



# Complying With the Stage 1 Disinfectants and Disinfection Byproducts Rule: Supplement B

## One of the Simple Tools for Effective Performance (STEP) Guide Series

For Small Subpart H Systems Using Conventional Filtration Treatment

*In addition to this Guide, small systems adding a chemical disinfectant should obtain the Basic Guide to learn about other requirements of the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) that will apply to their system. Owners and operators of systems adding chlorine dioxide or ozone should obtain Supplement A of this Guide or contact their state for more information on how the Stage 1 DBPR applies to them.*

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NOTICE: This Guide is intended to aid you in complying with the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) published on December 16, 1998, under the Safe Drinking Water Act (SDWA). The SDWA provisions, the Stage 1 DBPR, and other EPA regulations described in this Guide contain legally binding requirements. This document does not substitute for those provisions or regulations, nor is it a regulation itself. It does not impose legally-binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based on the circumstances. EPA and state decision-makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any decisions regarding a particular community water system or non-transient non-community water system will be made based on the applicable statutes and regulations. Therefore, interested parties are free to raise questions and objections about the appropriateness of the application of this Guide to a particular situation, and EPA will consider whether or not the recommendations or interpretations in this Guide are appropriate in that situation based on the law and regulations. EPA may change this guidance in the future. To determine whether EPA has revised this Guide and/or to obtain copies, contact the Safe Drinking Water Hotline at 1-800-426-4791.

Please note that the term “state” is used in this Guide to refer to your Primacy Agency. The Primacy Agency for most systems is your state Drinking Water Agency. However, the Primacy Agency for systems located in the Navajo Nation is your tribal office, and the Primacy Agency for systems located on other tribal lands, in Wyoming, or in the District of Columbia is your EPA Regional office.

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**Additional copies of this Supplement B, the Basic Guide, and Supplement A can be downloaded from EPA's Safe Drinking Water Web site at [www.epa.gov/safewater](http://www.epa.gov/safewater).**

**You can also call the Safe Drinking Water Hotline at 1-800-426-4791 to request the documents.**

# Acronyms and Definitions

**CaCO<sub>3</sub>** - Calcium carbonate

**CCR** - Consumer Confidence Report

**CFR** - Code of Federal Regulations

**Compliance Samples** - Required samples your system takes to comply with regulations. Compliance samples are identified in your monitoring plan. All compliance samples identified in your monitoring plan must be included in your compliance calculations, even if you take more than the minimum number of samples.

**Conventional Filtration** - A series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal. If you do not know whether your system uses conventional filtration, contact your state.

**CWS** - Community water system

**DBP** - Disinfection byproduct

**DBP Precursor** - Disinfection byproduct precursor

**DOC** - Dissolved organic carbon

**Enhanced Coagulation** - Refers to the process of achieving improved disinfection byproduct precursor removal by using conventional treatment.

**Enhanced Softening** - Refers to the process of achieving improved disinfection byproduct precursor removal by using precipitative softening.

**EPA** - Environmental Protection Agency

**GWUDI** - Ground water under the direct influence of surface water

**HAA5** - The sum of the concentration of the five haloacetic

acids covered by the Stage 1 DBPR (monochloro-, dichloro-, and trichloro-acetic acid and monobromo- and dibromo-acetic acid)

**MCL** - Maximum contaminant level

**MRDL** - Maximum residual disinfectant level

**NTNCWS** - Non-transient non-community water system

**Oxidant** - Oxidants are most often used for the oxidation of reduced iron and manganese, destruction of taste and odor causing organic contaminants, and the destruction of synthetic organic contaminants. Many oxidants act as coagulant aids and are used as part of an overall program for the control of potentially harmful disinfection by-products.

**PN** - Public notification

**Primacy Agency** - The state agency that has been granted primary enforcement responsibility for administration and enforcement of primary drinking water regulations and related requirements applicable to public water systems within a state (40 CFR 142.2).

**PWS** - Public water system

**RAA** - Running annual average

**SDWA** - Safe Drinking Water Act

**Stage 1 DBPR** - Stage 1 Disinfectants and Disinfection Byproducts Rule

**State** - Used in this Guide to refer to your Primacy Agency.

The Primacy Agency for most systems is your state Drinking Water Agency. The Primacy Agency for systems located in the Navajo Nation is your tribal office, and the Primacy Agency

for systems located on other tribal lands, in Wyoming, or in the District of Columbia is your EPA Regional office.

**Subpart H** - PWSs using surface water or GWUDI as a source

**SUVA** - Specific ultraviolet absorption, an indicator of the humic content of water

**TOC** - Total organic carbon, an indicator of organic compounds in water

**TNCWS** - Transient non-community water system

**TT** - Treatment technique

**TTHM** - Total trihalomethanes (the sum of the four trihalomethanes covered by the Stage 1 DBPR: chloroform, bromoform, and dibromochloro- and bromodichloro-methane)

**WTP** - Water treatment plant

# Is This Guide for Me?

The Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) applies to water systems that add a chemical disinfectant such as chlorine, chloramines, chlorine dioxide, or ozone to their drinking water during any part of the treatment process for any purpose (e.g., for disinfection or oxidation, or for taste, odor, or color). In addition to the basic requirements for all systems that add a chemical disinfectant (covered in the *Complying With the Stage 1 Disinfectants and Disinfection Byproducts Rule: Basic Guide* EPA Doc. No. 816-B-05-004) this Supplement covers the additional requirements for:

**Stop!**  
**If you do not add a chemical disinfectant to your water, the Stage 1 DBPR does not apply to your system. If you do not use conventional filtration, or if your system is not a Subpart H system, the requirements covered in this Supplement do not apply to your system.**

- Subpart H community water systems (CWSs) and non-transient, non-community water systems (NTNCWSs) that add a chemical disinfectant and use conventional filtration. You are a Subpart H system if either (1) your source water is surface water, (2) your source water is ground water under the direct influence of surface water (GWUDI), or (3) your source water is a combination of groundwater and surface water, or groundwater and GWUDI.

Systems that will typically find this Guide useful (if they add a chemical disinfectant and use conventional filtration) include:

- Small towns
- Rural water districts
- Tribal systems
- Manufactured housing communities
- Home owners' associations
- Small private systems
- Factories, religious institutions, and schools with their own water supplies

CWSs, NTNCWSs, and transient, non-community water systems (TNCWSs) that use chlorine dioxide and CWSs and NTNCWSs that use ozone should also obtain Supplement A of this Guide or contact their state. Contact information for Safe Drinking Water Act (SDWA) Primacy Agencies is provided in Appendix D. Tribal contact information is provided in Appendix E. If your system is a new system or if you are just starting to add a chemical disinfectant, you should work with your state to determine which requirements apply to you. Your state can also help you figure out how to calculate compliance with the Rule.



# What Will I Learn?

As a drinking water system operator, your most important job is to protect the health of your customers. This Guide serves as a companion to the Basic Guide, which offers information on basic requirements that apply to all systems that add a chemical disinfectant. It contains information about:

- The monitoring required for disinfection byproduct (DBP) precursors;
- How to determine if you are in compliance; and
- What to report to the state and to your customers.

Table 1 outlines the requirements of the regulation and the systems to which they apply. It also indicates where you can find information on each disinfectant residual, byproduct, or precursor in the Guide and its Supplements. The appendices contain examples of compliance calculations, sample monitoring worksheets, and sample monitoring plans.

**This Supplement does not provide information on the additional requirements for the two alternative compliance criteria available to systems using precipitative softening (i.e., lime or lime soda ash softening). If you use precipitative softening, consult your state for additional requirements and compliance options.**

**Table 1: Requirements of the Stage 1 DBPR**

Disinfectant Residual, Byproduct, or Precursor	Systems Required to Monitor	Where to Find Information
Chlorine & Chloramine Residuals	CWSs and NTNCWSs using chlorine or chloramines for any purpose	Basic Guide
Chlorine Dioxide Residuals	All systems using chlorine dioxide for disinfection or oxidation	Supplement A
Total trihalomethanes (TTHM) & five haloacetic acids (HAA5)	CWSs and NTNCWSs adding any chemical disinfectant for any purpose	Basic Guide
Chlorite	CWSs and NTNCWSs using chlorine dioxide for disinfection or oxidation	Supplement A
Bromate	CWSs and NTNCWSs using ozone	Supplement A
DBP Precursors	CWSs and NTNCWSs using GWUDI and conventional filtration	Supplement B Page 5

This Supplement describes the minimum federal requirements under the Stage 1 DBPR. Some states may have additional requirements and monitoring forms. Be sure to check your state’s specific requirements. For state and tribal contact information, refer to Appendices D and E.

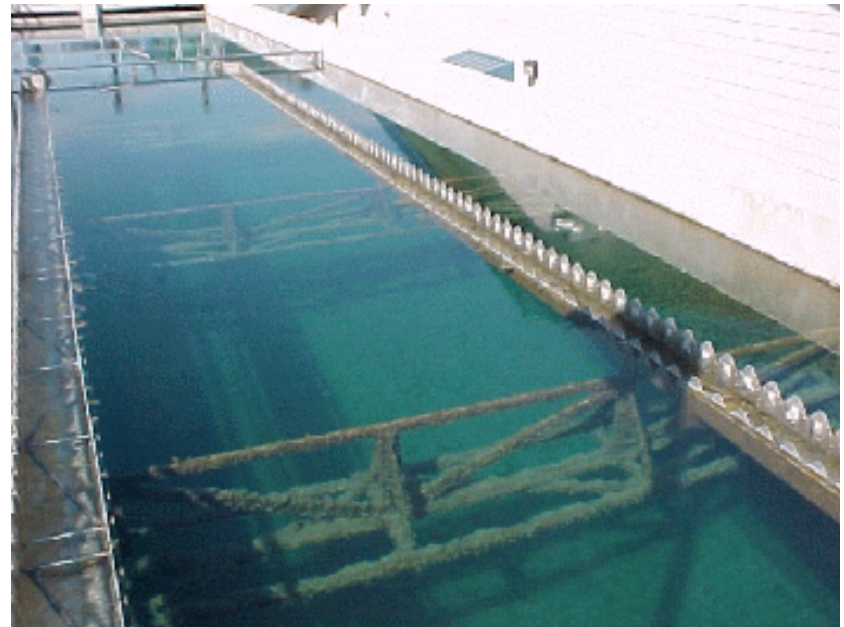
# DBP Precursors

# Why Do I Have to Monitor for DBP Precursors?

Chemical disinfectants react with natural organic and inorganic compounds (disinfection byproduct precursors, or DBP precursors) in water to form disinfection byproducts (DBPs). Thus, reducing DBP precursors in source water will reduce the formation of byproducts in treated water. The Stage 1 DBPR addresses DBP precursors through a treatment technique (TT) requirement for Subpart H water systems that add a chemical disinfectant and use conventional filtration (40 CFR 141.135(a)(1)).

