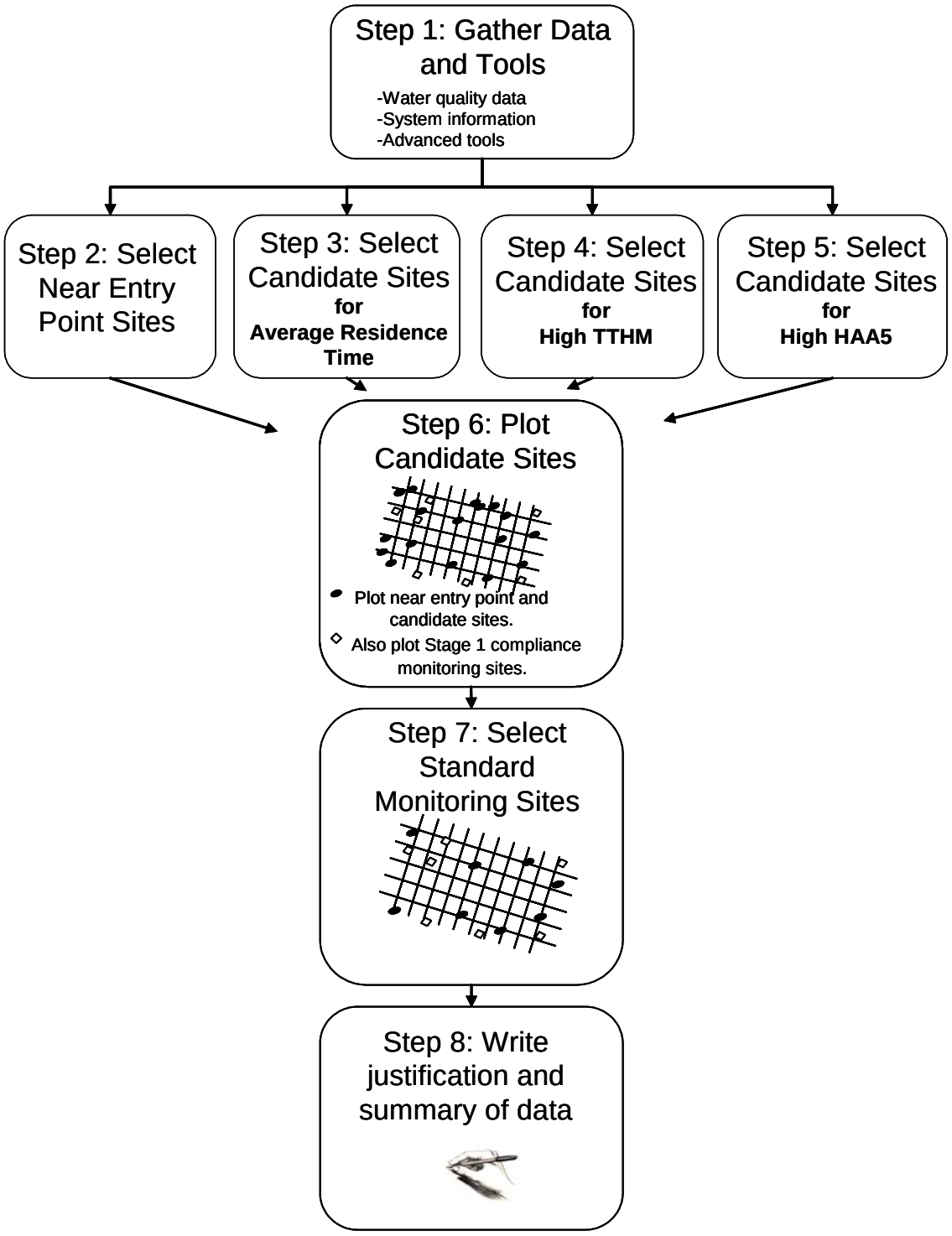
5. Use data sources and tools to select **candidate high HAA5 sites**. Try to identify at least twice as many candidate sites as are required for standard monitoring.

6. **Plot the near entry point sites and all candidate sites on a map of your distribution system**. You should include your Stage 1 DBPR compliance monitoring sites on the map so that you do not inadvertently select them as standard monitoring sites. You may want to color-code candidate sites (e.g., by type of site or data source).

7. Consider geographic coverage and other factors to **select standard monitoring sites from candidate sites.**

8. Write your **justifications** for site selection and **summary of data** that you relied on to select standard monitoring sites.

Exhibit 7.2 Recommended Approach to Selecting Standard Monitoring Sites



Remember that Stage 1 DBPR compliance monitoring sites ***cannot*** be used as standard monitoring sites.

Step 1: Gather Data and Tools

There are many kinds of data and tools that can be useful in selecting standard monitoring sites. Exhibit 7.3 shows the types of information typically available to water systems and for which types of sites they should be used.

One of the most important tools you can use to select standard monitoring sites is an up-to-date, detailed **map of your distribution system**. When you submit your standard monitoring plan, you are required to include a schematic of your distribution system showing all entry points, sources and storage facilities. Other useful map features include the layout of pipes, locations pump stations, pressure zone boundaries, locations of large users, and population density information. For security reasons, EPA recommends that you remove any information that could pose a security risk from your standard monitoring plan submittal. You may wish to use a separate, working version of your distribution system map for selecting sites, then transfer your information to a less detailed map for your standard monitoring plan submittal.

It is important that you consider available water quality data from your distribution system when selecting standard monitoring sites. In general, your water quality data should be less than 10 years old and should represent current system configurations to the extent possible. Most systems have collected disinfectant residual data from their distribution system, and this data can be very useful for selecting standard monitoring locations. EPA has provided additional guidelines for evaluating disinfectant residual data in Step 3.

Systems with multiple entry points that have different source water characteristics may find source water data quite useful for selecting standard monitoring sites. For instance, if a system has one surface water source and one ground water source, entry point sampling may indicate the surface water source produces much higher TTHM and HAA5 levels than the ground water source. Therefore, the water system may use this information to justify why a significant proportion of distribution system sample sites are served by the surface water plant.

Some systems, such as those that serve resort communities, have dramatic fluctuations in flow as well as population. If your system experiences widely varying demands on a **seasonal basis,** you should evaluate data and operational information for different seasons separately. When you are selecting sites, make sure that you select sites that represent the different operating scenarios of your system.

Exhibit 7.3 Data and Tools for Selecting Different Types of Standard Monitoring Sites

Type of Information	Type of Standard Monitoring Site			
	Near Entry Point	Average Residence Time	High TTHM	High HAA5
System Configuration				
Pipe layout, location of storage facilities		x	x	x
Location of sources	x	x	x	x
Pressure Zones		x	x	x
Information on Population Density		x	x	x
Locations of Large Customers		x		
Water Quality and Operational Data				
Disinfectant Residual Data		x	x	x
Stage 1 DBP Data			x	x
Other DBP Data			x	x
Microbiological Monitoring Data (e.g., HPC)				x
Tank Level Data, Pump Run Times		x	x	x
Customer Billing Records		x	x	x
Advanced Tools				
Water Distribution System Model		x	x	x
Tracer Study		x	x	x

Water distribution system models (e.g., hydraulic models and water quality models) and tracer studies can be very useful in selecting average residence time and high TTHM and HAA5 sites. Hydraulic models can be used to estimate typical residence time at various locations in your distribution system. A tracer study can provide a snapshot of water age at different locations in your distribution system. These tools have limitations, however, and should be used with caution. Some general guidelines are provided below.

- If your hydraulic model has not been recently calibrated or is highly skeletonized, you may want to rely on other types of information for selecting sites, or use modeling results in conjunction with other data.

- It is important that the hydraulic model and tracer study represent the current distribution system configuration. If your system has undergone major changes (e.g.,

new tank, new pump station, major system improvement projects) since the model was developed or the tracer study was conducted, consider using other data and tools to select standard monitoring sites.

Chapter 6 provides detailed guidelines on using distribution system hydraulic models for the IDSE and includes a list of technical references. Several books on distribution system modeling also contain information on tracer studies, such as the AWWA Manual M32, *Computer Modeling of Water Distribution Systems*, 2nd Edition, 2005 and *Advanced Water Distribution Modeling and Management* (Walski et al., 2003).

A key resource available to many systems is the experience and knowledge of **water system personnel.** Because distribution system operations and configuration are not always well documented, experienced operations personnel can provide valuable insights to the site selection process.

Step 2: Identify Near Entry Point Standard Monitoring Sites

Data from sites near the entry points to the distribution system represent minimum residence time and can be used as a baseline for interpreting changes in water quality as water travels through the system. EPA recommends that you use the following procedure to select near entry point standard monitoring sites.

Step 2a. Determine How Many Near Entry Point Sites You Need for Standard Monitoring

Determine how many near entry point standard monitoring sites you are required to have by referring to the ***Standard Monitoring Requirements - Attachment*** sheet in Chapter 2. Remember that IDSE monitoring requirements (i.e., the number of monitoring sites and sampling frequency) are based on the population served by your individual system, not the largest population in your combined distribution system. Note the special requirements for small consecutive systems to monitor at their consecutive system entry point.

Step 2b. Determine How Many Entry Points are in Your System

For the purposes of the IDSE, entry points are the locations where disinfected water enters your distribution system. Entry points can convey treated surface water, disinfected water from wells, or purchased water from a wholesale system (as long as it has been disinfected). Entry points generally include seasonal or intermittent connections. If a well is not disinfected or is disinfected using ultraviolet light (UV) only, you should not consider it an entry point for the purposes of the IDSE.

Step 2c. Compare Results from Step 2a to Step 2b

- If the number of near entry point sites required matches the number of entry points in your system, select a standard monitoring location near each entry point.

- If your system has FEWER entry points than required near entry point standard monitoring locations, you **must** replace the unassigned near entry point sites with high TTHM and HAA5 standard monitoring sites to maintain the required total number of standard monitoring sites for the IDSE. If you have an odd number of unused near entry point sites, select an additional high TTHM site. See Example 7.1 for how a hypothetical system used this procedure to replace near entry point sites with high TTHM and high HAA5 sites for standard monitoring.

Example 7.1 System with Fewer Entry Points than Required Near Entry Point Standard Monitoring Sites

A system has one surface water source and serves 260,000 people. According to the ***Standard Monitoring Requirements - Attachment*** sheet in Chapter 2, the system must select 4 near-entry point sites, 6 average residence time sites, 8 high TTHM sites, and 6 high HAA5 sites. However, the system has only one source with one entry point. This system must select its 1 near entry point site. Then it must replace the remaining 3 near entry point sites as follows: 2 high TTHM sites and 1 high HAA5 site. The system must therefore collect a total of 10 high TTHM sites, 7 high HAA5 sites, and 6 average residence time sites to go along with its 1 near entry point site.

