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

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

For Small Systems Adding Chlorine Dioxide or Ozone

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 Subpart H systems using conventional filtration should obtain Supplement B of this guide or contact their state for more information on how the Stage 1 DBPR applies to them.

Office of Water (4606M)
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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.

Contents

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

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

Acronyms and Definitions

ART - Average residence time

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 that results in substantial particulate removal.

CWS - Community water system

DBP - Disinfection byproduct

DBP Precursor - Disinfection byproduct precursor

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

EPTDS - Entry point to the distribution system

GWUDI - Ground water under the direct influence of surface water

LT1ESWTR - Long-Term 1 Enhanced Surface Water Treatment Rule

MCL - Maximum contaminant levels are the maximum permissible levels of a *contaminant* in water delivered to a consumer. MCLs are enforceable standards.

MRDL - Maximum residual disinfectant levels are the maximum permissible levels of *disinfectant residuals* in water delivered to a consumer. MRDLs are enforceable standards.

MRT - Maximum residence time is an active point in the distribution system where the water has been in the system the longest. This may not necessarily be the same as the most distant point from your treatment plant.

NTNCWS - Non-transient non-community water system

Operational Samples - Samples your system takes not for compliance purposes, but to gain a better understanding of water quality. These samples should not be included in your compliance calculations.

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 ground water under the direct influence of surface water as a source.

SUVA - Specific ultraviolet absorption

TCR - Total Coliform Rule

TOC - Total organic carbon

TNCWS - Transient non-community water system

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, chloramine, chlorine dioxide, or ozone to their drinking water during any part of the treatment process. 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 guide covers the additional requirements for:

- Community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) adding chlorine dioxide during any part of the treatment process;
- Transient non-community water systems (TNCWSs) adding chlorine dioxide during any part of the treatment process; and
- CWSs and NTNCWSs adding ozone during any part of the treatment process.

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 chlorine dioxide or ozone, the requirements covered in this supplement do not apply to your system.

Systems that will typically find this guide useful (if they use chlorine dioxide or ozone) 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

Subpart H systems that use conventional filtration should obtain Supplement B of this guide or contact their state. Contact information for Safe Drinking Water Act (SDWA) Primacy Agencies is provided in Appendix E. Tribal contact information is provided in Appendix F. If your system is a new system or if you are just starting to use a 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. This guide contains:

- The monitoring required for chlorine dioxide, chlorite, and bromate under the Stage 1 DBPR;
- 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 regulations and the systems to which they apply. It also indicates where you can find information on each disinfectant residual, byproduct, or precursor in the Basic Guide and its supplements. The appendices contain examples of compliance calculations, sample monitoring worksheets, and sample monitoring plans.

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 Page 5
Total trihalomethanes (TTHM) & five haloacetic acids (HAA5)	CWSs and NTNCWSs adding any chemical disinfectant for any purpose	Basic Guide
Chlorite	CWSs and NTNCWs adding chlorine dioxide for disinfection or oxidation	Supplement A Page 5
Bromate	CWSs and NTNCWSs using ozone	Supplement A Page 11
Disinfection Byproduct (DBP) Precursors	CWSs and NTNCWSs using surface water or ground water under the direct influence of surface water (GWUDI) and conventional filtration	Supplement B

This guide 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 E and F.

Chlorine Dioxide and Chlorite

Monitoring Requirements for Chlorine Dioxide and Chlorite

DO I HAVE TO MONITOR FOR CHLORINE DIOXIDE AND CHLORITE?

All systems (including TNCWSs) that add chlorine dioxide for disinfection or oxidation must monitor for chlorine dioxide and comply with the maximum residual disinfectant level (MRDL) listed in Table 2 (40 CFR 141.65). In addition, all CWSs and NTNCWSs using chlorine dioxide to disinfect or oxidize their water must monitor for chlorite and comply with the maximum contaminant level (MCL) listed in Table 3 (40 CFR 141.64). If you use chlorine dioxide intermittently, you only have to monitor on days or in months when you use it. **If you do not use chlorine dioxide to oxidize or disinfect, this section does not apply to you.** Unlike chlorite, excessive levels of chlorine dioxide can cause acute (i.e., immediate) health effects. Because of this, TNCWSs are required to comply with the chlorine dioxide MRDL even though they serve transient customers.

HOW OFTEN DO I HAVE TO SAMPLE AND WHERE DO I TAKE THE SAMPLES?

Routine and Additional Monitoring

Chlorine Dioxide. Routine monitoring for chlorine dioxide requires one sample per day taken at the entry point to the distribution system (EPTDS). If a sample exceeds the MRDL, you must take three additional samples in the distribution system the following day. Table 4 will help you determine how often you have to sample and how your system characteristics determine where you must take these samples (40 CFR 141.132(c)(2)(i)). These requirements apply to TNCWSs as well as CWSs and NTNCWSs.