The TT requirement only applies to systems with conventional filtration capability because these are typically the only systems that have the ability to reduce DBP levels in their source water affordably. Conventional filtration is a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal. If you do not know whether your system uses conventional filtration, contact your state.

Systems that use ground water **not** under the direct influence of surface water do not have to comply with the TT requirement because they usually have lower precursor levels in their source water, and systems with other types of treatment trains (e.g., direct filtration, slow sand filtration) don't have to comply because they lack sedimentation basins.



**A sedimentation basin at a conventional water treatment plant**

# How Do I Comply with the Treatment Technique Requirement?

You can achieve compliance with the TT requirement by:

- Meeting one of several **alternative compliance criteria**, or
- **Removing a percentage of total organic carbon (TOC)** through enhanced coagulation (i.e., Step 1 or Step 2 removal requirements), or
- Through a **combination of alternative compliance criteria and TOC removal**.

To determine compliance with the TT requirement, you will have to monitor your source and treated water for TOC, and your source water for alkalinity. For more information, see “How Often Do I Have to Monitor for DBP Precursors?” on page 10 of this guide.

If you cannot meet any of the alternative compliance criteria or the Step 1 or Step 2 TOC removal requirements, you may be eligible for a **waiver**. Additional information on Step 1, Step 2, and waivers appears later in this section.

## ***ALTERNATIVE COMPLIANCE CRITERIA (40 CFR 141.135(a)(2))***

You can comply with the TT requirement by meeting any one of the following alternative compliance criteria (referred to by number for the remainder of the document):

1. Running annual average (RAA) of source water TOC < 2.0 mg/L;
2. RAA of treated water TOC < 2.0 mg/L;
3. RAA of source water TOC < 4.0 mg/L, RAA of source water alkalinity > 60 mg/L, and either:
  - RAAs of total trihalomethanes (TTHM)  $\leq$  0.040 mg/L and haloacetic acids (HAA5)  $\leq$  0.030 mg/L; or,
  - The state has determined that your system has made a “clear and irrevocable financial commitment” to installing technology to limit TTHM and HAA5 to these levels. If the state has made this determination, you must submit progress reports to the state and follow a schedule to install these technologies. You should have completed installation and began operating the technologies no later than June 30, 2005.
4. RAAs of TTHM  $\leq$  0.040 mg/L and HAA5  $\leq$  0.030 mg/L, and the system uses only chlorine for primary disinfection and maintenance of a residual;
5. RAA of source water specific ultraviolet absorption (SUVA) prior to treatment  $\leq$  2.0 L/mg-m; or

6. RAA of treated water  $SUVA \leq 2.0$  L/mg-m.

### **TOC REMOVAL (40 CFR 141.135(b))**

If you do not meet one of the alternative compliance criteria discussed above, you will have to meet the TOC TT requirement.

#### Step 1 Removal Requirements

Systems unable to meet any alternative compliance criterion should try to meet the Step 1 removal requirements. The Step 1 removal requirements (shown in Table 2) specify a percentage of TOC that must be removed depending on the amount of source water TOC and alkalinity. If your source water alkalinity and/or your source water TOC levels change from month to month, the percentage of TOC that you must remove may change from month to month. EPA has designed the Step 1 removal percentages to be achievable by 90 percent of Subpart H systems.

#### Step 2 Removal Requirements

If you cannot comply with the removal requirements through an alternative compliance criteria or the Step 1 removal requirements due to water quality parameters or operational constraints, you will need to apply to the state for approval of Step 2 removal requirements. Your application to the state requesting Step 2 removal levels must include, among other things, the results of bench or pilot testing (jar testing), which is conducted according to a prescribed methodology. Using this data, the state determines an alternate enhanced coagulation level and precursor removal percentage that your system can meet. For more information on Step 2 removal requirements, see 40 CFR 141.135(b)(4) or contact your state. For information on the detailed jar testing procedures you must follow, consult EPA's *Enhanced Coagulation and Enhanced Precipitative Softening Guidance Manual* (EPA-815-R-99-012, May 1999), which can be downloaded at [www.epa.gov/safewater/mdbp/mdbptg.html#coag](http://www.epa.gov/safewater/mdbp/mdbptg.html#coag).

After the state has approved the Step 2 removal requirements for your system, you may use any coagulant and operate at any coagulant dose or pH level to achieve the specified Step 2 TOC removal percentage.

**Table 2: Required TOC Removal Requirements\***

Source Water TOC (mg/L)	Source Water Alkalinity (mg/L as CaCO <sub>3</sub> )		
	0-60	>60-120	>120
>2.0-4.0	35.0%	25.0%	15.0%
>4.0-8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%

\*40 CFR 141.135(b)(2)

**REMOVAL REQUIREMENT WAIVER (40 CFR 141.135(b)(4)(v))**

A system unable to meet any alternative compliance criterion, the Step 1 removal requirements, the Step 2 alternative threshold, or a combination of these methods may apply to its state for a waiver from the TT requirements (check with your state for more information).

**COMBINING COMPLIANCE OPTIONS (40 CFR 141.135(c)(2))**

If you are complying with the TT requirements through Step 1 or 2 TOC removal percentages, you may use alternative compliance criteria 1, 2, 5, and 6 to comply with the TOC removal requirements on a month to month basis. You may also use a combination of Step 1 and 2 TOC removal percentages (with state approval).

For example, if your source water TOC is less than 2.0 mg/L for one month during a time when you are complying through Step 1 or 2 TOC removal percentages, you may elect to comply through alternative criterion 1 for that month and will not have to remove a specified percentage of TOC.

If your source water characteristics change from month to month, and in certain months you find that you cannot meet the required Step 1 removal percentage, you may find that you will need to comply through a combination of Step 1 and Step 2 removal percentages. Work with your state to determine the best compliance strategy for your system. Note that you cannot use alternative compliance criteria 3 or 4 in combination with other compliance methods.



**Workers in Montana changing a 1-ton chlorine gas cylinder**

**While the many ways you can comply with the TT requirement may seem confusing, EPA designed the compliance options to give systems as many options and as much flexibility as possible.**

# How Often Do I Have to Monitor for DBP Precursors?

## ***ROUTINE MONITORING: TOC REMOVAL (40 CFR 141.132(d)(1))***

All systems, regardless of compliance method, must take at least one compliance sample set every month. The sample set includes:

- One sample of source water alkalinity; and,
- One “paired sample” of TOC: one sample from the source (untreated) water, and one sample from treated water (see Table 3). The treated water sample must be collected no later than the point of combined filter effluent turbidity monitoring.

The results of these samples will determine which compliance options are available to you, how much (if any) TOC you are required to remove, and how much TOC you have removed. **If your source water or treated water TOC is less than 2.0 mg/L, calculated quarterly as an RAA, you do not have to remove TOC from your water because you have met one of the alternative compliance criteria.** Information on how to determine compliance appears later in this Supplement, in “How Do I Determine Compliance?”

## ***REDUCED MONITORING (40 CFR 141.132(d)(2))***

If your RAA of treated water TOC is less than 2.0 mg/L for 2 consecutive years or less than 1.0 mg/L for 1 year, you may reduce monitoring for the TOC “paired sample” and source water alkalinity to one paired sample and one source water alkalinity sample per plant per quarter (with prior written state approval). If your RAA ever exceeds 2.0 mg/L while you are on reduced monitoring, you must return to routine monitoring immediately.

**Table 3: Monitoring Locations for all Subpart H Systems Using Conventional Filtration**

Relevant Systems	Routine Monitoring Frequency	Sample of	Routine Monitoring Location	Criteria for Reduced Monitoring	Reduced Monitoring Frequency & Locations
All Systems	Monthly	a. Alkalinity b. TOC c. TOC	a. Source water * b. Source water * c. Treated water **	Average treated water TOC either: 1. < 2.0 mg/l for 2 years; or 2. < 1.0 mg/l for 1 year	Quarterly in same locations as routine

\* Before any chemical treatment (e.g., disinfection, potassium permanganate for zebra mussels control).

\*\* Treated water samples should be taken after treatment but never beyond the point of combined filter effluent turbidity monitoring. The sample must be representative of treated water. Note that your state may have additional requirements for the site of the treated water TOC sample. Contact your state for more information (see Appendices D and E for contact information).



**ADDITIONAL MONITORING REQUIREMENTS: ALTERNATIVE COMPLIANCE CRITERIA (40 CFR 141.135(a)(2))**

If you intend to comply with the precursor requirements through an alternative criterion, you may have to perform additional tests on your water samples. Table 4 indicates which alternative compliance criteria require additional tests and which samples to test.

If your system is complying with the DBP precursors TT requirement by meeting one of the alternative compliance criteria, you must still perform routine TOC monitoring because your source water characteristics may change from month to month, and you may not always be able to meet the same alternative compliance criterion. For example, if your levels of source water TOC rise above 2.0 mg/L, you may no longer be able to comply using alternative criterion 1, and you would need to calculate compliance with Step 1 or Step 2 using your source water and treated water TOC samples as well as your source water alkalinity sample. The data from the routine TOC monitoring will help you choose a compliance strategy if you need to change how you comply with the Rule.