- If your system has MORE entry points than required near entry point standard monitoring locations, you **must** take samples near entry points to the distribution system having the highest annual water flows.

  Annual flows may be calculated based on measured flows if your system has a flow meter for each entry point location, pump or hour meter records, or other means. If you have a totalizing flow meter at an entry point, you may use the most recent year's readings from each meter if the measurements are representative of normal operating conditions. For entry points where a totalizing water meter is not available, you may use pump records or other water meter records to estimate the annual flow. You should begin by determining the average daily flow for each entry point. Then multiply the average daily flow at each entry point by the number of days that the entry point was in use to determine the annual flow. See Example 7.2 on the next page for how a hypothetical system used this procedure. Consecutive systems may need to check with wholesalers or check records of billings/deliveries from wholesalers.

The Stage 2 DBPR does not define near entry point sites explicitly. EPA recommends that you locate your near entry point sites ***between the entrance to the distribution system and no later than first customer***. If you are a consecutive system, a sample tap at the master meter would be an appropriate near entry point site. If you do not have a sample tap at your master meter, consider using the first customer as your near entry point site.

Example 7.2 System with More Entry Points than Required Near Entry Point Sample Sites

A system has two ground water sources and serves 15,000 people. According to the ***Standard Monitoring Requirements - Attachment*** sheet in Chapter 2, the system must select 1 near entry point site. For the most recent year, approximately 70 percent of the system's water came from Well A and the remaining 30 percent came from Well B. This system should locate its near entry point site near Well A because this source has the higher annual flow.

Step 3: Identify Candidate Average Residence Time Sites

Average residence time is the average age of water delivered to customers in a distribution system. Average residence time is *not* simply one-half the maximum residence time. Ideally, it should be a flow-weighted or population-weighted estimate. EPA recognizes that locating average residence time sites can be complex. A system map, used in conjunction with disinfectant residual data and possibly hydraulic modeling (if available) can help you to identify areas that represent average water age.

EPA recommends that you use tools and data sources available to select **at least twice** as many candidate average residence time sites as required for standard monitoring. You may want to map and color-code your candidate sites as you select them to ensure that your distribution system is fully represented. Later, you can use additional criteria to select the most representative standard monitoring sites from these candidate sites (see Step 7).

Step 3a: Use a Hydraulic Model or Tracer Study Data, if Available

One of the best ways to identify candidate average residence time sites is by using a hydraulic model. If run in extended period simulation mode, the model should be able to provide estimates of typical residence time for each node in the model. See Chapter 6 for more information on estimating residence time using hydraulic models. Also refer to Step 1 for cautions on using model results.

A tracer study can provide a snapshot of water age at different locations in your distribution system. You can use tracer study results along with information on population density and locations of large users (see Step 3c) to identify the average residence time of water in your distribution system. Remember, though, that tracer studies done in the past may no longer be representative of your system.

Step 3b: Examine Disinfectant Residual Data

You can identify approximate average residence time locations in your distribution system by calculating the **average disinfectant residual concentration** in your system and identifying sites with residual concentrations near the average. When calculating average disinfectant residual, it is important that you 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 you have booster disinfection, then residual data collected after those locations will skew this analysis. That data should be omitted.

See the guidelines in Exhibit 7.4 for using disinfectant residual data. If you believe that your residual data correlates well with water age, you can use the following analysis to help identify sites with average residence time (also see Example 7.3):

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 systems 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.

Exhibit 7.4 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 system. You may want to use only data from TCR sites, since these sites should be geographically representative of your system. 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 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.

Example 7.3 Average Disinfectant Residual Calculation

A system 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 system as a whole are calculated as shown. Note that sites #2, #3, and #9 have average chlorine residual concentrations close to the system average. These sites are good candidate average residence time sites.

Site ID	Monthly Average (mg/L)			Site Average (mg/L)
	Jun	Jul	Aug	
#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 Ave	**0.8**	**0.8**	**1.0**	**0.9**

Step 3c: Use Billing Records and a Map or Schematic

You can use billing records and information on population density, together with a map of your system, to rule out locations for average residence time sites. You should examine your customer billing records to determine where your 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 population will likely have high water age and will also not be good candidates for average residence times. You should consider the locations of storage tanks and the sizes of distribution system mains to the extent possible.

If your system does not have any large individual customers, you should consider locating your candidate sites in moderately developed areas in the approximate geographic center of the distribution system.

Step 4: Identify Candidate High TTHM Sites

It is not the intent of IDSE monitoring to identify sites with maximum daily or hourly TTHM concentrations. Instead, you should choose candidate sites to represent areas of the distribution system where you expect to find the highest TTHM levels throughout the year.

In general, **higher water temperatures** and **increased water age** lead to higher TTHM concentrations in distribution systems. Exhibit 7.5 provides typical characteristics of high TTHM sites, and Appendix A provides additional background information on TTHM formation.

Steps 4a through 4c below discuss how different types of data can be used to select candidate high TTHM sites. Each tool and data source has its own limitations; EPA recommends that you use all of the tools and data sources available to select **at least twice** as many candidate high TTHM sites than required for standard monitoring. Later, you will use additional criteria to select the best standard monitoring sites from these candidate sites and determine whether all standard monitoring sites are representative of the entire distribution system (see Step 7). You may also want to map and color-code your candidate sites as you select them to ensure that your distribution system is fully represented.

Exhibit 7.5 Typical Characteristics of High TTHM Sites

High TTHM sites are often located
- hydraulically downstream of storage facilities and booster disinfection
- in hydraulic dead-ends, where flow of water is low or stagnant
- near the ends of the distribution system, at or before the last group of customers

Sample sites should <u>not</u> be located
- at a dead-end where there are no customers.
- prior to booster disinfection with chlorine
- after the last hydrant or blow-off point

Step 4a: Use a Hydraulic Model or Tracer Study Data, if Available

Calibrated, system specific hydraulic models can be very useful in identifying locations of maximum water age that would be good candidate high TTHM sites. If run in extended period simulation mode, the model should provide estimates of typical residence time for each node in the model. You should select candidate sites near the nodes with the longest residence times, provided that they are prior to the last fire hydrant and before or at the last group of customers. Chapter 6 of this guidance manual provides more details on estimating residence time using hydraulic models. Also refer to Step 1 for cautions on using model results.

A tracer study can provide a snapshot of water age at different locations in the distribution system. The locations with highest water age typically should make good candidate high TTHM sites. Remember, though, that tracer studies done in the past may no longer be representative of your system.

Step 4b. Use Residual Disinfectant Data

Low disinfectant residuals relative to the system average may indicate longer residence times, and may correlate with higher TTHM concentrations. Because disinfectant residuals typically decay faster during the summer, a review of data from the summer months may be useful in identifying areas with consistently low residuals that are good candidate high TTHM sites. You should evaluate residual data with caution, however, because disinfectant residual decay can be caused by factors other than water age (e.g., corrosion, bacteriological activity). See Exhibit 7.4 for guidelines on using disinfectant residual data as indicators of water age.

When booster disinfection is applied, the disinfectant residual will increase despite advanced water age. TTHM levels are likely to increase after a booster disinfectant is applied due to the greater concentration of disinfectant available for reaction with DBP precursors. Therefore, if your system practices booster disinfection, you should locate high TTHM standard monitoring sites after booster disinfection is applied.

Step 4c: Use a Map or Schematic and Infrastructure Data

If your system practices booster disinfection, you should locate candidate sites downstream of your booster disinfection stations.

If your system has storage tanks or reservoirs, you should locate candidate high TTHM sites hydraulically downstream of those tanks. Storage facilities in a distribution system increase water age. During tank drain cycles, water age immediately downstream of a storage facility may be significantly (e.g., several days or more) older than "fresh" water upstream of the storage facility. As a result, areas of a distribution system receiving water that has been stored may have higher TTHM concentrations than areas that do not receive any stored water.

You should also locate candidate sites near dead ends, particularly those that are on smaller lines, far from major transmission lines. Sparsely populated residential areas can be good candidate sites for high TTHM. However, be sure to locate the candidate sites before or at the last group of customers on a dead end line. Samples taken at the very end of a dead end line are not representative of the water received by customers.

Step 5: Identify Candidate High HAA5 Standard Monitoring Sites

As with high TTHM standard monitoring sites, it is not the intent of IDSE monitoring to identify sites with maximum daily or hourly HAA5 concentrations. Instead, you should choose high HAA5 standard monitoring sites to represent areas of the distribution system where you expect to find the highest HAA5 levels throughout the year.

Higher temperatures and increased residence time can lead to higher HAA5 concentrations. However, microorganisms can consume HAA5, causing levels to decrease. This is know as ***biodegradation.*** Biodegradation is more likely to occur when disinfectant residual levels are low or non-existent, particularly in warmer months. Therefore, high HAA5 sites may be located closer to the entrance to the distribution system rather than locations with very high water age. See Appendix A for more information on HAA5 formation.

Steps 5a through 5e below discuss how different types of data can be used to select candidate high HAA5 sites. Each tool and data source has its own limitations. EPA recommends that you use all of the tools and data sources available to select **twice** as many candidate high HAA5 sites than required for standard monitoring. Later, you will use additional criteria to select the best standard monitoring sites from these candidate sites (see Step 7). You may also want to map and color-code your candidate sites as you select them to ensure that your distribution system is fully represented.

Remember that high HAA5 sites must be *different* from high TTHM sites for IDSE standard monitoring.

Step 5a: Review Historical HAA5 Data to Identify Trends

One way to determine if HAA5 biodegrades in your system is to examine Stage 1 DBPR monitoring or other HAA5 data. You should evaluate the data over time at different locations in the distribution system to look for trends. Consider evaluating your data to answer the following questions:

- Are the highest HAA5 values typically in the summer months?
- Are the highest HAA5 values at maximum residence time locations?
- Do the highest HAA5 generally occur at the same time of year and locations as high TTHM values?

If you answered **"yes"** to all of these questions, it is unlikely that you are experiencing biodegredation of HAA5 at your existing monitoring sites. If you answered **"no"** to any of these questions, HAA5 compounds may be degrading in your system due to biological activity. In this case you should focus on selecting sites with lower water age compared to sites you selected for high TTHM. It is important that you also evaluate disinfectant residual data and microbiological monitoring data (e.g., HPC data), if available, to determine whether a monitoring location is appropriate.