Table 2: Chlorine Dioxide MRDL

Disinfectant	MRDL (mg/L)
Chlorine Dioxide*	0.8

*As ClO_2

Table 3: Chlorite MCL

DBP	MCL (mg/L)
Chlorite	1.0

Chlorite. Routine monitoring for chlorite requires one daily sample at the EPTDS as well as three monthly distribution system samples. Table 4 explains where to take these samples. If any daily sample exceeds the MCL, you must take additional samples in the distribution system the following day (40 CFR 141.132(b)(2)(i)). These requirements apply only to CWSs and NTNCWSs. TNCWSs are not required to monitor for chlorite because it usually causes negative health effects only after long-term exposure.

Reduced Monitoring

There is no reduced monitoring for **chlorine dioxide** (40 CFR 141.132(c)(2)(iii)) or for **daily chlorite** monitoring (40 CFR 141.132(b)(2)(iii)(A)).

Monthly chlorite monitoring can be reduced to quarterly monitoring after one year of sampling (with prior written permission from the state) if:

- No individual sample taken in the distribution system exceeded the chlorite MCL; and
- No individual daily sample taken at the EPTDS exceeded the chlorite MCL.

You must return to routine monitoring if any of your samples (quarterly or daily) exceed the MCL (40 CFR 141.132(b)(2)(iii)(B)).

Table 4: Monitoring Frequency and Locations for Chlorine Dioxide and Chlorite

Disinfectant	MRDL (mg/L)	System Type	Routine Monitoring Frequency	Routine Monitoring Location	Increased Monitoring Frequency*	Increased Monitoring Locations
Chlorine Dioxide (measured as ClO_2)	0.8	All systems using chlorine dioxide	Daily**	At the EPTDS	3 samples the day after a daily sample exceeds the MRDL	Systems not operating a booster chlorination station after the first customer must take three samples as close to the first customer as possible with at least 6 hours between samples (e.g., 6am, 12pm, 6pm).
						Systems operating a booster chlorination station after the first customer must take 3 samples: 1. As close as possible to the first customer 2. At the location representative of average residence time (ART);*** and, 3. At the location of maximum residence time (MRT).***

DBP	MCL (mg/L)	System Type	Routine Monitoring Frequency	Routine Monitoring Location	Increased Monitoring Frequency*	Increased Monitoring Locations
Chlorite	1.0	All systems using chlorine dioxide except TNCWSs	Daily**	At the EPTDS	3 samples the day after a daily sampling exceeds the MCL	At the same locations as the routine monthly samples 1. As close as possible to the first customer; 2. Location representative of ART; and 3. Location of MRT
			Monthly**	3 samples: 1. As close as possible to the first customer; 2. Location representative of ART; and 3. Location of MRT.		

* You must still take the routine daily sample at the EPTDS the day after you exceed the MRDL.

** If you use chlorine dioxide intermittently, you are only required to monitor on days or months when you use chlorine dioxide.

*** States may use different criteria to determine locations of average and MRT in the distribution system. Consult with your state for assistance in determining the points of average and MRT in your distribution system.

HOW DO I DETERMINE COMPLIANCE?

Chlorine Dioxide. There are two types of chlorine dioxide violations: acute and non-acute.

- *Acute violations* occur when any routine daily sample taken at the EPTDS exceeds the MRDL and one or more of the samples taken in the distribution system the following day also exceeds the MRDL (i.e., exceedance of chlorine dioxide in the distribution system). **Failure to take any one of the required additional samples in the distribution system on the day following an exceedance of the chlorine dioxide (MRDL) at the entry point is also an acute MRDL violation** (40 CFR 141.133(c)(2)(i)). For example:

    - System A's routine EPTDS sample was 0.90 mg/L (> MRDL).
    - System A's additional distribution system samples the following day were 0.80 mg/L, 0.70 mg/L, and 0.90 mg/L.
    - System A has committed an acute MRDL violation because one of its additional distribution system samples exceeded the MRDL.

- *Non-acute violations* occur when two consecutive routine daily entry point samples exceed the MRDL, but none of the additional samples taken in the distribution system are above the MRDL (i.e., exceedance of chlorine dioxide at the EPTDS, but not in the distribution system.). F**ailure to collect the routine entry point sample on the day following an exceedance of the chlorine dioxide MRDL at the entry point is also a non-acute MRDL violation** (40 CFR 141.133(c)(2)(ii)). For example:

    - System A's routine EPTDS sample was 0.90 mg/L (> MRDL).
    - System A's routine EPTDS sample on the following day was also 0.90 mg/L, and System A's additional distribution system samples taken the same day (because of the initial exceedance) were 0.80 mg/L, 0.70 mg/L, and 0.60 mg/L.
    - System A's routine EPTDS sample on the third day was 0.10 mg/L.
    - System A has committed a non-acute MRDL violation because two consecutive routine EPTDS samples exceeded the MRDL, but none of the additional distribution system samples exceeded the MRDL.

Chlorite. Compliance for chlorite monitoring is based exclusively on the average of the 3-sample set taken in the distribution system. Daily samples must also be taken. If the **average** of any 3-sample set (either your routine monthly sample set or an additional set taken due to a daily exceedance) exceeds the MCL, your system has violated the MCL. **Even if your routine daily entry point monitoring result exceeds the MCL and one or more of your additional distribution system samples exceeds the MCL, you are not in violation unless the average of your three additional distribution system sample exceeds the MCL** (40 CFR 141.133(b)(3)).