**Table 4: Additional Testing for Alternative Compliance Criteria**

<b>Alternative Criterion</b>	<b>Additional Testing Required</b>
1	None; use routine source water TOC sample
2	None; use routine treated water TOC sample
3	None; use routine source water TOC and alkalinity samples and routine TTHM/HAA5 samples
4	None; use routine TTHM/HAA5 samples
5	Test monthly source water SUVA ( $UV_{254}$ and DOC)
6	Test monthly treated water SUVA ( $UV_{254}$ and DOC)



# **Analysis, Compliance, and Reporting**

# Who Must Analyze My Samples?

The Stage 1 DBPR specifies analytical methods for measuring each relevant water quality parameter covered by the Rule. You must use analytical methods specified in the Rule or otherwise approved by EPA to monitor and show compliance under the Stage 1 DBPR. For more information on analytical methods, see 40 CFR 141.131 or refer to the *Stage 1 Disinfectants and Disinfection Byproducts Rule: Laboratory Quick Reference Guide* (EPA 816-F-02-021), available online at [www.epa.gov/safewater/publicoutreach/quickreferenceguides.html](http://www.epa.gov/safewater/publicoutreach/quickreferenceguides.html).

TOC, alkalinity, and SUVA tests must be performed by a person approved by the state. Your system operator may be able to qualify for state approval to analyze these samples. For more information on this and other requirements for obtaining state approval, contact your state. Contact information is provided in Appendix D. Tribal contact information appears in Appendix E.

# How Do I Determine Compliance?

Systems complying through an alternative compliance criterion use their monitoring results to calculate compliance. They use monthly or quarterly results from each of the past 12 months (i.e., 4 quarters) to calculate an RAA. Using this RAA, systems can determine whether they are in compliance.

Compliance determination is more difficult under the Step 1 and Step 2 removal requirements. Your removal requirements can change from month to month based on your source water characteristics. For example, changing levels of TOC in your source water may require you to remove 35.0% of TOC one month and 45.0% the following month (see Table 5). You will know whether you removed a high enough percentage of TOC each month, but you will not be able to combine individual monthly removal percentages to calculate compliance at the end of each quarter.

To allow you to combine results and calculate an average for compliance, EPA requires that you use a ratio – the percent you actually removed divided by the percent you were required to remove – to compare removal levels and determine compliance from month to month (40 CFR 141.135(c)).

Example 1, on the following page, illustrates how to calculate this ratio, and the worksheet illustrates how to calculate compliance with the Step 1 and Step 2 removal requirements using the results from your monthly sample set. Note how the required removal percentages (which are for Step 1 compliance in this example) change from month to month based on the source water characteristics, and how the results affect the removal ratio used to calculate compliance. Table 6 summarizes how to determine compliance for Step 1, Step 2, and alternative compliance criteria.

**Table 5: Required TOC Removal Requirements\***

Source Water TOC (mg/L)	Source Water Alkalinity (mg/L as CaCO <sub>3</sub> )		
	0-60	>60-120	>120
>2.0-4.0	35.0%	25.0%	15.0%
>4.0-8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%

\*40 CFR 141.135(b)(2)

**DBP Precursors**

**Example #1: A Surface Water System Using Conventional Filtration**

This example shows how a small surface water system using conventional filtration would conduct routine monitoring for DBP precursors and calculate compliance.

This surface water system monitors for DBP precursors and complies with the TT requirements through a combination of Step 1 TOC removal requirements and alternative compliance criteria (monitoring results are listed in the worksheet on page 17). On October 4, 2004, the system collects its routine samples of source water alkalinity and TOC. The source water TOC (3.5 mg/L) and alkalinity samples (58 mg/L) determine the required removal percentage for the month of October as 35.0% (see the table at right). The system uses its treated water TOC sample (3.0 mg/L) and its source water TOC sample (3.5 mg/L) to determine if it has met the required removal percentage. To determine the percent TOC removed, it divides the difference between the source water TOC sample and the treated water TOC sample by the value of the source water TOC sample and multiplies the result by 100:

Required TOC Removal Requirements\*

Source Water TOC (mg/L)	Source Water Alkalinity (mg/L as CaCO <sub>3</sub> )		
	0-60	>60-120	>120
>2.0-4.0	35.0%	25.0%	15.0%
>4.0-8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%

\*40 CFR 141.135(b)(2)

$$\frac{\text{Source water TOC} - \text{Treated water TOC}}{\text{Source water TOC}} = \frac{3.5 \text{ mg/L} - 3.0 \text{ mg/L}}{3.5 \text{ mg/L}} \times 100 = 14.3\%$$

Next, it divides the percentage of TOC removed by the percentage it was supposed to remove. This result is its removal ratio:

$$\frac{\% \text{ TOC Removed}}{\text{Required Removal \% (from Table 5)}} = \frac{14.3}{35.0} = 0.41 \text{ (less than 1.00; below compliance removal ratio)}$$

The system has fallen below the compliance removal ratio of 1.00, but since compliance is based on an RAA, calculated quarterly, the system has not yet committed a violation.

In November of 2004, the characteristics of the system's source water change: its source water TOC is now 3.2 mg/L and its source water alkalinity is now 61 mg/L. The required removal percentage for the month of November is 25.0% (see table at right). The treated water TOC sample is 2.3 mg/L, so the percentage of TOC removed is 28.1%, yielding a removal ratio of 28.1/25.0, or 1.12. The system continues to collect samples each month. At the end of each quarter, the system calculates its RAA based on results on this worksheet and data from previous quarters not shown here.

Required TOC Removal Requirements\*

Source Water TOC (mg/L)	Source Water Alkalinity (mg/L as CaCO <sub>3</sub> )		
	0-60	>60-120	>120
>2.0-4.0	35.0%	25.0%	15.0%
>4.0-8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%

\*40 CFR 141.135(b)(2)

In April of 2005, the system's treated water TOC is 1.9 mg/L. Since having treated water TOC lower than 2.0 mg/L is one of the alternative compliance criteria (criterion 2), the system will not have to meet the Step 1 TOC removal percentage for the month and can instead use a 1.00 for the removal ratio. Note that if the system tried to calculate a removal ratio using the required percentage (25.0%) and the percentage removed (9.5%), it would not meet the required removal ratio for the month. By allowing systems to use 1.00 as a removal ratio in this situation, the Rule contains built-in flexibilities to help systems comply with the TT requirements through more than one option.

In September of 2005, the system calculates its RAA of removal ratios using its removal ratios for the last 12 months (all shown on this worksheet):

$$\frac{0.41 + 1.12 + 1.33 + 1.07 + 1.14 + 0.57 + 1.0 + 0.87 + 0.76 + 1.53 + 1.74 + 1.14}{12} = 1.06 (\geq 1.00)$$

The system's RAA is above the required compliance removal ratio of 1.00. The system is in compliance.

DBP Precursors Monitoring Worksheet								
PWSID:		A	B	C	D	E	F	G
Quarter	Month	Date	Source TOC (mg/L)(a)	Source Alkalinity (mg/L @CaCO <sub>3</sub> )(a)	Required TOC Removal %(b)	Treated TOC (mg/L) (a)	% TOC Removed (B-E)/B * 100	Removal Ratio (F/D)
4	1	10/4/04	3.5	58	35.0	3.0	14.3	0.41
	2	11/6/04	3.2	61	25.0	2.3	28.1	1.12
	3	12/2/04	3.0	65	25.0	2.0	33.3	1.33
	RUNNING ANNUAL AVERAGE (circle if less than 1.00)							
1	1	1/5/05	3.0	77	25.0	2.2	26.7	1.07
	2	2/15/05	2.8	84	25.0	2.0	28.6	1.14
	3	3/11/05	3.5	86	25.0	3.0	14.3	0.57
	RUNNING ANNUAL AVERAGE (circle if less than 1.00)							
2	1	4/4/05	2.1	89	25.0	1.9	9.5	1.0
	2	5/19/05	4.1	58	45.0	2.5	39.0	0.87
	3	6/8/05	3.7	91	25.0	3.0	18.9	0.76
	RUNNING ANNUAL AVERAGE (circle if less than 1.00)							
3	1	7/13/05	3.4	83	25.0	2.1	38.2	1.53
	2	8/16/05	3.9	71	25.0	2.2	43.6	1.74
	3	9/7/05	2.1	67	25.0	1.5	28.6	1.14
	RUNNING ANNUAL AVERAGE (circle if less than 1.00)							

(a) Note: All systems must collect a sample of source water alkalinity and a paired TOC sample each month, regardless of the compliance criterion the system is using.

(b) The required TOC removal percentage can be read from Table 5 based on the sample results for source water TOC and source water alkalinity.

**Table 6: Determining Compliance**

For Systems Meeting the:	Compliance is based on:	You are in compliance if:
Step 1 and Step 2 TOC Removal Requirements	An RAA of monthly ratios (i.e., the ratio of actual TOC percent removed to required TOC percent removed), computed quarterly (see worksheet on page 16 for details on how to calculate). Step 2 TOC has different required removal percentages (as determined by your state).	Result is $\geq 1.00$
Alternative Compliance Criteria	RAA of monitoring results (computed quarterly) and fulfillment of additional non-sampling criteria (if applicable).	<ol style="list-style-type: none"> <li>1. Source water TOC is <math>&lt; 2.0</math> mg/L</li> <li>2. Treated water TOC is <math>&lt; 2.0</math> mg/L</li> <li>3. Source water TOC is <math>&lt; 4.0</math> mg/L, source water alkalinity <math>&gt; 60</math> mg/L, and either: <ul style="list-style-type: none"> <li>■ TTHM <math>\leq 0.040</math> mg/L, HAA5 <math>\leq 0.030</math> mg/L;</li> <li>OR,</li> <li>■ The system has made clear and irrevocable financial commitment to installing technology to limit TTHM and HAA5.</li> </ul> </li> <li>4. TTHM <math>\leq 0.040</math> mg/L, HAA5 <math>\leq 0.030</math> mg/L, and system uses only chlorine for primary disinfection and/or maintenance of a residual in the distribution system.</li> <li>5. Source water SUVA prior to treatment is <math>\leq 2.0</math> L/mg-m</li> <li>6. Treated water SUVA is <math>\leq 2.0</math> L/mg-m</li> </ol>

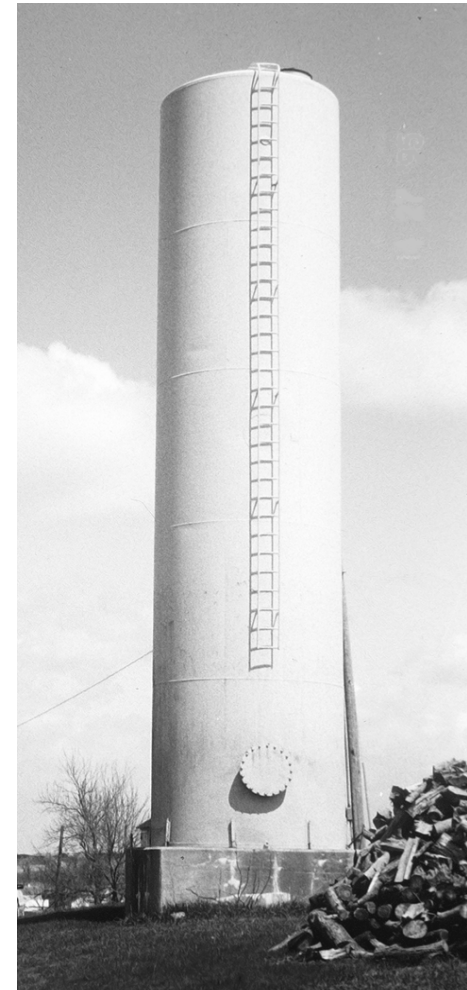
# What Do I Report to the State?