Step 5b. Use a Hydraulic Model or Tracer Study

Calibrated, system specific hydraulic models can be very useful for identifying locations of maximum residence time. If run in extended period simulation mode, the model should provide estimates of typical residence time for each node in the model. Chapter 6 of this

guidance manual provides more details on estimating residence time using hydraulic models. Also refer to Step 1 for cautions on using model results.

You should consider selecting high HAA5 candidate sites near the nodes with the longest residence times, provided that they are prior to the last fire hydrant and before or at the last group of customers. You should examine chlorine residual data and HPC data if available to ensure that these locations are not susceptible to biodegradation (see Steps 5c and 5d). However, if you have determined that biodegradation is occurring in your distribution system in step 5a, you should focus on sites with lower water age.

A tracer study can provide a snapshot of water age at different locations in the distribution system. The locations with highest water age typically should make good candidate sites, unless disinfectant residual levels are too low. Remember, though, that tracer studies done in the past may no longer be representative of your system.

Step 5c. Use Residual Disinfectant Data

Low disinfectant residuals relative to the system average may indicate longer residence times, and may correlate with higher HAA5 concentrations (unless biodegradation is occurring in the distribution system as discussed in step 5a). Sites with very low or non-existent residuals, however, are more likely to have biodegradation of HAA5 and would not be good candidate high HAA5 sites.

You should ***not*** select high HAA5 sites in locations that regularly or in the summer months have free chlorine residuals less than 0.2 mg/L or with chloramine residuals less than 0.5 mg/L.

Because disinfectant residuals typically decay faster during the summer, a review of data from the summer months may be useful in identifying areas with consistent disinfectant residuals that are good candidate high HAA5 sites. You should consider locating candidate high HAA5 sites where disinfectant residuals are less than the system average, but still regularly above 0.2 mg/L for free chlorine systems and above 0.5 mg/L for chloramine systems.

When booster disinfection is applied, the disinfectant residual will increase despite advanced water age. HAA5 levels are likely to increase after a booster disinfectant is applied due to the greater concentration of disinfectant available for reaction with DBP precursors and decreased potential for biodegradation. Therefore, if your system practices booster disinfection, you should locate high HAA5 standard monitoring sites after booster disinfection is applied.

Step 5d. Use Heterotrophic Plate Count Data, if Available

In addition to disinfectant residual data, HPC data can be extremely useful for identifying areas in your distribution system that are biologically active. If locations in the distribution system have high HPC levels compared to other locations (particularly in the summer months), they should be excluded as candidate high HAA5 sites.

Step 5e. Use a Map or Schematic and Infrastructure Data

Geographic locations for high HAA5 sites depend on whether your system experiences biodegredation in the distribution system. See Step 5a for guidance on evaluating historical HAA5 data for trends, and Steps 5c and 5d to evaluate other data to assess the potential for biodegredation.

If you **do not** believe that HAA5 biodegrades in your system, follow the same general guidelines for locating high TTHM sites for locating high HAA5 sites (see *Step 4c*). If you **do** believe that HAA5 biodegrades in your system, you should consider locating HAA5 sites in areas with lower water age in the center regions of your system where you maintain high disinfectant residuals.

Step 6: Plot Sites on a Distribution System Map

A key step in selecting standard monitoring sites from candidate sites is plotting all candidate sites on a map of your distribution system. If you have not already done so, locate all Stage 1 DBPR compliance monitoring locations, near entry point sites, and candidate average residence time, high TTHM, and high HAA5 sites on your water distribution map. Consider color coding the sites by the site type.

As noted in Step 1, your map should also contain the system attributes that will be useful in identifying representative standard monitoring sites, such as:

- Layout of pipes
- Storage facilities
- Pumping stations
- Booster disinfection stations
- Pressure zone boundaries

If possible, your map should also include the location of large water users, areas of significant development, and areas with relatively few customers.

Step 7: Select Standard Monitoring Sites from Candidate Sites

As described in the previous sections, various data sources and tools can be used to identify standard monitoring sites. If you followed the recommended procedures, you should have more candidate sites than are required for standard monitoring. This will allow you to select a final set of standard monitoring locations that represents the entire distribution system, considering the whole picture in addition to the specific characteristics you examined in steps 3 through 6. *How should you prioritize the data and combine data sources and tools to select standard monitoring sites?* This section addresses this question by providing general guidelines for (1) evaluating sites and determining if they meet expectations, and (2) narrowing down the candidate sites to standard monitoring sites. Remember that you must write a justification for each standard monitoring site and a summary of data considered (see Step 8), to be included in

your IDSE standard monitoring plan. You may want to consider how you will write your justifications as you examine your candidate sites.

You should always visually confirm that standard monitoring sites, in combination with existing Stage 1 DBPR monitoring sites, provide geographic coverage of the distribution system. You should also visually confirm that standard monitoring sites are in expected areas of high and average residence time (as predicted by a hydraulic model or other data source). You should confirm that you are not missing key areas that may not have been sampled in the past. If you have GIS capabilities, queries can be extremely useful in automating the site selection process. Experienced systems operations personnel can provide valuable input during this process.

The following are general guidelines for choosing standard monitoring sites from the list of candidate sites identified.

Step 7a. Evaluate Sites. Do They Meet Expectations?

The purpose of this step is to confirm that your candidate sites cover key areas and to add candidate sites if appropriate. The following questions may be useful as you evaluate all candidate sites together on the map:

- Are candidate high TTHM sites located in the extremities of the distribution system?
- Are candidate high TTHM sites generally downstream of storage facilities and booster disinfection stations (if booster disinfection is practiced)?
- Are candidate high HAA5 sites in areas where you can regularly maintain disinfectant residual levels greater than 0.2 mg/L for chlorine and 0.5 mg/L for chloramine?
- Are there any other areas where you suspect water age is high that are not represented by a candidate high TTHM (and possibly high HAA5) site?

Step 7b. Select Standard Monitoring Sites

Now that you have plotted the candidate sites on the map, you will need to choose the best locations to represent each type of site. The following issues should be considered when making these choices:

- **Look for geographic representation**. Select sites that are geographically diverse from the other standard monitoring sites and existing Stage 1 compliance monitoring locations. EPA recommends that you locate at least one of the high TTHM standard monitoring sites in a remote area of the distribution system. If your distribution system contains hydraulically isolated portions, you should represent as many of these as possible with at least one standard monitoring site. If you are only required to select one high TTHM site, it is strongly recommended that you locate this site far

away from the treatment plant, near the last group of customers (but prior to the last fire hydrant).

- **Look for hydraulic representation**. Select standard monitoring sites in hydraulically different areas. Even if sites are geographically near each other, they may represent different pressure zones. You should also select sites that represent mixing zones if multiple sources with different water quality characteristics are used.

- **Use sites that "multi-task."** Prioritize sites that meet the multiple siting criteria and those identified based on more than one data source. For example, a candidate high TTHM site that has low disinfectant residual, is near the edge of the distribution system and is downstream of a tank would be an excellent standard monitoring site.

- **Consider site access**. Select standard monitoring sites for which access will not be an issue. Sites should remain accessible over the long term.

- **Use existing TTHM and HAA5 monitoring data to prioritize choices**. If you have more than enough sites in a given area of the distribution system and no other data favors one over the other, use existing TTHM or HAA5 monitoring results (if available) to prioritize sites. For example, if disinfectant residual data are the same for three sites over the same periods, then the DBP data can be used to select a high TTHM or HAA5 standard monitoring site. Remember that you *cannot* use Stage 1 DBPR compliance monitoring sites as standard monitoring sites.

Step 8: Write Justifications and a Summary of Data

Your final steps in selecting standard monitoring sites are to write a justification for each site and write the summary of data you used to justify your site selection.

Step 8a. Write Justification for Each Standard Monitoring Site

You **must** write a justification for **each standard monitoring site**. Justifications should document the key site characteristics that led you to select the site for standard monitoring. They should be brief, but as specific as possible. Some characteristics you should consider including in your justifications are as follows:

- Pipe size, or range of pipe sizes in the area
- Relationship to storage facilities
- Estimated water age, if available
- Source of water (if the distribution system is served by more than one source)
- Range of disinfectant residual concentrations (if lower in the summer, provide summer values)
- For HAA5 sites, range of HPC levels, if available

Not all systems will have all data types in this list; include the information that is available to your system in your justification. Hypothetical examples of justifications for each type of standard monitoring site are below. Additional examples of justifications are provided in Appendices H and I of this guidance manual and in the EPA manual, *Initial Distribution System Evaluation Guide for Systems Serving < 10,000 People*.

- *<u>High TTHM site:</u> This site is served by our surface water source and is at the end of one of our pressure zones. It is hydraulically downstream of Tank X, one of our largest storage facilities. The site is a gas station in a residential area with predominantly 4 and 6 inch pipes. Chlorine residuals at this site are below system average, ranging from 1.2 to 1.5 mg/L in the summer.*

- *<u>High HAA5 site:</u> 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).*

- *<u>Average residence time site:</u> This site is in the geographic center of Pressure Zone 2 and has a chlorine residual level close to the system average (1.5 mg/L).*

- *<u>Near entry point:</u> This site is our finished water sampling location for Surface Water Treatment Plant X. We have more entry points than required near entry point sites, so we selected this entry point because it has the highest average daily flow compared to our other sources.*

Step 8b. Write a Summary of Data

You **must** provide a summary of data you relied on to justify standard monitoring location selections. You should describe the water quality data you reviewed, map features you considered, ranges of relevant water quality data, and water sources and seasonal operations if applicable, and tools you used to select your standard monitoring sites. An example summary is provided below. Additional examples of data summaries are provided in Appendices H and I of this guidance manual and in the EPA manual, *Initial Distribution System Evaluation Guide for Systems Serving < 10,000 People*.

> *We used our up-to-date water distribution system map to plot data and select sites. Our map shows locations and sizes of all pipes, storage tanks, booster pumping stations, and sources. We noted the location of large users and new developments. We analyzed disinfectant residual collected at TCR sites in 2004 and 2005 and plotted average concentrations from the summer months on our map. Summer disinfectant levels ranged from 2.5 mg/L at the plant to 0.3 mg/L in the distribution system. The distribution system average was between 0.9 and 1.1 mg/L. We also indicated average TTHM and HAA5 concentrations for our Stage 1 DBPR sites for 2005 data. TTHM concentrations ranged from 0.035 mg/L through 0.085 mg/L and HAA5 concentrations ranged from 0.015 mg/L through 0.037 mg/L.*

We reviewed our tank level data and determined average water age inside the tank to help identify areas with higher water age. We have some water age information from a tracer study of our distribution system done in 1995. We have estimated the highest water age in the distribution system to be approximately 4.5 days. We also highlighted two problem areas that our operations staff say are places where we get repeat customer complaints and low residuals.