Table 5 presents information on determining compliance and identifies MCL and MRDL violations.

Table 5: Determining Compliance for Chlorine Dioxide and Chlorite

Disinfectant	Monitoring Frequency	Compliance is based on:	You have an MCL or MRDL violation if:
Chlorine Dioxide	Daily	Consecutive daily sampling results	**Acute violation:** Your routine daily entrance point result is > 0.8 mg/L, and either: 1. Any additional distribution system sample is > 0.8 mg/L; or, 2. You fail to take any of the additional samples in the distribution system. **Non-acute violation:** 1. Two consecutive routine daily entry point samples are > 0.8 mg/L, but distribution system samples are ≤ 0.8 mg/L. 2. Your daily sample is > 0.8 mg/L, and you fail to take your required routine *entry point* daily sample the next day.
DBP	**Monitoring Frequency**	**Compliance is based on:**	**You have an MCL or MRDL violation if:**
Chlorite	Daily and monthly	An average of each 3-sample set taken in the distribution system (both routine monthly and all additional sets). Add the results from each 3-sample set and divide the sum by 3.	The average of any 3-sample set is > 1.0 mg/L. Note: If your daily entry point sample is above the MCL, you are not in violation unless the average of your 3 additional distribution system samples is above the MCL.

Bromate

Monitoring Requirements for Bromate

DO I HAVE TO MONITOR FOR BROMATE?

If your system uses ozone for disinfection or oxidation, you must monitor for bromate, a byproduct of ozonation, and comply with the MCL listed in Table 6 (40 CFR 141.64). A system may choose to monitor for bromide in order to reduce bromate monitoring and thereby reduce their overall monitoring costs.

Table 6: Bromate MCL

DBP	MCL (mg/L)
Bromate	0.010

HOW OFTEN DO I HAVE TO SAMPLE?

Routine and Increased Monitoring

You must take one sample per month for each treatment plant using ozone while the ozonation system is operating under normal conditions (40 CFR 141.132(b)(3)(i)). There is no increased monitoring for bromate.

Reduced Monitoring

Systems using ozone may reduce their bromate monitoring (with prior written state permission), and thereby reduce overall monitoring costs, to once per quarter by monitoring for bromide in source water for twelve consecutive months. Because bromate is formed from bromide, low levels of bromide in your source water indicate low levels of bromate in you treated water. If your running annual average (RAA) for bromide is < 0.05 mg/L, you may be eligible for reduced bromate monitoring. Contact your state for more information.

If you qualify for reduced monitoring, you must continue to monitor for bromide every month. If your RAA of bromide is ever > 0.05 mg/L, you must return to routine (monthly) bromate monitoring. NOTE: Monitoring the source water for bromide is optional and is only necessary if you choose to try to qualify for and remain on reduced bromate monitoring (40 CFR 141.132(b)(3)(ii).

WHERE DO I TAKE THE SAMPLES?

You must take your routine or reduced bromate samples at the EPTDS (see Table 7 for locations) (40 CFR 141.132(b)(3)(i)). If you choose to sample for bromide to obtain reduced monitoring status, you must sample your source water (40 CFR 141.132(b)(3)(ii)).

Table 7: Bromate and Optional Bromide Monitoring Requirements and Locations

DBP	MCL (mg/L)	System Type	Routine Monitoring Frequency	Reduced Monitoring Frequency	Increased Monitoring Frequency	Monitoring Location
Bromate	0.010	Systems using ozone	Monthly	Quarterly		EPTDS
Precursor	**Trigger Level (mg/L)**	**System Type**	**Monitoring Frequency**	**Reduced Monitoring Frequency**	**Increased Monitoring Frequency**	**Monitoring Location**
Bromide	0.05	Systems using ozone attempting to qualify for reduced monitoring	Monthly			Source water

HOW DO I DETERMINE COMPLIANCE?

Compliance with the bromate monitoring requirements is determined by an RAA of your monthly samples (or monthly averages if you take more than one sample per month), calculated at the end of each quarter. If your RAA exceeds the MCL, your system is in violation.

For example, if System A's monthly results for the last 12 months were 0.015 mg/L, 0.010 mg/L, 0.010 mg/L, 0.012 mg/L, 0.014 mg/L, 0.016 mg/L, 0.010 mg/L, 0.012 mg/L, 0.010 mg/L, 0.012 mg/L, 0.015 mg/L, and 0.013 mg/L, the sum of System A's 12 monthly results (0.149 mg/L) divided by the number of samples collected (12) equals 0.012 (> MCL). System A has committed an MCL violation.

If you are on reduced monitoring and your RAA for bromate exceeds the MCL, your system is in violation. You must notify the public and report to the state (40 CFR 141.134) whenever you commit a violation. Table 8 presents compliance criteria and identifies MCL violations (40 CFR 141.133(b)(2)). The next section of this guide provides information on reporting requirements.