## ***ROUTINE MONITORING REPORTS***

All public water systems (PWSs) required to comply with the Stage 1 DBPR must report routine sampling results to the state. Systems monitoring for DBP precursors must report within 10 days of the end of each quarter (40 CFR 141.134(a)). Table 7 shows what information must be included in each report.

## ***TT AND MONITORING VIOLATIONS***

If you violate a TT, you must notify the state within 24 hours. In addition, you must provide Tier 2 public notice to your customers within 30 days (40 CFR 141.203(b)(1)). If you violate a monitoring requirement (i.e., you fail to take a required sample), you must report to your customers within 1 year. Information on public notification (PN) requirements is included in the next section of this Guide. Check with your state for more information.



**A finished water storage tank  
(stand pipe)**



**Table 7: Routine Monitoring Report Information\***

If you are a...	Criteria	Reporting Frequency	You must report...
System monitoring monthly or quarterly for TOC and are required to meet the enhanced coagulation or enhanced softening requirements	n/a	Quarterly	<ul style="list-style-type: none"> <li>i. The number of paired TOC samples collected during the last quarter</li> <li>ii. Location, date, and results of each paired sample and the associated source water alkalinity taken during the last quarter</li> <li>iii. Average of the percent reduction of TOC for each paired sample and the required TOC percent removal</li> <li>iv. The calculations for determining compliance with the TOC percent removal requirements</li> <li>v. Whether your system is in compliance for the last 4 quarters</li> </ul>
System monitoring monthly or quarterly for TOC and meeting one or more of the alternative compliance criteria**	All	Quarterly	<ul style="list-style-type: none"> <li>i. The alternative compliance criterion the system is using</li> <li>ii. The number of paired TOC samples taken during the last quarter</li> <li>iii. Location, date, and results of each paired sample and the associated source water alkalinity taken during the last quarter</li> <li>ix. Whether your system is in compliance with the particular alternative compliance criteria</li> </ul>
	1	Quarterly	iv. The RAA based on monthly averages of source water TOC
	2		iv. The RAA based on monthly averages of treated water TOC
	3		<ul style="list-style-type: none"> <li>iv. The RAA based on monthly averages of source water TOC</li> <li>vi. The RAA of source water alkalinity</li> <li>vii. The RAA of both TTHM and HAA5</li> </ul>
	4		vii. The RAA of both TTHM and HAA5
	5		v. The RAA based on monthly measurements of source water SUVA
	6		v. The RAA based on monthly measurements of treated water SUVA

\* 40 CFR 141.134(d).

\*\*Systems using alternative compliance criteria must include additional information based on their compliance method

# What Do I Report to My Customers?

Letting your customers know what is happening with their water system is part of your legal responsibility. In addition, informed customers are more likely to understand the need for new treatment systems, infrastructure changes, and rate increases. While you should try to communicate with your customers on a regular basis, you **must** provide information in the following situations:

## ***ROUTINE CONSUMER CONFIDENCE REPORTS***

By July 1 of every year, you must make a consumer confidence report (CCR) available to your customers (40 CFR 141.152(b)). This report is designed to provide a “snapshot” of the quality of the water supplied by your system over the past year. In your CCR, you must tell your customers about any violations, the actions you took to fix the violations, and any potential health effects resulting from the violations. You can find more information on CCRs on EPA’s CCR Web site, [www.epa.gov/safewater/drinkingwaterquality/index.html](http://www.epa.gov/safewater/drinkingwaterquality/index.html).

## ***PUBLIC NOTIFICATION IN THE CASE OF A VIOLATION***

If you have a TT violation, you must provide Tier 2 public notice: that is, you must let your customers know within 30 days by using at least one of a variety of PN methods (40 CFR 141.203(b)(1)).

Unless otherwise directed by your state, you must provide notice to each customer receiving a bill, to other service connections to which your system delivers water, and to other people regularly served by your system who would not otherwise receive notice (e.g., house renters, students, nursing home patients, prison inmates). You must use at least one of a variety of public notification methods. You can deliver the notice door-to-door or send it via mail. If you operate a non-community water system, you can also post the notice in a public place. If any of your customers will not receive the notice through mail, door-to-door delivery, or postings, you must also use other methods, like a newspaper or radio announcement, to reach these customers (40 CFR 141.203(c)). Within 10 days of notifying your customers, you must submit to the state both a certification that you have fully complied with the PN regulations and a copy of the PN.

### **REMEMBER!**

You must send your state copies of all PNs sent to your customers for Stage 1 DBPR monitoring and TT violations. The copies must be sent with a letter stating that you have met all the requirements of the Public Notification Rule. This must be done **within 10 days** of sending out a public notice.

All monitoring violations must be reported to the state and to your customers. Generally, monitoring violations require Tier 3 public notice: that is, you must notify your customers within 12 months of the violation. You may include the notification in your CCR if it is published in time to satisfy the 12-month deadline. Your state has the discretion to impose more stringent PN requirements. Check with your state for more

information.

All PNs for must include the following specific health effects language (40 CFR Subpart Q, Appendix B):

- **TOC:** “Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the maximum contaminant level (MCL) may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer.”

**For more detailed information about the DBP precursors TT and reporting requirements, please see EPA’s Enhanced Coagulation and Enhanced Precipitative Softening Guidance Manual (EPA 815-R-99-012), available online at [www.epa.gov/safewater/mbp/mbpbtg.html#coag](http://www.epa.gov/safewater/mbp/mbpbtg.html#coag).**

## **Appendices**

# Appendix A: Sample Monitoring Worksheet

The following worksheet is designed to help you keep track of your Stage 1 DBPR sampling and results. The worksheet is designed to allow you to record both the results from your routine monitoring and your compliance calculations. While the worksheet may be a useful management tool, system operators should also keep the original laboratory results on file. You can photocopy the blank worksheet so that you have blank worksheets to use in the future.

The worksheet can help you ensure that you collect the right number of routine samples in each monitoring period and that you calculate compliance correctly. The worksheet will also remind you of corrective actions you will have to take if you violate the TT.

The worksheet includes an explanation of how to complete it and how to use it to calculate compliance. Review the example on pages 14-16 to help you understand how the worksheet would be used in a real-world situation.

**Some states may have their own monitoring worksheets that small community drinking water systems are required to complete. The worksheet contained in this section is presented as a learning tool and *should not* replace monitoring forms required by the state.**

## DBP Precursor Monitoring Worksheet Instructions

### **Step # 1 Enter PWSID number.**

Enter the PWSID number for your water system in the upper left hand corner of the shadowed area of the table.

### **Step #2a Circle the quarter and enter the date when you took the sample.**

Circle the quarter in which you are sampling in the "Quarter" column.

In column A, record the day, month, and year you took the 3-sample set (source water TOC, source water alkalinity, and treated water TOC) for that month. The worksheet is set up to allow you to enter your results by quarter. At the end of each quarter, you must calculate your RAA.

### **Step #3 Enter the source water TOC and alkalinity results, including units of measure.**

Record your results for source water TOC in column B and record your results for source water alkalinity in column C. These results will determine what percentage of TOC you will be required to remove from the water.

### **Step #4 Enter the percentage of TOC you are required to remove.**

Using the results from columns B and C, consult Table 5 to determine the percentage of TOC you will have to remove from your water. Record that percentage in column D.

### **Step # 5 Enter the treated water TOC result.**

Record your result for treated water TOC in column E. Use this result to calculate the percent of TOC you removed from your water.

### **Step #6 Calculate and enter the percentage of TOC that you actually removed.**

To calculate the percentage of TOC removed, perform the following calculation: subtract the number in column E from the number in column B. Take the difference

and divide it by the number in column B. Multiply this number by 100. The result is the percentage of TOC you actually removed from your water. Enter this number in column F.

### **Step #7 Calculate and enter your removal ratio.**

To calculate your removal ratio, perform the following calculation: divide the number in column F by the number in column D. The result will be your removal ratio. Enter this number in column G. If you are complying through an alternative compliance criterion for that month, you may substitute a 1.0 for your actual removal ratio. Contact your state for more information.

### **Step #8 At the end of each quarter, calculate your RAA of removal ratios.**

After each quarter, calculate your RAA of removal ratios by adding the results from column G for the last 12 months and dividing that result by 12. Record your RAA in the shaded gray row that corresponds to the quarter for which you are calculating the average.

If your RAA is greater than or equal to 1.00, you are in compliance with the Step 1 TOC removal requirements. If the result is less than 1.00, circle the result because you are out of compliance and must notify your state and customers.