7.1.2 Selecting Your Peak Historical Month and Determining Standard Monitoring Schedule

Determining Peak Historical Month

The Stage 2 DBPR defines the peak historical month as the month with the highest TTHM or HAA5 levels or the warmest water temperature. It is meant to represent "worst case" conditions when DBPs are the highest. You **must** review available compliance, study, or operational data to determine the peak historical month for TTHM or HAA5 levels or warmest water temperature. You can use **Worksheet 7.1** on the next page to determine your peak historical month.

In some cases, you may find data in addition to TTHM, HAA5, and temperature data helpful in selecting your peak historical month. As described in Appendix A, key factors affecting TTHM and HAA5 formation are **temperature**, **water age**, and concentration of **DBP precursors** (i.e., organic compounds that react with disinfectants to produce DBPs). Some systems may regularly see an increase in total organic carbon (TOC) levels in the spring or fall. If your TTHM and HAA5 monitoring does not capture a seasonal increase in TOC, you may want to consider the month with highest TOC when selecting your peak historical month.

Seasonal changes in water age in your distribution system can be another influencing factor in determining the worst-case conditions when DBPs are the highest. For example, some systems may experience a decrease in peak usage in the fall, thereby increasing residence time in the distribution system. The water temperature in the fall may not be as high as it was in the summer months, but it still may be relatively high, such that increased residence time significantly increases TTHM and HAA5 formation. In this scenario, you should consider water age when selecting your peak historical month.

If you based the selection of your peak historical month on data other than TTHM, HAA5, and temperature, you should document the basis for selection in your IDSE standard monitoring plan.

Worksheet 7.1 Selecting the Peak Historical Month

A. Do you have more than one water source (e.g., treatment plant or consecutive system entry point) in your system? ☐ Yes ☐ No

*If **Yes***, you should identify the source associated with the highest TTHM and HAA5 levels in your system based on your Stage 1 DBPR monitoring data. You should use data from this source for selecting your peak historical month. Continue to STEP B

*If **No***, continue to STEP B

B. Do you have monthly or quarterly TTHM and HAA5 data? ☐ Yes ☐ No

*If **Yes***, you should determine in which month your TTHM and HAA5 levels are the highest.

What if the highest TTHM and/or HAA5 levels occur at different times during different years? You should choose the year of data that is most representative of typical system operating and weather conditions.

What if the highest TTHM and HAA5 levels occur in different months? You should consider which contaminant is of more concern. If one contaminant clearly shows a higher overall trend and is closer to the MCL, you should choose the month in which that contaminant is highest.

Choose the month with the highest TTHM and HAA5 levels as your peak historical month. *Stop here.*

*If **No***, continue to STEP C

C. Use temperature data to select your peak historical month

Calculate the average water temperature for each summer month to identify the month of warmest water temperature. If available, use data from several years to determine when the warmest water temperature occurs. If warmest temperature occurs in different months in different years, select the year(s) that are most typical of climatological and water quality data and water use for your region.

Remember, in your standard monitoring plan you should indicate the source used to select your peak historical month and the basis for selecting it (high TTHM, high HAA5, and/or temperature)

Determining Standard Monitoring Schedule

You **must** take one round of standard monitoring samples during the peak historical month. If you serve more than 499 people, you must also conduct sampling at equal intervals before and/or after the peak historical month, based on your required sampling frequency. You can find your required sampling frequency on the ***Standard Monitoring Requirements - Attachment*** sheet in Chapter 2. Be sure to plan your monitoring so that all sampling is complete by the deadline on your requirements summary sheet in Chapter 2.

The intent of the required time interval is to ensure that samples represent the quality of water over an extended period and do not over-emphasize either high or low concentrations of TTHM or HAA5 that may occur seasonally. For example, a system on quarterly monitoring could sample in the **third full week of every third month**. You should keep in mind holidays and sampling schedules for other water quality programs when determining your standard monitoring schedule.

7.1.3 Preparing Your Standard Monitoring Plan

Every system that conducts IDSE standard monitoring **must** prepare and submit an Standard Monitoring Plan. You should submit the plan to the Information Processing and Management Center (IPMC) for review by EPA or your state. See Section 1.4 of this guidance manual for information on how to submit your plan to the IPMC.

EPA has developed a **Standard Monitoring Plan Form (Form 6)**, presented in this section and available electronically as part of the **IDSE Tool.** You are not required to use this form; however, if you choose not to use it, refer to Exhibit 7.1 on page 7-3 for a list of the minimum elements you must include in your standard monitoring plan.

The IDSE Tool creates a custom form for your system and provides links to technical guidance from this manual. The tool is available on EPA's website at http://www.epa.gov/safewater/disinfection/stage2.

Your deadlines for submitting your standard monitoring plan and conducting standard monitoring can be found on your requirements summary sheet in Chapter 2. If EPA or your state does not approve or request modifications to your plan, or notify you that your plan is still under review **within 12 months** after the deadline for plan submission, **you may consider the plan approved**.

The standard monitoring plan form includes the following sections:

I. General Information
II. IDSE Requirements
III. Selecting Standard Monitoring Sites
IV. Justification of Standard Monitoring Sites
V. Peak Historical Month and Standard Monitoring Schedule
VI. Planned Stage 1 DBPR Compliance Monitoring Schedule
VII. Distribution System Schematic
VIII. Attachments

Sections of the form with an asterisk (*) are required by the Stage 2 DBPR. Examples of completed standard monitoring plans using this form are provided in Appendices H and I of this guidance manual and in the EPA manual, *Initial Distribution System Evaluation Guide for Systems Serving < 10,000 People*. The rest of this section provides guidance on the completion of this form.

I. General Information

I.A. PWS Information* - Important definitions for classifying your system are provided in the **definitions section** at the beginning of this guidance manual. If you have any questions on this section, contact EPA or your state.

PWSID - Enter your PWSID identification number here. This number is typically assigned by your state.

PWS Name - Enter the name of your system here.

PWS Address - Enter the primary mailing address for your water system here.

Population Served - Enter the number of people served by your PWS. Remember, this is your RETAIL population served, not including the population served by consecutive systems that purchase water from you.

System Type - Put a check mark in the appropriate box to identify whether your system is a CWS or a NTNCWS. Definitions for CWS and NTNCWS can be found in the **definitions section** at the beginning of this guidance manual.

Source Water Type - Put a check mark in the appropriate box to identify whether your system is a subpart H system or a ground water system. If you use any surface water or GWUDI as a source, mark the subpart H box. Definitions for subpart H system (including GWUDI) and ground water system can be found in the **definitions section** at the beginning of this guidance manual.

Buying/Selling Relationships - Put a check mark in the appropriate box to identify whether your system is a consecutive system, a wholesale system, or neither. If

you are both a consecutive and wholesale system (e.g., you buy and sell water), check both boxes. Definitions for consecutive system and wholesale system can be found in the **definitions section** at the beginning of this guidance manual and in **Appendix D**.

I.B. Date Submitted* - Enter either the date that you are submitting the form electronically, putting it in the mailbox, or dropping it off with an express delivery service. Be sure to submit your standard monitoring plan before the deadline found on your requirements summary sheet.

I.C. PWS Operations - This section asks questions about your system to help inform EPA and state personnel during the plan review process.

Residual Disinfectant Type - Put a check mark in the appropriate box to identify the type of disinfectant you most often use **to maintain a residual in your distribution system** (not necessarily the same disinfectant used for primary disinfection at the treatment plant). If you use chloramine but switch to free chlorine for a short time, you should still check chloramine only. If you use chloramine and chlorine regularly in your system (e.g, 4 months of free chlorine and 8 months of chloramines), check both chlorine and chloramine. If you maintain your residual with a disinfectant other than chlorine or chloramines (e.g., chlorine dioxide), you should place a check next to the box marked "Other" and enter the type of disinfectant you use in the blank next to "Other".

Number of Disinfected Sources - Enter the total number of sources that deliver disinfected water to your distribution system. If you connect to a single wholesale system at a number of locations in your distribution system, consider this one source. Multiple wells that are disinfected at a common treatment plant should also be considered one source. Do not count wells that are not disinfected or are disinfected by UV only.

I.D. Contact Person* - Enter the contact information of the person who is submitting the form. This should be the person who will be available to answer questions from EPA and/or state reviewers.

II. IDSE Requirements*

II.A Number of Sites - Refer to the ***Standard Monitoring Requirements - Attachment*** sheet in Chapter 2. Copy the numbers from the "IDSE Standard Monitoring Requirements" table that correspond to your source type and the population served by your system.

Note that you may need to adjust the number of each site type if you have fewer entry points than required near entry point sites (see Step 1 in Section 7.1.1). This

adjustment should be reflected in your site selection and justification in Section IV. Your total should always be the same.

II.B. Schedule - Enter the schedule for your system based on the **letter** sent to you from
EPA or your state. See Chapter 2 for more information on the letter.

II.C. Standard Monitoring Frequency - Refer to the ***Standard Monitoring Requirements Attachment*** sheet in Chapter 2. Locate the monitoring frequency from the "IDSE Standard Monitoring Requirements" table that corresponds to your source type and the population served by your system. Put a check mark in the box corresponding to that monitoring frequency.

III. Selecting Standard Monitoring Sites

III.A. Data Evaluated - Put a check mark in each box corresponding to the data that you used to select each type of standard monitoring site. Water quality data may be compliance data or operational data.

III.B. Summary of Data* - In the space provided (or in an attached writeup), provide a summary of the data you used to justify your site selection. See Step 8b in Section 7.1.1 of this manual for guidance.

IV. Justification of Standard Monitoring Sites* Enter the site ID from the distribution schematic, site type (whether it is near an entry point, average residence time, high TTHM, or high HAA5), and justification. Justification for each standard monitoring site should include the system characteristics that led you to choose it as a standard monitoring site. See Step 8a in Section 7.1.1 of this manual for guidance. If you have fewer near entry points than required near entry point monitoring locations, be sure to replace the extra near entry point sites with high TTHM or high HAA5 sites.

Note that there is only space for 8 monitoring sites on this sheet. If you are a ground water system serving more than 499,999 people or a subpart H system serving more than 49,999 people you are required to monitor at more than 8 sites. Therefore, you will need to attach additional sheets.