Table 8: Determining Compliance for Bromate

DBP	Monitoring Frequency	Compliance is based on:	You have an MCL violation if:
Bromate	Monthly	An RAA of the last 12 monthly samples (or monthly averages if > 1 sample each month) computed each quarter.	1. The RAA is > 0.010 mg/L; OR, 2. Any one sample result will cause the RAA to violate the MCL.

Analysis 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 16-F-02-021), available online at www.epa.gov/safewater/publicoutreach/quickreferenceguides.html.

Monthly chlorite sample analysis must be done by a certified laboratory. Your system operator, however, may be able to qualify for state approval to analyze chlorine dioxide and daily chlorite samples. Bromate sample analysis must be done by a certified laboratory. If you choose to sample for bromide to attempt to qualify for reduced bromate monitoring, your system operator may be able to qualify for state approval to collect and analyze bromide samples. Contact your state for more information. Contact information is provided in Appendix E. Tribal contact information is provided in Appendix F.

What Do I Report to the State?

All public water systems (PWSs) required to comply with the Stage 1 DBPR must report routine sampling results to their state within 10 days of the end of each quarter in which they collect samples (40 CFR 141.134(a)). Table 9 shows what information must be included in your chlorine dioxide and chlorite routine report. Table 10 shows what information must be included in your bromate routine report. You must also report all MCL, MRDL, and monitoring violations. You must notify the state within 48 hours of a non-acute chlorine dioxide MRDL violation, a bromate MCL violation, or a chlorite MCL violation. Due to the acute health effects of chlorine dioxide, you must report acute chlorine dioxide violations to your state as soon as possible, but within 24 hours (40 CFR 141.202(b)(2)).

Table 9: Reporting Information for Chlorine Dioxide and Chlorite

Disinfectant	Monitoring Frequency	Report Information
Chlorine Dioxide*	Daily	1. Dates, results, and locations of all samples taken during the last quarter. 2. Whether the MRDL was violated. 3. Whether the MRDL was exceeded in any two consecutive daily samples and if so, whether the violation was acute or non-acute.
DBP	**Monitoring Frequency**	**Report Information**
Chlorite**	Daily and Monthly	1. Number of entry point samples taken each month for last 3 months. 2. Location, date, and result of each sample (both entry point and distribution) taken during the last quarter. 3. For each month in the reporting period, the average of each 3-sample set taken in the distribution system. 4. Whether the MCL was violated, in which month, and how many times it was violated each month.

* 40 CFR 141.134(c)
** 40 CFR 141.134(b)

Table 10: Reporting Information for Bromate

DBP	Monitoring Frequency	Report Information
Bromate	Monthly	1. Number of samples taken during the last quarter. 2. Location, date, and result of each sample taken during the quarter. 3. Average of the monthly averages of all samples taken during the previous 12 months.* 4. Whether the MCL was violated.

* If you only collect one sample per month, your monthly average should be the same as your monthly result.

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 public notification (PN) in the following situations:

PUBLIC NOTIFICATION IN THE CASE OF A VIOLATION

The method and timing of your PN report varies based on the type of violation. If you have a non-acute chlorine dioxide MRDL violation, a bromate MCL violation, or a chlorite MCL violation, you must provide Tier 2 PN: that is, you must notify the public as soon as practicable, but no later than 30 days after you learn of the violation (40 CFR 141.203(b)(1)). Within 10 days of notifying your customers, you must also 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, MCL, and MRDL 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 PN.

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 PN 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)).

Due to the acute health effects caused by chlorine dioxide, the requirements for an acute violation are more stringent. In the case of an acute chlorine dioxide MRDL or monitoring violation, you must provide Tier 1 PN: that is, you must notify the public as soon as possible, but within 24 hours using television, radio, posted notices, or hand delivery. Whatever method you choose to use must be designed to reach residential, transient, and non-transient users (40 CFR 141.202(c)). Your state may establish other or additional methods to help ensure that your notice reaches all users. Within 10 days of notifying your customers, you must also submit to the state both a certification that you have fully complied with the PN regulations and a copy of the PN.

All monitoring violations (e.g., failure to take the required number of samples) must be reported to the state and to your customers.

Generally, monitoring violations require Tier 3 PN, that is, you must notify your customers within 12 months of the violation. You may include the notification in your Consumer Confidence Report (CCR) if it is published in time to satisfy the 12-month deadline. Chlorine dioxide monitoring violations require you to issue a Tier 1 PN and notify the public as soon as possible, but within 24 hours (40 CFR 141.202(c)). Your state has the discretion to impose more stringent PN requirements. Check with your state for more information.

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

- **Acute chlorine dioxide:** "Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.

  The chlorine dioxide violations reported today include exceedances of the EPA standard within the distribution system which delivers water to consumers. Violations of the chlorine dioxide standard within the distribution system may harm human health based on short-term exposures. Certain groups, including fetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure."

- **Non-acute chlorine dioxide:** "Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.

  The chlorine dioxide violations reported today are the result of exceedances at the treatment facility only, not within the distribution system which delivers water to consumers. Continued compliance with chlorine dioxide levels within the distribution system minimizes the potential risk of these violations to consumers."

- **Chlorite:** "Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia."

- **Bromate:** "Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer."