**This worksheet is designed to be used over several years. You can photocopy the blank worksheet, start filling out a new one after you have collected samples for 4 quarters, and refer to old worksheets for the results from the previous 3 quarters that you will need to calculate compliance.**

DBP Precursor Monitoring Worksheet								
PWSID:		A	B	C	D	E	F	G
Quarter	Month	Date	Source TOC (mg/L)(a)	Source Alkalinity (mg/L @CaCO <sub>3</sub> )(a)	Required TOC Removal %(b)	Treated TOC (mg/L) (a)	% TOC Removed (B-E)/B * 100	Removal Ratio (F/D)
4	1							
	2							
	3							
	RUNNING ANNUAL AVERAGE (circle if less than 1.00)							
1	1							
	2							
	3							
	RUNNING ANNUAL AVERAGE (circle if less than 1.00)							
2	1							
	2							
	3							
	RUNNING ANNUAL AVERAGE (circle if less than 1.00)							
3	1							
	2							
	3							
	RUNNING ANNUAL AVERAGE (circle if less than 1.00)							

(a) Note: All systems must collect a sample of raw water alkalinity and a paired TOC sample each month, regardless of the compliance criterion the system is using.  
(b) The required TOC removal percentage can be read from Table 5 based on the sample results for source water TOC and alkalinity.

# Appendix B: Monitoring Plan Worksheets and Examples

## ***MONITORING PLAN REQUIREMENT***

Under the Stage 1 DBPR, each regulated system must develop and follow a monitoring plan that describes specific locations and schedules for collecting samples to fulfill monitoring requirements, and the methods the system will use to calculate compliance with the MCLs, MRDLs, and TTs. If you are approved for monitoring as a consecutive system or if you are providing water to a consecutive system, you must account for the entire distribution system in your plan. The plan must have been available to the state and to the public by no later than **January 31, 2004**. Subpart H systems serving between 3,300 and 10,000 persons must have submitted the plan to the state by **April 10, 2004**. Developing a monitoring plan helps ensure that your system will meet the sampling requirements for the Stage 1 DBPR even if there are changes in your system's personnel. Consult *Complying With the Stage 1 Disinfectants and Disinfection Byproducts Rule: Basic Guide* for more information on the monitoring plan requirements, including information on completing the basic portions of a monitoring plan and additional blank worksheets. If you have not already developed a monitoring plan, you should contact your state for assistance.

In the pages that follow, you will find completed monitoring plan examples you can use for reference. The examples are followed by blank monitoring plan forms you can use to develop a monitoring plan.

### **Remember!**

**Your state may have additional monitoring plan requirements that are not covered in this worksheet. Check with your state for more information.**



### ***Monitoring Plan Example #1: A Subpart H System Using Conventional Filtration***

Green Acres, a Subpart H system using conventional filtration and chlorine for disinfection, was required to develop and maintain a monitoring plan and make it available for state inspection by January 31, 2004. The operator of the system, Bob Waters, completed a monitoring plan that includes an overview of system characteristics as well as individual monitoring schedules for the disinfectant (chlorine), disinfection byproducts (TTHM and HAA5), and DBP precursors (measured as TOC). This plan presents basic system information and describes where and when the system collects its samples and how it determines compliance with the MCLs, MRDLs, and TT requirements.

To develop the plan, operator Waters entered system contact information, including the system's name and address, and the operator's phone number and email address. This information can be useful for state officials or customers who need to contact the system. Next, the operator entered the number of customers (1,350) and the number of service connections (495) Green Acres serves. This information can help state officials who are unfamiliar with the system determine the Stage 1 DBPR requirements that apply to the system.

Next, the operator entered the system characteristics, including the type of system (CWS) and types of disinfection and filtration (conventional filtration and chlorination). All of these determine that Green Acres is required to monitor for chlorine, TTHM and HAA5, and DBP precursors.

The operator then made note of the system's source water characteristics. This will give the state a better understanding of how the system operates, when the system is in operation, and how the system's source water characteristics affect its Stage 1 DBPR compliance requirements. This information is also useful should Green Acres hire a new operator who is less familiar with the system. Green Acres draws its water from one source, the Green Acres River. The system uses conventional filtration and chlorination at its one treatment plant.

### Stage 1 Disinfectants and Disinfection Byproducts Monitoring Plan

#### System Information

System Name: <u>Green Acres</u>	Contact Person: <u>Bob Waters</u>	Population Served: <u>1,350</u>
PWSID Number: <u>GR67890</u>	Phone Number: <u>(999) 000-1234</u>	Service Connections: <u>495</u>
Address: <u>29 Pond Street</u> <u>Yourtown, Any State</u>	Email: <u>bwaters@greenacres.com</u>	

#### System Characteristics

<b>Type of System:</b> <input checked="" type="checkbox"/> CWS <input type="checkbox"/> NTNCWS <input type="checkbox"/> TNCWS	<b>Type of Filtration:</b> <input checked="" type="checkbox"/> Conventional Filtration <input type="checkbox"/> Softening <input type="checkbox"/> None	<b>Type of Disinfectant:</b> <input checked="" type="checkbox"/> Chlorine and/or Chloramines <input type="checkbox"/> Chlorine Dioxide <i>Booster Chlorination?</i> <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Ozone <input type="checkbox"/> Other (please specify)
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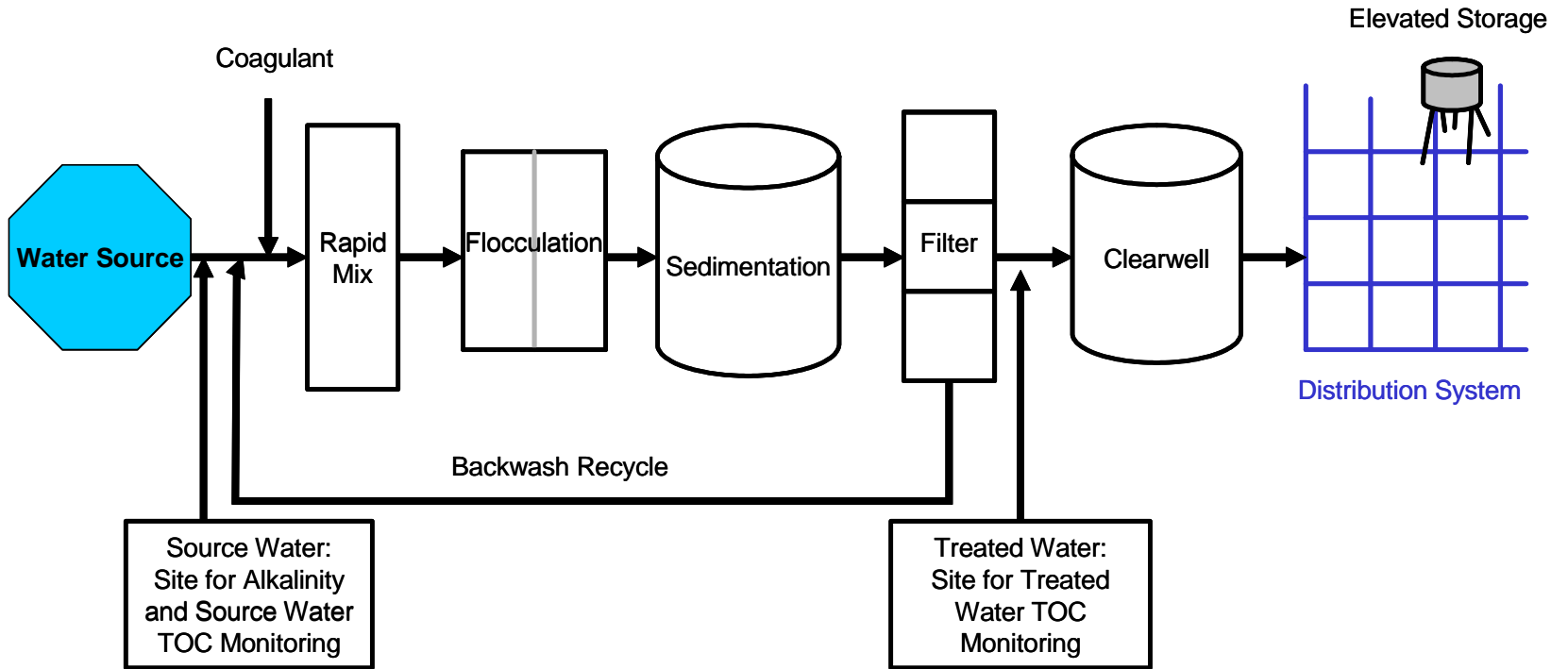
#### Source Water Characteristics

Source Name	Source Type (GW, SW, Purch.)	Purpose (Primary, Backup)	Period of Operation	Treatment Type	Treatment Plant
Green Acres River	SW	Primary	Year-round	Conventional filtration and chlorine	Green Acres WTP

Attach your system schematic to this monitoring plan for system staff, state, and lab reference.

Date Last Modified: September 30, 2003

**System Schematic:**



## ***Monitoring Plan Example #2: Green Acres' DBP Precursors Monitoring Plan***

Green Acres' monitoring plan for DBP precursors serves as both a reference for the system operator and staff and as a guide for the state to determine whether the system is sampling at the correct frequency and in the correct locations. After consulting the Rule and asking the state about any additional requirements, Green Acres' operator determined that the monitoring plan must include sampling site locations, sampling schedules, and a description of compliance determination methods.

First, the operator indicated which compliance method the system will use to meet the DBP precursor removal requirements of the Stage 1 DBPR. Green Acres chose to attempt to comply through the Step 1 removal requirements. If the system cannot comply with Step 1 in any given month, it attempts to comply through one of the alternative compliance criteria. Therefore, the operator also checked off the alternative compliance criteria for which the system could qualify.

The operator noted where he collects samples for source water TOC, source water alkalinity, and treated water TOC ('Sample Location'), the appropriate sample site IDs for these locations, how often the samples will be taken ('Frequency'), and how many samples will be taken. The system is required to take one monthly sample for each of these analytes. Under 'Additional Monitoring,' the operator includes sampling information for source water and treated water SUVA because the system has determined that it might need to comply with the removal requirement using an alternative compliance criterion (it already collects source water TOC, treated water TOC, and TTHM and HAA5 samples based on the other Stage 1 DBPR requirements that apply to the system). Next, the operator noted the scheduled sample dates. Whenever possible, the operator selected dates early in the sampling period to allow for time to address any compliance problems or lab capacity issues.