V. Peak Historical Month and Proposed Standard Monitoring Schedule

V.A. Peak Historical Month* - Enter the month that you determined to be your peak historical month. See Section 7.1.2 and **Worksheet 7.1** for guidelines on selecting your peak historical month.

V.B. If Multiple Sources, Source Used to Determine Peak Historical Month - If your system has only one source, write "N/A" here. If you have more than one source, write the name of the source you used as the basis for determining peak historical

month. For example, if a system has one surface water, one ground water, and one purchased ground water source, it is likely that they relied heavily on data from the surface water source to select their peak historical month. This system would write "surface water source" in the blank provided.

V.C Peak Historical Month Based On* - Put a check mark in the appropriate box to identify the basis for determining your peak historical month. If your peak historical month is supported by more than one parameter (e.g., peak historical month is month of high TTHM and maximum temperature), check each box that applies. If you used data other than TTHM, HAA5, and temperature data to select your peak historical month (e.g., you used TOC data and/or water age data), describe how you used additional data here.

V. D. Proposed Standard Monitoring Schedule* - Enter the ID for each standard monitoring site in the table (verify that these match the IDs you enter in Section IV and on your schematic). Enter your proposed sampling schedule for the number of monitoring periods identified in Section II.C. The entry can be a specific date or week and can be in a number of different formats. For example:

- 7/9/07
- 2nd week in Nov '07
- Week of 7/9/07

Remember that at least one monitoring period must be during the peak historical month identified in Section V.A. Note that there is only space for 8 monitoring sites on this sheet. If you are a ground water system serving more than 499,999 people or a subpart H system serving more than 49,999 people you are required to monitor at more than 8 sites. Therefore, you will need to attach additional sheets.

VI. Planned Stage 1 DBPR Compliance Monitoring Schedule* Enter the projected sampling schedule for the number of Stage 1 DBPR monitoring periods in which you will conduct Stage 1 DBPR monitoring during your IDSE standard monitoring. Verify that site IDs in this table match the IDs on your distribution system schematic. If you are required to monitor at more than 8 Stage 1 DBPR locations you will need to attach additional sheets. You may also want to attach your Stage 1 DBPR monitoring plan.

VII. Distribution System Schematic* Attach a distribution system schematic to your monitoring plan. Your schematic must include the locations of entry points, sources, storage facilities, standard monitoring sites, and Stage 1 compliance monitoring sites.

IDSE standard monitoring plans will not be considered confidential business information (CBI) and are subject to the Freedom of Information Act (FOIA). *Therefore, **your distribution system schematic should not contain information that poses a security risk to your system.*** EPA suggests that you consider one of the following options for submitting distribution system schematics:

- **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.

Schematics should be as clear and easy to read as possible. They should typically be submitted on a scale of between 1:4,000 and 1:8,000; however, larger-scale drawings are acceptable as long as systems components can still be clearly shown. All sizes from 8½ inches x 11 inches to larger, plan-sized sheets are acceptable. If electronic versions are submitted, use one of the following file types:

- Adobe PDF file (*.pdf)
- Microsoft Word (*.doc)
- WordPerfect (*.wpd)
- Image file (*.gif, *.bmp, *.jpg, *.jpeg)

VIII. Attachments Put a check mark in each of the boxes corresponding to any attachments that you have included in your report.

A distribution system schematic is required. Refer to Section VII for details.

Note that there is only space for 8 monitoring sites in Section IV and Section VI. If you are a ground water system serving more than 499,999 people or a subpart H system serving more than 49,999 people, you will need to attach additional sheets for Section IV and Section VI.

If you submit your standard monitoring plan electronically, you also have the option to submit attachments in hard copy. Include a note in your electronic standard monitoring plan explaining that attachments are being submitted in hard copy, and mail the hard copy to the IPMC mailing address in your Requirements Summary Sheet. The IPMC will match the hard copy submission with your electronic submission when it is received.

Enter the total number of pages in your monitoring plan (including attachments) in the blank at the bottom of this section. This will allow EPA or your state to ensure that all pages were received.

Form 6: Standard Monitoring Plan

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:
☐ CWS	☐ Subpart H	☐ Consecutive System
☐ NTNCWS	☐ Ground	☐ Wholesale System
		☐ 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: ___	☐ Schedule 1	☐ During peak historical month (1 monitoring period)
Avg Residence Time: ___	☐ Schedule 2	
High TTHM: ___	☐ Schedule 3	☐ Every 90 days (4 monitoring periods)
High HAA5:	☐ Schedule 4	☐ Every 60 days (6 monitoring periods)

Form 6: Standard Monitoring Plan

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*)

Form 6: Standard Monitoring Plan

IV. JUSTIFICATION OF STANDARD MONITORING SITES*

Standard Monitoring Site ID (from map)[1]	Site Type	Justification
	☐ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ☐ High HAA5	
	☐ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ☐ High HAA5	
	☐ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ☐ High HAA5	
	☐ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ☐ High HAA5	
	☐ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ☐ High HAA5	
	☐ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ☐ High HAA5	
	☐ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ☐ High HAA5	
	☐ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ☐ 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.

Form 6: Standard Monitoring Plan

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)

Form 6: Standard Monitoring Plan

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.

Form 6: Standard Monitoring Plan

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). **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**.
- ☐ Additional sheets for explaining how you used data other than TTHM, HAA5, and temperature data to select your peak historical month (Section V).
- ☐ 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**.
- ☐ 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

7.2 Conducting Standard Monitoring

Conducting standard monitoring is an integral part of the IDSE. The results of standard monitoring, along with the results of Stage 1 DBPR compliance monitoring, **must** be used to select the best sites for Stage 2 DBPR compliance monitoring and **must** be documented in your IDSE report.

Remember, you must submit your standard monitoring plan before you begin standard monitoring. If EPA or your state does not approve or request modifications to your plan, or notify you that your plan is still under review **within 12 months** after the deadline for plan submission, **you may consider the plan approved**. You must conduct standard monitoring according to the approved monitoring plan.

This section presents sampling requirements and tips for sample collection for conducting standard monitoring.

REMINDER: you must continue to collect samples and comply with the Stage 1 DBPR during the IDSE. Results from standard monitoring should **not** be used for making Stage 1 compliance determinations.

Your Requirements

You **must** conduct standard monitoring according to the schedule and at each of the monitoring locations listed in your standard monitoring plan. ***If you deviate from the approved plan for any reason*** (e.g., a site was not accessible on the planned week and you needed to sample during the next week), you must include an explanation for the deviation in your IDSE report.

During each sampling event, you must collect a **dual sample set** (i.e., two samples) at each location. One sample must be analyzed for TTHM and the other must be analyzed for HAA5. Two samples are required because the analytical methods used for the two groups of contaminants require different sample preservation methods. You must use EPA-approved methods for analysis of your TTHM and HAA5 samples. More information on EPA-approved methods can be found in Appendix C.

Tips for Sample Collection

As you conduct standard monitoring, you should keep in mind the following tips:

- **Use appropriate sample bottles.** You should use sample bottles that already contain the appropriate dechlorinating agent and preservative for sample collection. You should contact your lab for a recommended sampling and preservation protocol. A typical sampling protocol can be found in Appendix C.

- **Flush your sample tap.** If you collect samples from a tap, you should open the cold water tap and allow the line to flush until the water temperature has stabilized (usually about 3-5 minutes). If you collect a sample at a hydrant or blow-off, the flushing time only needs to be long enough to purge the connecting line to the main. The purpose of this step is to ensure the sample does not represent stagnant water that has been sitting for a long time in the water line between the street and the faucet. The sample should represent the water flowing through the distribution system at the chosen sampling point.

- **Collect cold water samples.** If you collect indoor samples you should collect them from a cold water line.

- **Collect additional water quality data.** You may wish to collect additional water quality data, such as disinfectant residual and temperature data, at the time of DBP sample collection. This information can be helpful as you interpret standard monitoring results (e.g., unusually low residual at a location could mean unusually high residence time).

- **Re-sample if a sample is lost or broken.** If a sample bottle is lost or broken after sample collection, you should re-sample as soon as possible after the loss occurs. Only the lost sample needs to be recollected, not the entire sample set that was collected together. Make sure to note the loss of sample and resample date as a deviation in your IDSE report.

If you need to change an IDSE standard monitoring sampling location for reasons beyond your control, or if you miss a required sampling period entirely, you should contact EPA or your state so they can approve your re-sampling strategy.

7.3 Selecting Stage 2 DBPR Compliance Monitoring Sites and Preparing the IDSE Report

Every system that conducts standard monitoring **must** use results from Stage 1 DBPR compliance monitoring and standard monitoring to select Stage 2 DBPR compliance monitoring sites. You must follow a **specific protocol**, as laid out in the Stage 2 DBPR, to select compliance sites unless you decide to recommend alternative Stage 2 compliance monitoring sites to your state or EPA.

You **must** include your monitoring results and recommended Stage 2 compliance monitoring sites in an IDSE Report. You should submit your IDSE report to the Information Processing and Management Center (IPMC) for review by EPA or your state. See Section 1.4 of this guidance manual for information on how to submit your plan to the IPMC.

This section presents the required protocol for selecting Stage 2 DBPR compliance monitoring sites and provides guidance for preparing an IDSE report.

EPA has developed an **IDSE Report for Standard Monitoring Form (Form 7)**, presented in Section 7.3.3 and available electronically as part of the **IDSE Tool.** You are not required to use this form; however, if you choose not to use it, refer to Exhibit 7.6 for a list of the minimum elements you must include in your IDSE report. Examples of completed reports can be found in Appendices H and I. The IDSE Tool is available on EPA's website at http://www.epa.gov/safewater/disinfection/stage2.