ROUTINE CONSUMER CONFIDENCE REPORTS

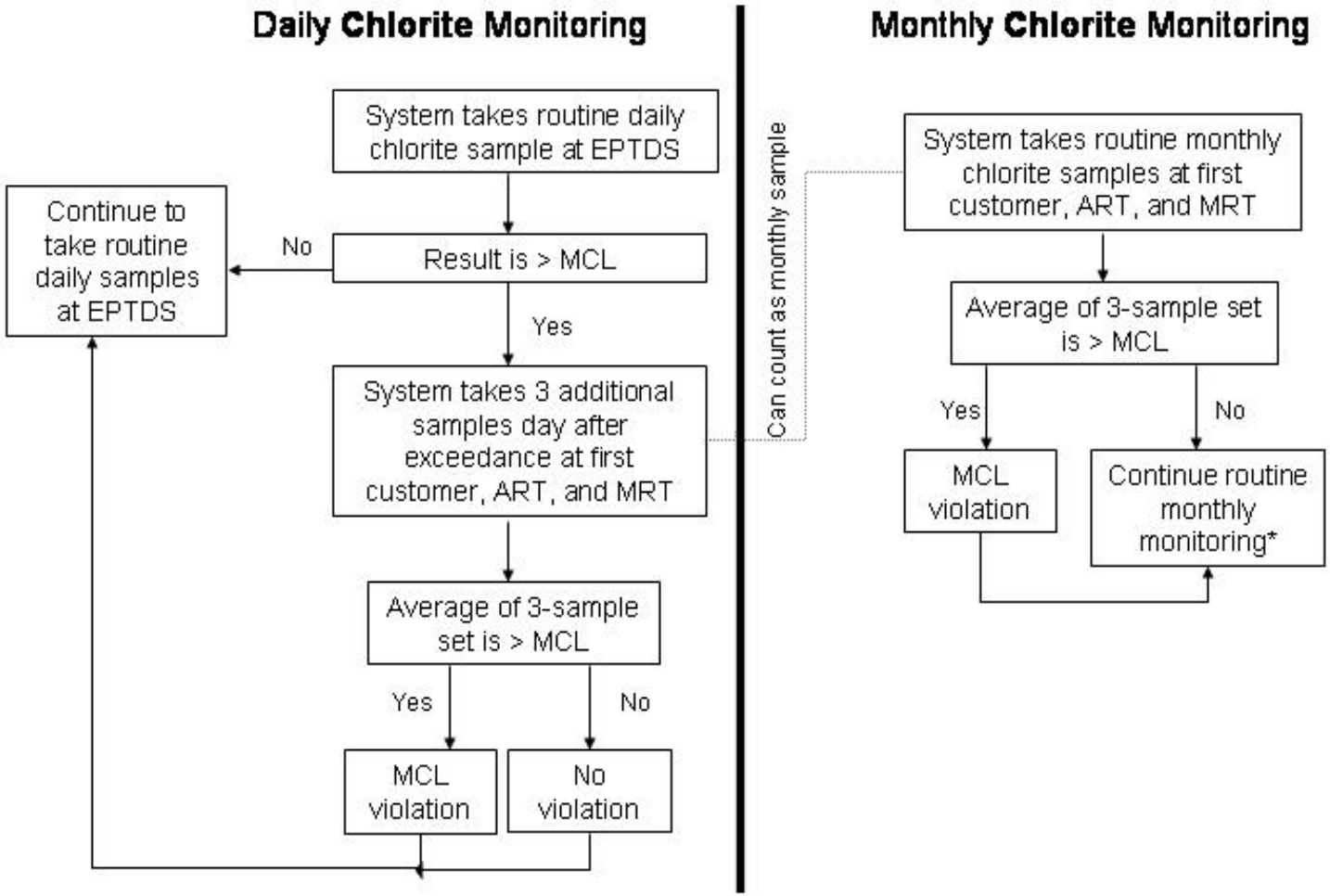
By July 1 of every year, you must make a CCR available to your customers (40 CFR 141.152(b)). This report is designed to provide a "snapshot" of the quality of the water supplied by your system over the past year. In your CCR, you must tell your customers about any violations, the actions you took to 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.

Appendix A: Compliance Determination Examples

The following examples are designed to help you understand the requirements of the Stage 1 DBPR. The chlorite and chlorine dioxide compliance determination examples are each preceded by a flowchart outlining monitoring requirements and situations in which systems are considered to have committed a violation. Monitoring examples, including a detailed narrative of monitoring activities for each disinfectant or byproduct, are provided, followed by portions of completed monitoring worksheets showing sampling results and compliance calculations. Blank copies of the monitoring worksheets are provided in Appendix B for your use. Please note that the completed worksheets that accompany the examples are abbreviated versions of the blank copies provided.

Note: The monitoring requirements listed in these examples correspond to the type of system described in each example, and may be different than the requirements for your system.

CHLORITE



*After 1 year system can reduce monthly monitoring to quarterly, with state approval, if no individual monthly samples and no routine daily samples exceed the MCL.