Under 'Reduced Monitoring,' the operator noted the sampling schedule and frequency for reduced source water TOC and alkalinity and treated water TOC monitoring, should the system qualify. Next, the operator wrote down a brief description of how the system will determine compliance with the Step 1 removal requirements.

Lastly, the operator filled in the date on which the monitoring plan was completed in the 'Date Last Modified' area. If at any point the operator needs to modify the monitoring plan (e.g., because the state determines that the system must change its sampling locations, the system wants to take additional compliance samples) he will indicate the date that changes were made as a reference for system staff and the state.



Monitoring Schedule and Locations, Continued					
Sample Type	Sample Location	Sample Site ID	Frequency	Number of Samples Collected	Scheduled Sample Dates
<b>Reduced Monitoring</b>					
Source Water TOC	Green Acres River	SW-GA-TOC	Quarterly	1	1 <sup>st</sup> week of month, first month of quarter
Source Water Alkalinity	Green Acres River	SW-GA-ALK	Quarterly	1	1 <sup>st</sup> week of month, first month of quarter
Treated Water TOC	Green Acres WTP	GA-WTP-TOC	Quarterly	1	1 <sup>st</sup> week of month, first month of quarter
<b>Additional Monitoring<sup>1</sup></b>					
Source water SUVA	Green Acres River	SW-GA-SUVA	Monthly	1	1 <sup>st</sup> week of month
Treated water SUVA	Green Acres WTP	GA-WTP-SUVA	Monthly	1	1 <sup>st</sup> week of month
<sup>1</sup> To be completed when complying through an alternative compliance criterion that requires additional sampling.					
<b>Compliance Determination</b>					
<p>To determine the amount of TOC it has removed, Green Acres will subtract the treated water sample result from the source water sample result and divide by the source water sample result. In order to calculate the percent removed, Green Acres will then multiply the result by 100.</p> <p>To calculate the removal ratio, Green Acres will divide the result from the equation above (actual percent of TOC removed) by the required removal amount. The system will substitute '1.0' for the removal ratio for the months during which it complies with an alternative compliance criterion.</p> <p>The system will then calculate the RAA of removal ratios by adding together the monthly ratios and dividing by 12. If the result is greater than or equal to 1.00, the system is in compliance.</p>					

Date Last Modified: September 30, 2003

## Stage 1 DBPR Monitoring Plan Worksheet Instructions

### **Step #1 Enter your system information.**

Enter your system's name, address, and PWSID. Next, enter the name of the system's contact person, their phone number, and their email address. Then, enter the number of customers and service connections your system serves.

### **Step #2 Enter your system's characteristics.**

Check off the appropriate boxes to describe the type of system that you operate, including which disinfectant(s) are used to treat the water and whether your system uses conventional filtration or softening.

### **Step #3 Enter your system's source water characteristics.**

- Under 'Source Name,' list all the drinking water sources your system uses. Include sources that are used intermittently (e.g., backup sources, seasonal sources).
- Under 'Source Type,' indicate whether the sources used are surface water, ground water, or GWUDI.
- Under 'Purpose,' indicate whether the source serves as a primary, backup, or emergency source.
- Under 'Period of Operation,' indicate when the source is in use (e.g., year-round, only in the summer months).
- Under 'Treatment Type,' indicate how the water from each source is treated (e.g., chlorine, conventional filtration). Then note where each source is treated under 'Treatment Plant.'

### **Step #4 Attach a system schematic.**

Attach a schematic of your system for system staff, state, and lab reference.

### **Step #5 Enter the monitoring plan completion date.**

In the 'Date Last Modified' area, enter the date on which you completed this monitoring plan. If the monitoring plan is modified at any point, enter the modification date in this area.

*Note: If you operate more than one treatment plant, you may want to photocopy this worksheet and use one for each treatment plant.*

**Stage 1 Disinfectants and Disinfection Byproducts Monitoring Plan**

**System Information**

PWSID Number: \_\_\_\_\_ Phone Number: \_\_\_\_\_ Service Connections: \_\_\_\_\_  
 Address: \_\_\_\_\_ Email: \_\_\_\_\_

**System Characteristics**

<p><b>Type of System:</b></p> <p><input type="checkbox"/> CWS</p> <p><input type="checkbox"/> NTNCWS</p> <p><input type="checkbox"/> TNCWS</p>	<p><b>Type of Filtration:</b></p> <p><input type="checkbox"/> Conventional Filtration</p> <p><input type="checkbox"/> Softening</p> <p><input type="checkbox"/> None</p>	<p><b>Type of Disinfectant:</b></p> <p><input type="checkbox"/> Chlorine and/or Chloramines</p> <p><i>Booster Chlorination?</i>    <input type="checkbox"/> Yes    <input type="checkbox"/> No</p> <p><input type="checkbox"/> Chlorine Dioxide</p> <p><input type="checkbox"/> Ozone</p> <p><input type="checkbox"/> Other (please specify)</p>
--	--	--

**Source Water Characteristics**

Source Name	Source Type (GW, SW, Purch.)	Purpose (Primary, Backup)	Period of Operation	Treatment Type	Treatment Plant

Attach your system schematic to this monitoring plan for system staff, state, and lab reference.

Date Last Modified: \_\_\_\_\_



## DBP Precursors Monitoring Plan Worksheet Instructions

### **Step #1 Select compliance methods.**

Check off the compliance methods through which your system will attempt to meet the DBP precursor requirements of the Stage 1 DBPR. If you select 'Alternative Compliance Criteria,' indicate which alternative method(s) your system may use to comply.

### **Step #2 Set up a schedule for routine monitoring.**

Under 'Sample Type,' indicate the substance for which you will be sampling. Under 'Sample Location,' enter the sites at which you conduct routine sampling. Under 'Sample Site ID,' enter the abbreviated IDs for these sites. Under 'Frequency,' indicate how often you will be sampling for the substance. Under 'Number of Samples Collected,' indicate how many samples you will take of each substance in each monitoring period. Under 'Scheduled Sample Dates,' enter the dates (or range of dates) on which the monitoring will be performed.

### **Step #3 Set up a schedule for reduced monitoring.**

Under 'Sample Type,' indicate the substance for which you will be sampling. Under 'Sample Location,' enter the sites at which you conduct reduced monitoring. Under 'Sample Site ID,' enter the abbreviated IDs for these sites. Under 'Frequency,' indicate how often you will be sampling for the substance on a reduced monitoring schedule. Under 'Number of Samples Collected,' indicate how many samples you will take of each substance in each monitoring period. Under 'Scheduled Sample Dates,' enter the dates on which the monitoring will be performed.

### **Step #4 Set up a schedule for any additional monitoring.**

If you plan on sampling for any additional substances in anticipation of having to or wanting to comply through an alternative compliance criterion, enter the sampling information, following the instructions under Step #2.

### **Step #5 Describe how you will determine compliance.**

Enter a narrative description of how you will calculate compliance with the treatment technique requirement. Discuss how you will calculate the RAA of removal ratios.

### **Step #6 Enter the monitoring plan completion date.**

In the 'Date Last Modified' area, enter the date on which you complete this monitoring plan. If the monitoring plan is modified at any point, enter the modification date in this area.

**Disinfection Byproduct Precursors Monitoring Plan**

**Compliance Methods**

- Step 1**
 **Step 2**
 **Alternative Compliance Criteria (see below)**

**Alternative Compliance Criteria**

- 1:** RAA of source water TOC < 2.0 mg/L
  **2:** RAA of treated water TOC < 2.0 mg/L
 **3:** RAA of source water TOC < 4.0 mg/L, RAA of source water alkalinity > 60mg/L, and either<sup>1</sup>:  
 a) TTHM RAA ≤ 0.040 mg/L and HAA5 RAA ≤ 0.030 mg/L  
 OR  
 b) State determines you have made a “clear and irrevocable” commitment to installing technology to limit TTHM/HAA5 to those levels
- 4:** TTHM RAA ≤ 0.040 mg/L and HAA5 RAA ≤ 0.030 mg/L (available only to systems using only chlorine as a disinfectant )<sup>1</sup>
 **5:** RAA of source water SUVA prior to treatment ≤2.0 L/mg-m
 **6:** RAA of treated water SUVA ≤2.0 L/mg-m

<sup>1</sup> This alternative compliance criterion cannot be used on a monthly basis or in combination with Step 1 or Step 2.

**Monitoring Schedule and Locations**

Sample Type	Sample Location	Sample Site ID	Frequency	Number of Samples Collected	Scheduled Sample Dates
<i>Routine Monitoring</i>					

Monitoring Schedule and Locations, Continued					
Sample Type	Sample Location	Sample Site ID	Frequency	Number of Samples Collected	Scheduled Sample Dates
<i>Reduced Monitoring</i>					
<i>Additional Monitoring<sup>1</sup></i>					
<sup>1</sup> To be completed when complying through an alternative compliance criterion that requires additional sampling.					
<b>Compliance Determination</b>					

Date Last Modified: \_\_\_\_\_

# Appendix C: Additional Sources of Information on the Stage 1 DBPR

Below are some sources of information on topics related to the Stage 1 DBPR.

## Regulations

**The Federal Register Notice on the Final Rule:** National Primary Drinking Water Regulations: Disinfectants and Disinfection Byproducts; Final Rule. December 16, 1998. Federal Register. Volume 63, No. 241, pp. 69390-69476. Available online at [www.epa.gov/safewater/mdbp/dbpfr.html](http://www.epa.gov/safewater/mdbp/dbpfr.html).

**The Federal Register Technical Corrections to the Stage 1 DBPR:** Revisions to the Interim Enhanced Surface Water Treatment Rule (IESWTR), the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR), and Revisions to the State Primacy Requirements to Implement the Safe Drinking Water Act (SDWA) amendments; Final Rule. January 16, 2001. Federal Register. Volume 66, No. 10, pp. 3770-3780. Available online at [www.epa.gov/fedrgstr/EPA-WATER/2001/January/Day-16/w655.htm](http://www.epa.gov/fedrgstr/EPA-WATER/2001/January/Day-16/w655.htm).