IDSE Tool

Exhibit 7.6 Required Elements of Your IDSE Report for Standard Monitoring

- Explanation of any deviations from approved standard monitoring plan
- TTHM and HAA5 analytical results from Stage 1 DBPR monitoring and IDSE standard monitoring
- Recommendations and justification of Stage 2 DBPR monitoring sites and sampling dates
- If changed from the approved standard monitoring plan:
  - Distribution system schematic
  - Population served by the system
  - System type (subpart H or ground water)

7.3.1 Selecting Stage 2 DBPR Compliance Monitoring Locations

You should begin the Stage 2 site selection process by calculating the locational running annual average (LRAA) for each standard monitoring site and Stage 1 DBPR compliance monitoring site. Note that because the duration for IDSE standard monitoring is one year, the LRAA for each standard monitoring site is equivalent to the average of all TTHM or HAA5 data collected at the location (either one, four, or six data points depending on your IDSE standard monitoring frequency). The LRAA for each Stage 1 DBPR compliance monitoring site should be the LRAA for the year that you conducted standard monitoring (either one or four data points depending on your Stage 1 compliance monitoring frequency). You should consider using a spreadsheet to store your data and calculate your LRAAs. You can also use **Worksheet 7.2** to help you organize your data

You must use the **site selection protocol in Exhibit 7.7** to select your Stage 2 compliance monitoring locations. The number of required Stage 2 compliance monitoring sites for your system can be found on page 2 of the **Standard Monitoring Requirements - Attachment** sheet in Chapter 2. If you complete all steps in the protocol and need additional compliance monitoring sites for the Stage 2 DBPR, repeat the protocol until the required number of sites has been selected. If you arrive at Step 3 or Step 7 and have no more Stage 1 DBPR sites from which to select, continue to the next step. Example 7.4 shows how a large system uses the protocol to select their Stage 2 compliance monitoring sites.

You may select alternate sites other than those identified using the protocol, but you **must justify** the alternate locations in your IDSE report. Additional factors that may prompt you to choose alternate sites are discussed below.

Additional Factors to Consider During Selection of Stage 2 Compliance Monitoring Sites

In general, TTHM and HAA5 LRAAs are the most important factors in site selection. However, the Stage 2 rule allows for some flexibility in this process. As you work through the site selection protocol, you should consider other factors that may lead you to select a site with a similar or slightly lower LRAA. If you do not use your highest TTHM and HAA5 LRAAs to select your Stage 2 compliance monitoring sites, you **must** provide justification for your selection in your IDSE report. The following conditions are possible reasons why you may select a site with a slightly lower LRAA over another site:

- The site provides more complete geographic coverage of the entire distribution system
- The site allows you to maintain a historical record
- Sampling at that site provides the opportunity to collect other water quality or operational data (e.g., chloramine systems may want to collect nitrate or nitrite data at that site)

EPA recognizes that a slight difference between LRAAs measured at two sites may not be meaningful given the normal variability that may occur at a site over time. As a result, the selection of a Stage 2 compliance monitoring site with a slightly lower LRAA may be acceptable if other factors, such as those listed above, favor the site with the lower LRAA. Examples 7.5 and 7.6 illustrate situations in which hypothetical systems might select Stage 2 DBPR compliance monitoring sites using criteria other than the site selection protocol.

It is possible that EPA or your state may not concur with your justification and may require you to select different Stage 2 compliance monitoring sites.

Worksheet 7.2 Stage 2 DBPR Site Selection Worksheet for Standard Monitoring

Instructions:

1) Enter the number of required Stage 2 DBPR compliance monitoring sites based on your ***Standard Monitoring Requirements - Attachment*** summary sheet from Chapter 2.

2) Enter the Site ID and LRAA for each IDSE standard monitoring and Stage 1 compliance monitoring location. You may want to sort your entries in order by TTHM LRAA or HAA5 LRAA values.

3) As you work through the site selection protocol in Exhibit 7.7, fill in the "Stage 2 Site Type" column each time you select a site to indicate whether the site is a high TTHM, high HAA5, Existing Stage 1 DBPR Compliance Monitoring Site, or selected using criteria other than the protocol.

No. of Stage 2 DBPR Compliance Monitoring Sites Required

_____Highest TTHM _____Highest HAA5 ____Existing Stage 1 _____TOTAL

Site ID	LRAA		Stage 2 DBPR Site Type*
	TTHM (mg/L)	HAA5 (mg/L)	
Example	*0.075*	*0.045*	*Highest TTHM*

* Enter Highest TTHM, Highest HAA5, or existing Stage 1 DBPR

Exhibit 7.7 Protocol for Selecting Stage 2 DBPR (Subpart V) Compliance Monitoring Sites

Steps[1] [required by rule]		Stage 2 Compliance Monitoring Sites Selected [2]
1	Select the location with the highest TTHM LRAA	1st highest TTHM site
2	Select the remaining location with the highest HAA5 LRAA	1st highest HAA5 site
3	For subpart H systems: Select the remaining existing Stage 1 DBPR average residence time compliance monitoring location with the highest HAA5 LRAA For ground water systems: Select the remaining existing Stage 1 DBPR maximum residence time compliance monitoring location with the highest HAA5 LRAA *Skip this step if you have no more Stage 1 DBPR sites*	1st Stage 1 DBPR site
4	Select the remaining location with the next highest TTHM LRAA.	2nd highest TTHM site
5	Select the remaining location with the next highest TTHM LRAA	3rd highest TTHM site
6	Select the remaining location with the next highest HAA5 LRAA	2nd highest HAA5 site
7	For subpart H systems: Select the remaining existing Stage 1 DBPR average residence time compliance monitoring location with the highest TTHM LRAA For ground water systems: Select the remaining existing Stage 1 DBPR maximum residence time compliance monitoring location with the highest TTHM LRAA *Skip this step if you have no more Stage 1 DBPR sites*	2nd Stage 1 DBPR site
8	Select the remaining location with the next highest HAA5 LRAA	3rd highest HAA5 site
*If you need more Stage 2 DBPR compliance monitoring locations, Go back to **Step 1** of this protocol and repeat the steps until you have selected the required number of total sites.*		

1. All steps are based on your calculated LRAAs for your standard monitoring sites and Stage 1 DBPR compliance monitoring sites. This means that your existing Stage 1 DBPR sites can be selected in steps *other than* 3 or 7. Stop when you reach your required number of Stage 2 DBPR compliance monitoring sites.
2. You cannot select the same site as a highest TTHM and a highest HAA5 compliance monitoring site.

Example 7.4 Selecting Stage 2 DBPR Compliance Monitoring Sites

A consecutive system serving 15,000 people has conducted standard monitoring for the IDSE. This system purchases disinfected ground water from a number of ground water systems drawing from the same aquifer. Based on state determination, the system has two Stage 1 DBPR compliance monitoring sites. According to the ***Standard Monitoring Requirements Attachment*** sheet in Chapter 2, the system must select the following **four** Stage 2 compliance monitoring sites from IDSE standard monitoring and Stage 1 DBPR sites:

- 2 highest TTHM sites,
- 1 highest HAA5 site, and
- 1 maximum residence time sites from the existing Stage 1 DBPR data.

The table below lists the TTHM and HAA5 LRAAs for the Stage 1 DBPR compliance monitoring sites and standard monitoring sites during the IDSE monitoring period.

Site Number and Description	TTHM LRAA (mg/L)	HAA5 LRAA (mg/L)
Stage 1 DBPR Compliance Monitoring Results:		
1 (Stage 1 max. residence time)	0.059	0.037
2 (Stage 1 max. residence time)	0.036	0.045
IDSE Standard Monitoring Results:		
3 (high TTHM)	0.058	0.031
4 (high TTHM)	0.052	0.034
5 (high HAA5)	0.051	0.042
6 (high HAA5)	0.047	0.038
7 (ave. residence time)	0.038	0.034
8 (near entry point)	0.021	0.015

Example 7.4 Selecting Stage 2 DBPR Compliance Monitoring Sites (cont.)

The system used the required protocol in Exhibit 7.7 to select their compliance monitoring sites.

Go to Step 1: Select the Highest TTHM LRAA Site

Site 1 has the highest TTHM LRAA and is selected as the first high TTHM site.

Go to Step 2: Select the Highest HAA5 LRAA Site

Site 2 has the highest HAA5 LRAA and has not already been selected. Therefore, **Site 2** is chosen as the first high HAA5 site.

Go to Step 3: Select the Stage 1 Maximum Residence Time Site with the Highest HAA5 LRAA

There are no remaining Stage 1 sites to select from. **Skip this step and go to Step 4.**

Go to Step 4: Select the Next Highest TTHM LRAA Site

Site 3 has the next highest TTHM LRAA and is therefore chosen as the next highest TTHM site.

Go to Step 5: Select the Next Highest TTHM LRAA Site

Site 4 has the next highest TTHM LRAA and is therefore chosen as the next highest TTHM site.

Final Inventory of Stage 2 DBPR Compliance Monitoring Sites*

Highest TTHM: Site 1, Site 3, Site 4 (3 sites)

Highest HAA5: Site 2 (1 site)

Existing Stage 1 DBPR Site (as described in Step 3): No sites

TOTAL Sites = 4

**Note that the requirements on the previous page are for 2 highest TTHM sites, 1 highest HAA5 site, and 1 maximum residence time site from existing Stage 1 DBPR data. However, because the two Stage 1 DBPR sample sites were the highest TTHM site and the highest HAA5 site, these sites were selected during the first two steps of the selection protocol. As a result, there were no remaining Stage 1 DBPR sites to choose from during Step 3. Step 3 was skipped and the remaining two Stage 2 compliance sites were chosen using Steps 4 and 5.*

Example 7.5 Maintaining a Historical Record

A ground water system serves 90,000 people and must select four Stage 2 compliance sites from standard monitoring and Stage 1 DBPR data. The system has already selected one highest TTHM site, one highest HAA5 site, and one Stage 1 maximum residence time site. The fourth site to be selected is a high TTHM site which must be selected from the IDSE standard monitoring and Stage 1 DBPR sites not yet selected for Stage 2 compliance monitoring. The table below lists three remaining high-TTHM sites among the IDSE standard monitoring and Stage 1 DBPR sites.

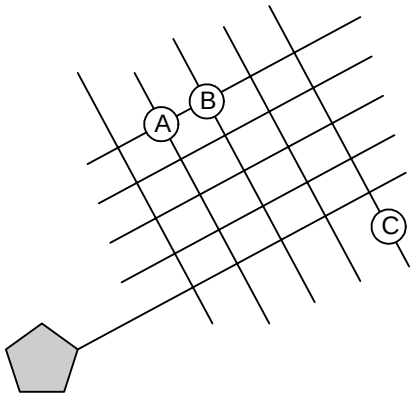
Site Number and Description	LRAA	
	TTHM (mg/L)	HAA5 (mg/L)
4 (Standard monitoring high TTHM)	0.072	0.051
8 (Standard monitoring high TTHM)	0.065	0.056
9 (Stage 1 DBPR max residence time site)	0.070	0.051

Among the three remaining high TTHM IDSE sites, standard monitoring Site 4 has the highest TTHM LRAA. However, the Stage 1 DBPR site has only slightly lower TTHM LRAA than standard monitoring Site 4. The system chooses **the Stage 1 DBPR site over standard monitoring site 4** for the Stage 2 high TTHM site to maintain the historical DBP

Example 7.6 Providing Geographic Coverage When Choosing Stage 2 Sites

In general, two representative high TTHM sites should not be located in the same general area of the distribution system. Consider the following example:

The two highest TTHM LRAAs in the distribution system are from adjacent historical sample sites (sites A and B). The site with the third highest TTHM LRAA is on the far side of the distribution system (site C). In this case, consider selecting sites **A and C** or **B and C** as Stage 2 sites for a broader geographical coverage of the distribution system.