Example #1: *A Small Surface Water CWS Monitors for Chlorite (Daily)*

This example shows how a small surface water system using chlorine dioxide would conduct routine monitoring for chlorite and calculate compliance on a daily basis. Although it will not be discussed in this example, the system must also monitor and calculate compliance with the chlorine dioxide MRDL.

This surface water system serves 700 persons and is required to perform daily chlorite monitoring at the EPTDS because it uses chlorine dioxide for oxidation and disinfection. It is also required to perform monthly distribution system chlorite monitoring. Monthly monitoring for chlorite will be covered in example #3. The system will also have to perform daily chlorine dioxide monitoring. Daily chlorine dioxide monitoring will be covered in examples #4 and #5.

On April 18, 2005 the daily chlorite sample at the EPTDS is below the MCL. The system's daily EPTDS sample on April 17 (not shown) was also below the MCL, so no additional monitoring in the distribution system was required. In addition, the system will not be required to take distribution system samples on April 19, 2005.

Example #1 Worksheet

Daily Chlorite Monitoring Worksheet									
MCL for Chlorite: 1.0 mg/L									
Routine Daily Monitoring				**Additional Distribution System Monitoring**					
Date Samples Collected	**Location**	**Result**	**Date Report Sent to State**	**Additional Sample and Date**		**Location**	**Result**	**Compliance Calculation**	**Follow-up Action Taken**
Day, month, and year	*Must be taken at EPTDS*	*Circle if above MCL*	*Routine or violation report*	*Must be taken day after entry point exceedance*		*1st customer, ART, MRT*		*Average of 3-sample set (circle if above MCL)*	*Check appropriate box*
4/18/05	EPTDS	0.8 mg/L		1					☐ Notify the State ☐ Notify the Public
				2					
				3					

Example #2: *A Small Surface Water CWS Monitors for Chlorite (Daily)*

This example shows what would happen if a routine daily entry point sample taken by the surface water system in example #1 exceeded the chlorite MCL, but the average of the three distribution system follow-up samples did not exceed the MCL.

The system collects its routine daily entry point sample on April 19, 2005. No additional distribution system monitoring is required on April 19 because the daily entry point sample collected on April 18, 2005 did not exceed the MCL (see example #1). The routine daily sample result collected on April 19 (1.2 mg/L) exceeds the MCL (1.0 mg/L). The system must take additional distribution system samples the next day (April 20) at each of the following three locations: the first customer, the location of ART, and the MRT. The system must take the three sample set in addition to the routine daily entry point sample required on April 20, 2005.

On April 20, the system takes its routine daily entry point sample (0.7 mg/L), which is below the MCL. The system will not have to take additional samples in the distribution system on April 21, 2005. The system also takes the three additional samples required by the exceedance of the MCL at the EPTDS on the previous day (April 19). The average of the three April 20 additional samples is below the MCL, so the system remains in compliance, even though the sample at the first customer (1.1 mg/L) is above the MCL:

$$\frac{1.1 + 0.9 + 0.5 \text{ mg/L}}{3} = 0.8 \text{ mg/L} \leq \text{MCL}$$

Example #2 Worksheet

Daily Chlorite Monitoring Worksheet									
MCL for Chlorite: 1.0 mg/L									
Routine Daily Monitoring				**Additional Distribution System Monitoring**					
Date Sample Collected	**Location**	**Result**	**Date Report Sent to State**	**Additional Sample and Date**		**Location**	**Result**	**Compliance Calculation**	**Follow-up Action Taken**
Day, month, and year	*Must be taken at EPTDS*	*Circle if above MCL*	*Routine or violation report*	*Must be taken day after entry point exceedance*		*1st customer, ART, MRT*		*Average of 3-sample set (circle if above MCL)*	*Check appropriate box*
4/19/05	EPTDS	1.2 mg/L		1 2 3					☐ Notify the State ☐ Notify the Public
4/20/05	EPTDS	0.7 mg/L		1 2 3	4/20/05	First Customer Average RT Maximum RT	1.1 mg/L 0.9 mg/L 0.5 mg/L	$\frac{1.1 + 0.9 + 0.5}{3}$ = 0.8 mg/L	☐ Notify the State ☐ Notify the Public

Example #3: *A Small Surface Water CWS Monitors for Chlorite (MCL Violation)*

This example shows how the surface water system in examples #1 and #2 violates the MCL with its routine monthly distribution system samples.

On June 20, 2005 the system takes its three routine distribution system samples for the month. The average of the three samples exceeds the MCL:

$$\frac{1.2\ \text{mg/L} + 1.1\ \text{mg/L} + 1.0\ \text{mg/L}}{3} = 1.1\ \text{mg/L} > \text{MCL}$$