**The Federal Register Minor Corrections to the Stage 1 DBPR:** Revisions to the LT1ESTWR, Surface Water Treatment Rule, and other National Primary Drinking Water Regulations; Final Rule. March 2, 2004. Federal Register. Volume 69, No. 41, pp. 9781-9790. Available online at [www.epa.gov/fedrgstr/EPA-WATER/2004/March/Day-02/w4464.htm](http://www.epa.gov/fedrgstr/EPA-WATER/2004/March/Day-02/w4464.htm).

## Documents

**EPA's MDBP Rules Implementation Activities Web site:** [www.epa.gov/safewater/mdbp/implement.html](http://www.epa.gov/safewater/mdbp/implement.html)  
EPA has posted a number of documents, including the text of the Stage 1 DBPR, an Implementation Guidance, many fact sheets, and a Quick Reference Guide to the Rule.

## Associations

**American Water Works Association:**  
[www.awwa.org/Science/dbp/index.cfm](http://www.awwa.org/Science/dbp/index.cfm)  
(800-926-7337)

**Association of State Drinking Water Administrators:**  
[www.asdwa.org](http://www.asdwa.org)  
(202-293-7655)

**Association of Metropolitan Water Agencies:**  
[www.amwa.net/features/sdwa/sbys/ss3.html](http://www.amwa.net/features/sdwa/sbys/ss3.html)  
(202-331-2820)

**National Rural Water Association:**  
[www.nrwa.org](http://www.nrwa.org)  
(580-252-0629)

**The Natural Resources Defense Council:**  
[www.nrdc.org/water/drinking/default.asp](http://www.nrdc.org/water/drinking/default.asp)  
(212-727-2700)

# Appendix D: Contact Information for Safe Drinking Water Act Primacy Agencies

For additional information or to learn more about the laws in your own state, please contact your EPA Regional Coordinator or State Drinking Water Agency.

State Agency	Web Site	Phone Number
<b>Alabama</b> Department of Environmental Management: Water Supply Branch	<a href="http://www.adem.state.al.us/WaterDivision/Drinking/DWMainInfo.htm">www.adem.state.al.us/WaterDivision/Drinking/DWMainInfo.htm</a>	(334) 271-7700
<b>Alaska</b> Department of Environmental Management: Water Supply Branch	<a href="http://www.state.ak.us/dec/eh/dw">www.state.ak.us/dec/eh/dw</a>	(907) 269-7647
<b>American Samoa</b> Environmental Protection Agency	<a href="http://www.epa.gov/safewater/dwinfo/samoa.htm">http://www.epa.gov/safewater/dwinfo/samoa.htm</a>	(684) 633-2304
<b>Arizona</b> Department of Environmental Quality: Safe Drinking Water Section	<a href="http://www.azdeq.gov/environ/water/dw/index.html">www.azdeq.gov/environ/water/dw/index.html</a>	(602) 771-2300
<b>Arkansas</b> Department of Health: Division of Engineering	<a href="http://www.healthyarkansas.com/eng/">www.healthyarkansas.com/eng/</a>	(501) 661-2623
<b>California</b> Department of Health Services: Division of Drinking Water & Environmental Management	<a href="http://www.dhs.ca.gov/ps/ddwem/technical/dwp/dwpindex.htm">http://www.dhs.ca.gov/ps/ddwem/technical/dwp/dwpindex.htm</a>	(916) 449-5577
<b>Colorado</b> Department of Public Health & Environment: Drinking Water Program	<a href="http://www.cdphe.state.co.us/wq/Drinking_Water/Drinking_Water_Program_Home.htm">http://www.cdphe.state.co.us/wq/Drinking_Water/Drinking_Water_Program_Home.htm</a>	(303) 692-3500
<b>Connecticut</b> Department of Public Health: Drinking Water Division	<a href="http://www.dph.state.ct.us/BRS/water/dwd.htm">www.dph.state.ct.us/BRS/water/dwd.htm</a>	(860) 509-7333
<b>Delaware</b> Delaware Health & Social Services: Division of Public Health	<a href="http://www.state.de.us/dhss/dph/about.html">www.state.de.us/dhss/dph/about.html</a>	(302) 744-4700

State Agency	Web Site	Phone Number
<b>District of Columbia</b> Environmental Health Administration: Water Resources Management Division	<a href="http://www.epa.gov/reg3wapd/drinkingwater">www.epa.gov/reg3wapd/drinkingwater</a>	(215) 814-2300
<b>Florida</b> Department of Environmental Protection: Drinking Water Program	<a href="http://www.dep.state.fl.us/water/drinkingwater/index.htm">www.dep.state.fl.us/water/drinkingwater/index.htm</a>	(850) 245-8335
<b>Georgia</b> Department of Natural Resources: Water Resources Branch	<a href="http://www.gaepd.org">www.gaepd.org</a>	(404) 657-5947
<b>Guam</b> Guam Environmental Protection Agency: Water Programs Division	<a href="http://www.guamepa.govguam.net/programs/water">www.guamepa.govguam.net/programs/water</a>	(671) 475-1658
<b>Hawaii</b> Department of Health: Environmental Health Division	<a href="http://www.hawaii.gov/health/environmental/water/sdwb/index.html">www.hawaii.gov/health/environmental/water/sdwb/index.html</a>	(808) 586-4258
<b>Idaho</b> Department of Environmental Quality: Water Quality Division	<a href="http://www.deq.state.id.us/water/">www.deq.state.id.us/water/</a>	(208) 373-0194
<b>Illinois</b> Environmental Protection Agency: Division of Public Water Supplies	<a href="http://www.epa.state.il.us/water/index-pws.html">www.epa.state.il.us/water/index-pws.html</a>	(217) 785-8653
<b>Indiana</b> Department of Environmental Management: Drinking Water Branch	<a href="http://www.in.gov/idem/water/dwb/">www.in.gov/idem/water/dwb/</a>	(317) 232-8603
<b>Iowa</b> Department of Natural Resources: Water Supply Program	<a href="http://www.iowadnr.com/water/drinking/index.html">www.iowadnr.com/water/drinking/index.html</a>	(515) 725-0275
<b>Kansas</b> Department of Environmental Protection: Bureau of Water	<a href="http://www.kdhe.state.ks.us/pws/">www.kdhe.state.ks.us/pws/</a>	(785) 296-5503
<b>Kentucky</b> Department for Environmental Protection: Division of Water	<a href="http://www.water.ky.gov/dw">www.water.ky.gov/dw</a>	(502) 564-3410

State Agency	Web Site	Phone Number
<b>Louisiana</b> Office of Public Health: Safe Drinking Water Program	<a href="http://www.oph.dhh.louisiana.gov/engineerservice/safewater">www.oph.dhh.louisiana.gov/engineerservice/safewater</a>	(225) 765-5038
<b>Maine</b> Maine Department of Human Services: Drinking Water Program	<a href="http://www.state.me.us/dhs/eng/water/">www.state.me.us/dhs/eng/water/</a>	(207) 287-2070
<b>Maryland</b> Department of the Environment: Public Drinking Water Program	<a href="http://www.mde.state.md.us/programs/WaterPrograms/Water_Supply/index.asp">www.mde.state.md.us/programs/WaterPrograms/Water_Supply/index.asp</a>	(410) 537-3000
<b>Massachusetts</b> Department of Environmental Protection: Drinking Water Program	<a href="http://www.mass.gov/dep/brp/dws/dwshome.htm">www.mass.gov/dep/brp/dws/dwshome.htm</a>	(617) 292-5770
<b>Michigan</b> Department of Environmental Quality: Water Bureau	<a href="http://www.michigan.gov/deq">www.michigan.gov/deq</a>	(517) 373-7917
<b>Minnesota</b> Department of Health: Drinking Water Protection Section	<a href="http://www.health.state.mn.us/divs/eh/water/index.html">www.health.state.mn.us/divs/eh/water/index.html</a>	(651) 215-0770
<b>Mississippi</b> Department of Health: Division of Water Supply	<a href="http://www.msdh.state.ms.us/msdhsite/index.cfm/44.0.76.html">www.msdh.state.ms.us/msdhsite/index.cfm/44.0.76.html</a>	(601) 576-7518
<b>Missouri</b> Department of Natural Resources: Water Protection and Soil Conservation Division	<a href="http://www.dnr.mo.gov/wpscd/wpcp/dw-index.htm">http://www.dnr.mo.gov/wpscd/wpcp/dw-index.htm</a>	(573) 751-1300
<b>Montana</b> Department of Environmental Quality: Public Water Supply Program	<a href="http://www.deq.state.mt.us/wqinfo/PWS/index.asp">www.deq.state.mt.us/wqinfo/PWS/index.asp</a>	(406) 444-4071

State Agency	Web Site	Phone Number
<b>Nebraska</b> Department of HHS: Public Water Supply Program	<a href="http://www.hhs.state.ne.us/enh/pwsindex.htm">www.hhs.state.ne.us/enh/pwsindex.htm</a>	(402) 471-0521
<b>Nevada</b> Department of Environmental Services: Safe Drinking Water Program	<a href="http://ndep.nv.gov/bsdw/index.htm">http://ndep.nv.gov/bsdw/index.htm</a>	(775) 687-6353
<b>New Hampshire</b> Department of Environmental Services: Water Division	<a href="http://www.des.state.nh.us/wseb/">www.des.state.nh.us/wseb/</a>	(603) 271-2513
<b>New Jersey</b> Department of Environmental Protection: Water Supply Administration	<a href="http://www.state.nj.us/dep/watersupply/">www.state.nj.us/dep/watersupply/</a>	(609) 292-5550
<b>New Mexico</b> Environment Department: Drinking Water Bureau	<a href="http://www.nmenv.state.nm.us/dwb/dwbtop.html">www.nmenv.state.nm.us/dwb/dwbtop.html</a>	(505) 827-1400
<b>New York</b> Department of Health: Bureau of Water Supply Protection	<a href="http://www.health.state.ny.us/nysdoh/water/main.htm">www.health.state.ny.us/nysdoh/water/main.htm</a>	(518) 402-7650
<b>North Carolina</b> Department of Environment and Natural Resources: Public Water Supply Section	<a href="http://www.deh.enr.state.nc.us/pws/">www.deh.enr.state.nc.us/pws/</a>	(919) 733-2321
<b>North Dakota</b> Department of Health: Division of Water Quality	<a href="http://www.health.state.nd.us/mf">www.health.state.nd.us/mf</a>	(701) 328-5211
<b>Ohio</b> Environmental Protection Agency: Division of Drinking & Ground Water	<a href="http://www.epa.state.oh.us/ddagw/">www.epa.state.oh.us/ddagw/</a>	(614) 644-2752
<b>Oklahoma</b> Department of Environmental Quality: Water Quality Division	<a href="http://www.deq.state.ok.us/WQDnew/index.htm">www.deq.state.ok.us/WQDnew/index.htm</a>	(405) 702-8100