7.3.2 Determining Your Stage 2 DBPR Compliance Monitoring Schedule

The first step in determining your Stage 2 DBPR compliance monitoring schedule is to select your peak historical month. You should use the peak historical month selected in your IDSE standard monitoring plan unless new data suggest another month. Refer to Section 7.1.2 for more information on determining peak historical month.

You **must** conduct Stage 2 DBPR compliance monitoring during the peak historical month. If you are a ground water system that serves more than 9,999 people or you are a subpart H system that serves more than 499 people, you must also conduct Stage 2 compliance sampling at 90 day intervals before and/or after the peak historical month.

The intent of the required time interval is to ensure that samples are representative of the quality of water over an extended period and do not over-emphasize either high or low concentrations of TTHM or HAA5 that might occur seasonally. For example, a system on quarterly monitoring could sample in the **third full week of every third month**. It is not necessary to sample all sites on the same day.

7.3.3 Preparing the IDSE Report for Standard Monitoring

Every system that conducts IDSE standard monitoring **must** prepare and submit an IDSE Report for Standard Monitoring. You should submit the report to the Information Processing and Management Center (IPMC) for review by EPA or your state. See Section 1.4 of this guidance manual for information on how to submit your report to the IPMC.

EPA has developed an **IDSE Report for Standard Monitoring Form (Form 7)**, presented in this section and available electronically as part of the **IDSE Tool.** You are not required to use this form; however, if you choose not to use it, refer to Exhibit 7.6 for a list of the minimum elements you must include in your IDSE report.

The IDSE Tool creates a custom form for your system and provides links to technical guidance from this manual. The tool is available on EPA's website at http://www.epa.gov/safewater/disinfection/stage2.


IDSE Tool

Before you begin Stage 2 DBPR compliance monitoring, you will also be required to prepare a Stage 2 DBPR compliance monitoring plan. In addition, if you are a subpart H system serving >3,300 people, you must submit a copy of your Stage 2 compliance monitoring plan to the state. If you include **compliance calculation procedures** in your IDSE report, the report can meet the requirement of the plan, and you do not have to prepare or submit a separate plan. As a guide for specifying your compliance calculation procedures, refer to the Stage 1 DBPR, 141.133(b), and your Stage 1 compliance monitoring plan. Check with your state, as they may have different requirements under the Stage 2 DBPR. If you are a consecutive or wholesale system, your state may choose to use its special primacy authority to modify your Stage 2 compliance monitoring requirements. In this case, you should check with the state to see if they

are going to use this authority. You should develop your IDSE report for the total number of required Stage 2 compliance locations for your system.

The IDSE report for standard monitoring form includes the following sections:

I. General Information
II. Stage 2 DBPR Requirements
III. Monitoring Results
IV. Justification of Stage 2 DBPR Compliance Monitoring Sites
V. Peak Historical Month and Stage 2 DBPR Compliance Monitoring Schedule
VI. Distribution System Schematic
VII. Attachments

Sections of the form with an asterisk (*) are required by the Stage 2 DBPR. Examples of completed IDSE reports for standard monitoring using this form are provided in Appendices H and I of this guidance manual and in the EPA manual, *Initial Distribution System Evaluation Guide for Systems Serving < 10,000 People*. The rest of this section provides guidance on the completion of this form.

I. General Information

I.A. PWS Information* - If nothing has changed since you completed your standard monitoring plan form, copy information from your plan into this section. If your system characteristics have changed, see Section 7.1.3 of this manual for guidance on completing this section.

I.B. Date Submitted* - Enter either the date that you are submitting the form electronically, putting it in the mailbox, or dropping it off with an express delivery service. Be sure to submit your IDSE report before the deadline found on your requirements summary sheet.

I.C. PWS Operations - This section asks questions about your system to help inform EPA and state personnel during the plan review process. If nothing has changed since you completed your standard monitoring plan form, copy information from your plan into this section. If your system characteristics have changed, see Section 7.1.3 of this manual for guidance on completing this section.

I.D. Contact Person* - Enter the contact information of the person who is submitting the report. This should be the person who will be available to answer questions from EPA and/or state reviewers.

II. Stage 2 DBPR Requirements*

II.A Number of Compliance Monitoring Sites - Refer to the ***Standard Monitoring Requirements - Attachment*** sheet in Chapter 2. Copy the numbers from the "Stage 2 Compliance Monitoring Requirements" table that correspond to your source type and the population served by your system.

II.B. Schedule - This should be the same schedule you entered for your standard monitoring plan. See Section 7.1.3 of this manual for guidance.

II.C. Compliance Monitoring Frequency - Refer to the ***Standard Monitoring Requirements - Attachment*** in Chapter 2. Locate the monitoring frequency from the "Stage 2 Compliance Monitoring Requirements" table that corresponds to your source type and the population served by your system. Put a check mark in the box corresponding to that monitoring frequency.

III. Monitoring Results*

III.A. Did you deviate in any way from your approved standard monitoring plan? - Put a check mark in the appropriate box to identify whether your system collected any standard monitoring samples on different dates or at different locations than indicated in your approved standard monitoring plan.

If you sampled on a different date or during a different week than scheduled in the approved monitoring plan, you should write an explanation in the space provided (or in attached sheets). You should include the standard monitoring site ID, the scheduled sampling date or week from your monitoring plan, and the actual sampling date. You must also explain why you sampled on a different day or week than planned. An example explanation is shown below.

> *According to our standard monitoring plan, we were to collect samples at standard monitoring sites 2 and 4 on January 14, 2009. However, a major snowstorm created hazardous road conditions and limited our access to sample locations. Therefore, we conducted our sampling at all sites on January 18, 2009 after the roads were cleared.*

III.B. Where were your TTHM and HAA5 samples analyzed? - Put a check mark in the appropriate box to identify whether your system analyzed TTHM and HAA5 samples in an in-house laboratory or sent the samples to a certified laboratory for analysis.

If you analyzed your TTHM and HAA5 samples in an in-house laboratory, check the appropriate box to identify whether your laboratory is certified. If you sent your TTHM and HAA5 samples to a certified laboratory, enter the name of the laboratory in the blank. If you used more than one laboratory (e.g., if you used different laboratories for standard monitoring samples and Stage 1 DBPR compliance samples), list both laboratories, or check "in-house" and list the name of the laboratory if applicable.

III.C What method(s) was used to analyze your TTHM and HAA5 samples? - Put a check mark in the appropriate box to indicate the analytical method used to measure the TTHM and HAA5 concentrations of your standard monitoring and Stage 1 DBPR compliance samples. If more than one method was used (e.g., if you used different laboratories for standard monitoring samples and Stage 1

DBPR compliance samples), check more than one method. If you do not know what method was used, contact your laboratory.

III.D. IDSE Standard Monitoring Results - TTHM - Enter your TTHM results for each standard monitoring site for each monitoring period in which you collected data. For each sample result, enter the date on which sampling was conducted. If you are a subpart H system serving more than 49,999 people or a ground water system serving more than 499,999 people, you were required to conduct standard monitoring at more than 8 sites. Therefore, you will need to attach additional sheets.

III.E. IDSE Standard Monitoring Results - HAA5 - Enter your HAA5 results for each standard monitoring site for each monitoring period in which you collected data. For each sample result, enter the date on which sampling was conducted. If you are a subpart H system serving more than 49,999 people or a ground water system serving more than 499,999 people, you were required to conduct standard monitoring at more than 8 sites. Therefore, you will need to attach additional sheets.

III.F. Stage 1 DBPR Compliance Monitoring Results - TTHM - Enter your TTHM results for each Stage 1 site for each monitoring period in which you collected data. For each sample result, enter the date on which sampling was conducted. Attach additional sheets if needed.

III.G. Stage 1 DBPR Compliance Monitoring Results - HAA5 - Enter your HAA5 results for each Stage 1 site for each monitoring period in which you collected data. For each sample result, enter the date on which sampling was conducted. Attach additional sheets if needed.

IV. Justification of Stage 2 DBPR Compliance Monitoring Sites*

Enter the site ID from the distribution schematic and the site type (whether it is highest TTHM, highest HAA5, Stage 1 DBPR, or a site selected using criteria other than the site selection protocol). For example:

This site had the 2nd highest TTHM LRAA

An example of how you might justify a site that was ***not*** selected using the protocol is below:

Among the three remaining high TTHM sites, standard monitoring Site 4 has the highest TTHM LRAA. However, Stage 1 DBPR Site 7 has only a slightly lower TTHM LRAA than standard monitoring Site 4. Therefore, we choose Stage 1 DBPR Site 7 over standard monitoring site 4 to maintain the historical DBP record.

V. Peak Historical Month and Proposed Stage 2 DBPR Compliance Monitoring Schedule

V.A. Peak Historical Month* - Enter the month that you determined to be your peak historical month.

V.B Is Your Peak Historical Month the Same as in Your IDSE Standard Monitoring Plan? - Put a check mark in the appropriate box to identify whether your system used the same peak historical month as in your standard monitoring plan. If your standard monitoring results prompted you to change your peak historical month, explain how you selected a new peak historical month.

V.C. Proposed Stage 2 DBPR Compliance Monitoring Schedule* - Enter the ID for each Stage 2 DBPR compliance monitoring site in the table (these should match the ID's you enter in Section IV and on your schematic). Enter your proposed sampling schedule for the number of monitoring periods identified in Section II.C. The entry can be a specific date or week and can be in a number of different formats. For example:

- 7/9/07
- 2nd week in Nov '07
- Week of 7/9/07

Remember that at least one monitoring period must be during the peak historical month identified in Section V.A. Note that there is only space for 8 monitoring sites on this sheet. If you are a subpart H system serving more than 249,999 people you are required to monitor at more than 8 sites. Therefore, you will need to attach additional sheets.

VI. Distribution System Schematic* - A distribution system schematic is required *only if it has changed from your approved IDSE standard monitoring plan.* If it has changed, attach the revised distribution system schematic. See Section 7.1.3 of this manual for guidance.