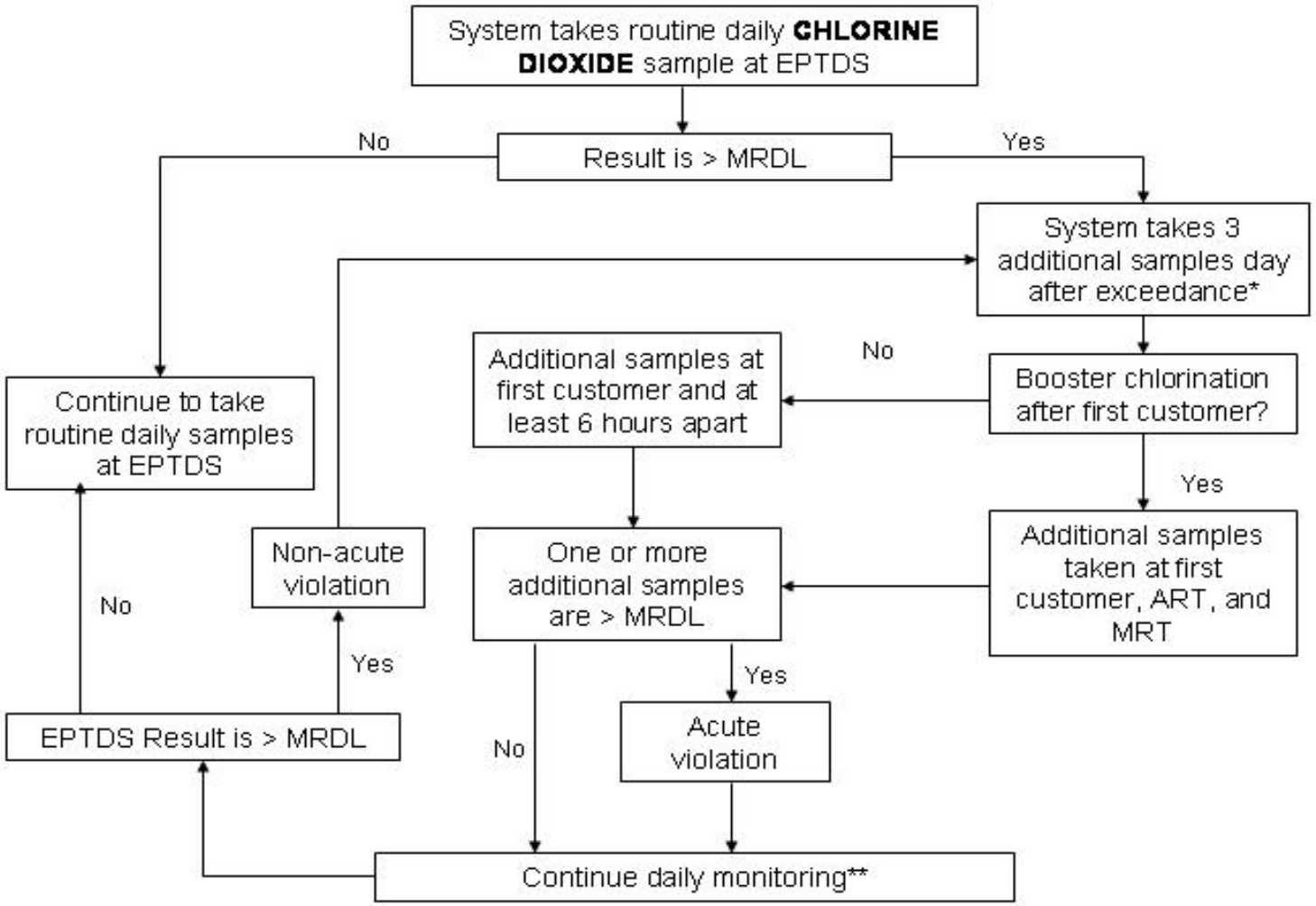
The system has committed an MCL violation and must report to the state within 48 hours and to its customers within 30 days.

The average of monthly distribution system samples taken for July 2005 does not exceed the MCL. The system is in compliance for the month of July.

Example #3 Worksheet

Monthly and Quarterly Distribution System Chlorite Monitoring Worksheet							
MCL for Chlorite: 1.0 mg/L							
Monitoring Frequency	**Date Sample Collected**	**Location**		**Results**	**Compliance Calculation**	**Follow-up Action Taken**	**Date Report Sent to State**
Check box	*Day, month, and year*	*Must be taken at first customer, ART, and MRT*		*Circle if above MCL*	*Average of 3-sample set; circle if above MCL*	*Check appropriate box*	*Routine or violation report*
✓ Monthly ☐ Quarterly	June 20, 2005	1	First Customer	1.2 mg/L	1.2 + 1.1 + 1.0 / 3 = 1.1 mg/L	✖ Notify the State ✖ Notify the Public	6/30/05
		2	Average Residence Time	1.1 mg/L			
		3	Maximum Residence Time	1.0 mg/L			
✓ Monthly ☐ Quarterly	July 20, 2005	1	First Customer	1.0 mg/L	1.0 + 0.9 + 0.8 / 3 = 0.9 mg/L	☐ Notify the State ☐ Notify the Public	
		2	Average Residence Time	0.9 mg/L			
		3	Maximum Residence Time	0.8 mg/L			

CHLORINE DIOXIDE



*Failure to take additional samples in the distribution system the day after your routine daily sample exceeded the MRL is an acute violation.

**Failure to take your routine EPTDS daily sample the day after a routine daily sample exceeds the MRDL is a non-acute violation.