State Agency	Web Site	Phone Number
<b>Oregon</b> Department of Human Services: Drinking Water Program	<a href="http://oregon.gov/DHS/ph/dwp/index.shtml">http://oregon.gov/DHS/ph/dwp/index.shtml</a>	(971) 673-0405
<b>Pennsylvania</b> Department of Environmental Protection: Office of Water Management	<a href="http://www.dep.state.pa.us/dep/deputate/watermgt/wsm/WSM.htm">www.dep.state.pa.us/dep/deputate/watermgt/wsm/WSM.htm</a>	(717) 772-4018
<b>Puerto Rico</b> Department of Health: Public Water Supply Supervision Program	<a href="http://www.epa.gov/region02/cepd/prlink.htm">www.epa.gov/region02/cepd/prlink.htm</a>	(787) 977-5870
<b>Rhode Island</b> Department of Health: Office of Drinking Water Quality	<a href="http://www.health.ri.gov/environment/dwq/index.php">www.health.ri.gov/environment/dwq/index.php</a>	(401) 222-6867
<b>South Carolina</b> Department of Health & Environmental Control: Drinking Water Program	<a href="http://www.scdhec.net/eqc/water/html/dwater.html">www.scdhec.net/eqc/water/html/dwater.html</a>	(803) 898-4300
<b>South Dakota</b> Department of Environment & Natural Resources: Drinking Water Program	<a href="http://www.state.sd.us/denr/des/drinking/dwprg.htm">www.state.sd.us/denr/des/drinking/dwprg.htm</a>	(605) 773-3754
<b>Tennessee</b> Department of Environment & Conservation: Division of Water Supply	<a href="http://www.state.tn.us/environment/dws/index.html">www.state.tn.us/environment/dws/index.html</a>	(615) 532-0191
<b>Texas</b> Texas Commission on Environmental Quality	<a href="http://www.tceq.state.tx.us/nav/util_water/">www.tceq.state.tx.us/nav/util_water/</a>	(512) 239-4691
<b>Utah</b> Department of Environmental Quality: Division of Drinking Water	<a href="http://www.drinkingwater.utah.gov">www.drinkingwater.utah.gov</a>	(801) 536-4200
<b>Vermont</b> Vermont Agency of Natural Resources	<a href="http://www.anr.state.vt.us/dec/watersup/wsd.htm">www.anr.state.vt.us/dec/watersup/wsd.htm</a>	(802) 241-3400

State Agency	Web Site	Phone Number
<b>Virgin Islands</b> Department of Planning & Natural Resources: Division of Environmental Protection	<a href="http://dpnr.gov.vi/dep/home.htm">http://dpnr.gov.vi/dep/home.htm</a>	(340) 773-1082
<b>Virginia</b> Department of Health: Office of Drinking Water	<a href="http://www.vdh.state.va.us/dw/index.asp">www.vdh.state.va.us/dw/index.asp</a>	(804) 864-7500
<b>Washington</b> Department of Environmental Health: Office of Drinking Water	<a href="http://www.doh.wa.gov/ehp/dw/">www.doh.wa.gov/ehp/dw/</a>	(360) 236-3100
<b>West Virginia</b> Bureau for Public Health: Department of Health and Human Resources	<a href="http://www.wvdhhr.org/oehs/eed/">www.wvdhhr.org/oehs/eed/</a>	(304) 558-6715
<b>Wisconsin</b> Department of Natural Resources: Drinking Water and Ground Water	<a href="http://www.dnr.state.wi.us/org/water/dwg/">www.dnr.state.wi.us/org/water/dwg/</a>	(608) 266-0821
<b>Wyoming</b> EPA Region VIII: Wyoming Drinking Water Program	<a href="http://www.epa.gov/region08/water/dwhome/wycon/wycon.html">www.epa.gov/region08/water/dwhome/wycon/wycon.html</a>	(303) 312-6812

# Appendix E: Tribal Contacts

For additional information or to learn more about the laws governing your tribe, use the contact information provided in this Appendix.

<b>U.S. EPA Headquarters</b>		
American Indian Environmental Office	<a href="http://www.epa.gov/indian">www.epa.gov/indian</a>	(202) 564-0303
<b>U.S. EPA Regional Tribal Capacity Development Coordinators</b>		
U.S. EPA Region 1	<a href="http://www.epa.gov/region01/topics/government/tribal.html">www.epa.gov/region01/topics/government/tribal.html</a>	(888) 372-7341
U.S. EPA Region 2	<a href="http://www.epa.gov/region02/nations/index.html">www.epa.gov/region02/nations/index.html</a>	(212) 637-3600
U.S. EPA Region 4	<a href="http://www.epa.gov/region04/ead/indian/index.htm">www.epa.gov/region04/ead/indian/index.htm</a>	(404) 562-6939
U.S. EPA Region 5	<a href="http://www.epa.gov/region5/water/stpb/">www.epa.gov/region5/water/stpb/</a>	(312) 353-2123
U.S. EPA Region 6	<a href="http://www.epa.gov/region06/6xa/tribal.htm">www.epa.gov/region06/6xa/tribal.htm</a>	(800) 887-6063
U.S. EPA Region 7	<a href="http://www.epa.gov/region07/government_tribal/index.htm">www.epa.gov/region07/government_tribal/index.htm</a>	(913) 551-7030
U.S. EPA Region 8	<a href="http://www.epa.gov/region08/tribes">www.epa.gov/region08/tribes</a>	(303) 312-6116
U.S. EPA Region 9	<a href="http://www.epa.gov/region09/cross_pr/indian/index.html">www.epa.gov/region09/cross_pr/indian/index.html</a>	(415) 744-1500
U.S. EPA Region 10	<a href="http://yosemite.epa.gov/r10/tribal.NSF/webpage/tribal+office+homepage?opendocument">yosemite.epa.gov/r10/tribal.NSF/webpage/tribal+office+homepage?opendocument</a>	(206) 553-4011
<b>Other Contacts</b>		
Administration for Native Americans	<a href="http://www.acf.dhhs.gov/programs/ana/">www.acf.dhhs.gov/programs/ana/</a>	(877) 922-9262
Bureau of Indian Affairs	<a href="http://www.doi.gov/bureau-indian-affairs.html">www.doi.gov/bureau-indian-affairs.html</a>	(202) 208-3710
Indian Health Service	<a href="http://www.ihs.gov">www.ihs.gov</a>	(301) 443-3024
Native American Water Association	<a href="http://www.nawainc.org">www.nawainc.org</a>	(775) 782-6636

## Appendix F: Other STEP Documents

This Supplement, the Basic Guide, and Supplement A are part of a series of Simple Tools for Effective Performance (STEP) documents for small drinking water systems. The currently available STEP documents can be obtained from EPA by calling the Safe Drinking Water Hotline at 1-800-426-4791 and requesting the document by its publication number or by visiting EPA's Small Drinking Water Web site at [www.epa.gov/safewater/smallsys.htm](http://www.epa.gov/safewater/smallsys.htm).

### *Safe Drinking Water Act (SDWA) Regulation Overview Brochure for Small Systems*

This brochure summarizes SDWA regulations that currently exist, are proposed, or are under development that affect or will affect small water systems. The brochure emphasizes how the regulations relate to each other and explains the multi-barrier approach to microbial and chemical risks and how SDWA regulations fit into this type of framework. The brochure also emphasizes how most small systems can achieve compliance through process optimization and more efficient system management.

Publication number EPA 816-R-02-004

### *Complying With the New Drinking Water Standard for Arsenic*

This workbook is designed to help systems understand and achieve compliance with the Arsenic Rule. The workbook provides sample worksheets to help systems organize data and provides guidance for small systems on their selection of appropriate compliance options.

Publication number EPA 816-R-02-008A

### *Asset Management: A Handbook for Small Water Systems*

This workbook guides small systems through a four-step process of developing an asset management plan and includes worksheets on completing a thorough asset inventory; prioritizing the maintenance, rehabilitation, and replacement of your assets; developing a simple asset management plan; and carrying out the plan. The workbook also provides information about how asset management can help improve your system's financial health and ability to provide safe drinking water.

Publication number EPA 816-K-03-016

### *Strategic Planning: A Handbook for Small Water Systems*

This workbook is designed to help systems understand the concept of strategic planning and how it can help them prepare to meet public expectations and regulatory requirements while maintaining organizational and financial stability in the future. The workbook provides worksheets to help systems create a vision statement and mission, assess their capacity, define their area of service, identify challenges, and develop a strategic plan for their system.

Publication number EPA 816-R-03-015

### *Taking Stock of Your Water System: A Simple Asset Inventory for Very Small Drinking Water Systems*

This workbook will guide very small systems through a simple asset inventory of their drinking water system and the first steps of an asset management plan. The workbook includes worksheets on asset condition and prioritization.

Publication number EPA 816-K-03-002

### *Preventive Maintenance Tasks for Tribal Drinking Water Systems: Guide Booklet and Log Sheets*

The log cards and guidance booklet provide a schedule of routine operation and maintenance tasks for small drinking water systems that use a groundwater supply. The booklet is divided into sections that outline daily, weekly, and monthly tasks, plus individual sections that describe specific tasks for each month of the year. Each section contains guidance notes that provide additional information on some tasks. The notes correspond to the tasks on the accompanying cards.

Publication number EPA 816-F-01-017