VII. Attachments - Put a check mark in each of the boxes corresponding to any attachments that you have included in your report.

A distribution system schematic is required *only if it has changed since you submitted your IDSE standard monitoring plan*. Refer to Section VI for details.

If you submit your IDSE report electronically, you also have the option to submit attachments in hard copy. Include a note in your electronic IDSE report explaining that attachments are being submitted in hard copy, and mail the hard copy to the IPMC mailing address in your Requirements Summary Sheet. The IPMC will match the hard copy submission with your electronic submission when it is received.

If you are a subpart H system serving >3,300 people, you must submit a copy of your Stage 2 compliance monitoring plan to the state. If you include **compliance calculation**

procedures in your IDSE report, the report can meet the requirement of the plan, and you do not have to prepare or submit a separate plan. As a guide for specifying your compliance calculation procedures, refer to the Stage 1 DBPR, 141.133(b), and your Stage 1 compliance monitoring plan. Check with your state, as they may have different requirements under the Stage 2 DBPR.

Enter the total number of pages in your IDSE report (including attachments) in the blank at the bottom of this section. This will allow EPA or your state to ensure that all pages were received.

This page intentionally left blank.

Form 7: IDSE Report for Standard Monitoring

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:
☐ CWS	☐ Subpart H	☐ Consecutive System
☐ NTNCWS	☐ Ground	☐ Wholesale System
		☐ 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. STAGE 2 DBPR REQUIREMENTS*

A. Number of Compliance Monitoring Sites	B. Schedule	C. Compliance Monitoring Frequency
Highest TTHM: ____	☐ Schedule 1	☐ During peak historical month (1 monitoring period)
Highest HAA5: ____	☐ Schedule 2	
Existing Stage 1: ____	☐ Schedule 3	☐ Every 90 days (4 monitoring periods)
Total: ____	☐ Schedule 4	

Form 7: IDSE Report for Standard Monitoring

III. MONITORING RESULTS*

A. Did you deviate in any way from your approved standard monitoring plan? ☐ Yes ☐ No

If YES, explain (attach additional pages if necessary):

_____

_____

_____

_____

_____

_____

B. Where were your TTHM and HAA5 samples analyzed?

☐ In-House

Is your in-house laboratory certified? ☐ Yes ☐ No

☐ Certified Laboratory

Name of certified laboratory: _____

C. What method(s) was used to analyze your TTHM and HAA5 samples?

TTHM	HAA5
☐ EPA 502.2	☐ EPA 552.1
☐ EPA 524.2	☐ EPA 552.2
☐ EPA 551.1	☐ EPA 552.3
	☐ SM 6251 B

Form 7: IDSE Report for Standard Monitoring

III. MONITORING RESULTS (Continued)*

D. IDSE Standard Monitoring Results - TTHM

Site ID[1]	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							
	Sample Date							
	Sample Result							
	Sample Date							
	Sample Result							

[1] *Verify that site IDs for IDSE standard monitoring sites match the site IDs in your Standard Monitoring Plan.*

Attach additional sheets as needed for IDSE standard monitoring results.

Form 7: IDSE Report for Standard Monitoring

III. MONITORING RESULTS (Continued)*

E. IDSE Standard Monitoring Results - HAA5

Site ID[1]	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							
	Sample Date							
	Sample Result							
	Sample Date							
	Sample Result							

[1] *Verify that site IDs for IDSE standard monitoring sites match the site IDs in your Standard Monitoring Plan.*

Attach additional sheets as needed for IDSE standard monitoring results.

Form 7: IDSE Report for Standard Monitoring

III. MONITORING RESULTS (Continued)*

F. Stage 1 DBPR Compliance Monitoring Results - TTHM

Site ID[1]	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					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					

[1] *Verify that site IDs for Stage 1 compliance monitoring sites match the site IDs in your Standard Monitoring Plan.*

Attach additional sheets as needed for Stage 1 compliance monitoring results.

Form 7: IDSE Report for Standard Monitoring

III. MONITORING RESULTS (Continued)*

G. Stage 1 DBPR Compliance Monitoring Results - HAA5

Site ID[1]	Data Type	HAA5 (mg/L)				LRAA
	Sample Date					
	Sample Result					
	Sample Date					
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	Sample Result					

[1] *Verify that site IDs for Stage 1 compliance monitoring sites match the site IDs in your Standard Monitoring Plan.*

Attach additional sheets as needed for Stage 1 compliance monitoring results.

Form 7: IDSE Report for Standard Monitoring

IV. JUSTIFICATION OF STAGE 2 DBPR COMPLIANCE MONITORING SITES*

Stage 2 Compliance Monitoring Site ID	Site Type	Justification
	☐ Highest TTHM ☐ Highest HAA5 ☐ Stage 1 DBPR	
	☐ Highest TTHM ☐ Highest HAA5 ☐ Stage 1 DBPR	
	☐ Highest TTHM ☐ Highest HAA5 ☐ Stage 1 DBPR	
	☐ Highest TTHM ☐ Highest HAA5 ☐ Stage 1 DBPR	
	☐ Highest TTHM ☐ Highest HAA5 ☐ Stage 1 DBPR	
	☐ Highest TTHM ☐ Highest HAA5 ☐ Stage 1 DBPR	
	☐ Highest TTHM ☐ Highest HAA5 ☐ Stage 1 DBPR	
	☐ Highest TTHM ☐ Highest HAA5 ☐ Stage 1 DBPR	

Attach additional copies of this sheet if you need more room.

Form 7: IDSE Report for Standard Monitoring

V. PEAK HISTORICAL MONTH AND PROPOSED STAGE 2 DBPR COMPLIANCE MONITORING SCHEDULE

A. Peak Historical Month* _____

B. Is Your Peak Historical Month the Same as in Your IDSE Standard Monitoring Plan?

☐ Yes ☐ No

If no, explain how you selected your new peak historical month *(attach additional sheets if needed*)

_____

_____

_____

_____

_____

_____

C. Proposed Stage 2 DBPR Compliance Monitoring Schedule*

Stage 2 Compliance Monitoring Site ID	Projected Sampling Date (date or week)[1]			
	period 1	period 2	period 3	period 4

[1] period = monitoring period. Complete for the number of monitoring periods from Section II.C.

Attach additional copies of this sheet if you need more room.

Form 7: IDSE Report for Standard Monitoring

VI. DISTRIBUTION SYSTEM SCHEMATIC*

ATTACH a schematic of your distribution system if it has changed since you submitted your Standard Monitoring Plan (Form 6).

VII. ATTACHMENTS

- ☐ Additional sheets for explaining how and why you deviated from your standard monitoring plan (Section III).
- ☐ Additional sheets for Standard Monitoring Results (Section III). **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**.
- ☐ Additional sheets for Stage 2 DBPR Compliance Monitoring Sites (Section IV). **REQUIRED** if you are a subpart H system serving **more than 249,999 people**.
- ☐ Additional sheets for explaining how you selected the peak historical month (Section V).
- ☐ Additional sheets for proposed Stage 2 DBPR peak historical month and compliance monitoring schedule (Section V). **REQUIRED** if you are a subpart H system serving **more than 249,999 people**.
- ☐ Distribution system schematic* (Section VI). **REQUIRED if it has changed from your approved IDSE standard monitoring plan**.
- ☐ Compliance calculation procedures (for Stage 2 Compliance Monitoring Plan).

Total Number of Pages in Your Report: _____

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

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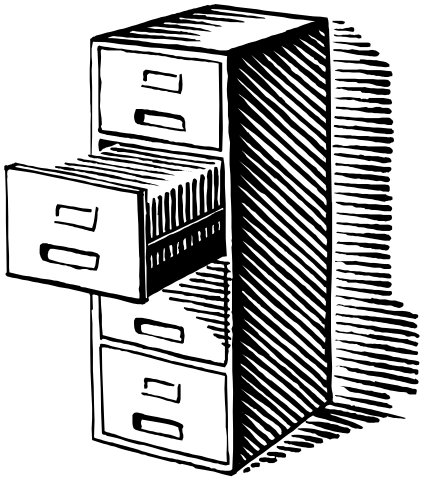
7.4 Recordkeeping



The IDSE standard monitoring report must be kept on file for **10 years** after the date it is submitted. If EPA or your state modifies the recommendations made in your report or approves alternative Stage 2 DBPR compliance monitoring locations, you must also keep a copy of EPA or your state's notification on file for 10 years after the date of the notification. You must make your IDSE report and any notification available for review by your state or the public.

The standard monitoring plan, including any modifications by EPA or your state, must also be kept on file for as long as you are required to retain your IDSE standard monitoring report. You must make the plan and any modifications available for review by your state or the public.

7.5 Next Steps: Preparing the Stage 2 DBPR Compliance Monitoring Plan

As the final step before you can begin compliance monitoring for the Stage 2 DBPR, you must develop and implement a **Stage 2 DBPR monitoring plan** by the deadline provided in your requirements summary sheet. The plan will be similar to your Stage 1 DBPR monitoring plan in that it will identify how you intend to sample for compliance with Stage 2. You must keep your plan on file for state and public review. If you are a subpart H system serving > 3,300 people, you **must** submit your plan to EPA or your state prior to when you are required to start monitoring.

Exhibit 7.8 contains the minimum requirements for what must be included in your Stage 2 DBPR compliance monitoring plan. Because compliance monitoring plans are not addressed as part of the IDSE provisions of the Stage 2 DBPR, ***EPA has not included detailed guidance for developing Stage 2 compliance monitoring plans in this guidance manual***. EPA plans to develop other manuals and training that address the compliance monitoring provisions of the Stage 2 DBPR.

See EPA's website http://www.epa.gov/safewater/disinfection/stage2 for an up-to-date inventory of Stage 2 DBPR guidance manuals and training materials, or call the Safe Drinking Water Hotline at 1-800-426-4791.

Exhibit 7.8 Required Contents of Stage 2 DBPR Compliance Monitoring Plans

All Systems	Additional Requirements for Consecutive and Wholesale Systems [1]
• Monitoring locations • Monitoring dates • Compliance calculation procedures	• If your state has used its special primacy authority to modify your monitoring requirements, you must include monitoring plans for other systems in your combined distribution system

1. See Appendix D of this manual for guidance specifically for consecutive and wholesale systems

References

T.M. Walski, D.V. Chase, D.A. Savic, W. Grayman, S. Beckwith, E. Koelle. 2003. "Advanced Water Distribution Modeling and Management", Haestad Methods, Waterbury CT: Haestad Press.