Example #4: *A Surface Water CWS Monitors for Chlorine Dioxide (Non-acute Violation)*

This example shows how a surface water system using chlorine dioxide collects routine daily entry point samples and commits a non-acute chlorine dioxide MRDL violation based on consecutive daily entry point samples. Although it will not be discussed in this example, the system would also be required to monitor and calculate compliance with the chlorite MCL.

This surface water system serves 1,000 persons and is required to perform daily chlorine dioxide monitoring at the entrance to the distribution system because it uses chlorine dioxide as a disinfectant. On March 29, 2004 the system takes its required sample at the EPTDS. The sample (0.7 mg/L) is below the MRDL (0.8 mg/L), and no additional monitoring is required.

On March 30, the system takes its required daily sample at the EPTDS. The sample (0.9 mg/L) exceeds the MRDL, and the system must perform additional distribution system monitoring on March 31. Since two samples collected on consecutive days have not yet exceeded the MRDL (the routine entry point sample for March 29 was below the MRDL), the system has not yet committed a violation.

On March 31, the system takes its required sample at the EPTDS and its three additional distribution system samples required by the March 30 entry point sample result. Since the entry point sample (0.9 mg/L) exceeds the MRDL, the system must perform additional monitoring on April 1. Now, because two routine daily entry point samples in a row exceed the MRDL (March 30 and 31), the system has committed a non-acute MRDL violation and must report to the state within 48 hours and to its customers within 30 days. Because the system does not operate booster chlorination stations after the first customer, the additional distribution system three sample set taken on March 31 (due to the MRDL exceedance on March 30) is taken as close as possible to the first customer. The samples are taken at least 6 hours apart from one another. None of the additional distribution system samples exceed the MRDL. Based on the entry point sample result for March 30 and the distribution system monitoring for March 31, the system has not committed an acute MRDL violation (but does have a non-acute violation).

On April 1, the system collects its routine daily entrance point sample. The sample (0.7 mg/L) does not exceed the MRDL. No additional monitoring in the distribution system will be required on April 2. Still on April 1, the system collects the additional distribution system samples required because of the exceedance at the entry point on March 31. None of the additional distribution system samples exceed the MRDL. The system has not committed an acute violation.

Example #4 Worksheet

Chlorine Dioxide Monitoring Worksheet

MRDL for Chlorine Dioxide: 0.8 mg/L (as ClO_2)

Routine Monitoring				Additional Monitoring						
Date Sample Collected	**Location**	**Result**	**Date Report Sent to State**		**Additional Sample and Date**	**Location** or Time	**Result**	**Violation Type**	**Follow-up Action Taken**
Day, month, and year	*Must be taken at EPTDS*	*Circle if above MRDL*	*Routine or violation report*		*Must be taken day after exceedance*	*Varies by system type*	*Circle if above MRDL*	*Check appropriate box*	*Check appropriate box*
3/29/04	EPTDS	0.7 mg/L						☐ Acute ☐ Non-acute	☐ Notify the State ☐ Notify the Public
3/30/04	EPTDS	0.9 mg/L		1 2 3				☐ Acute ☐ Non-acute	☐ Notify the State ☐ Notify the Public
3/31/04	EPTDS	0.9 mg/L	non-acute violation 4/2/04	1 2 3	3/31/04 6:00 am 12:00 pm 6:00 pm	First customer First customer First customer	0.7 mg/L 0.5 mg/L 0.6 mg/L	☐ Acute ✖ Non-acute	✖ Notify the State ✖ Notify the Public
4/1/04	EPTDS	0.7 mg/L		1 2 3	4/1/04 6:00 am 12:00 pm 6:00 pm	First customer First customer First customer	0.8 mg/L 0.8 mg/L 0.7 mg/L	☐ Acute ☐ Non-acute	☐ Notify the State ☐ Notify the Public

Example #5: *A Surface Water CWS Monitors for Chlorine Dioxide (Acute Violation)*

This example shows how the surface water system in example #4 commits an acute MRDL violation based on additional distribution system samples. Although it will not be discussed in this example, the system will also be required to monitor and calculate compliance with the chlorite MCL.

On April 2, the system continues to collect its routine daily chlorine dioxide entry point sample. The sample (1.1 mg/L) exceeds the MRDL (0.8 mg/L). The system must conduct additional distribution system monitoring the following day (April 3) to determine whether it has committed an acute MRDL violation.

On April 3, the system collects its routine daily entry point sample. The sample (0.8 mg/L) does not exceed the MRDL (0.8 mg/L). No additional distribution system samples are required on April 4. Still on April 3, the system conducts follow-up sampling because of the routine daily exceedance on April 2. Two of the samples taken at the first customer in the distribution system (1.1 mg/L, 0.9 mg/L) violate the MRDL. The system has now committed an acute violation since, in combination with the previous day's entry point exceedance, any single violation of the MRDL during follow-up distribution system sampling constitutes an acute violation. The system must report to the state as soon as possible (but no later than 24 hours after learning of the violation) and issue a PN within 24 hours (starting at 6 a.m., the time the first sample violated the MRDL). The system reports the violation to the state and the public on April 3.

The routine daily entry point sample for April 4 (0.6 mg/L) does not exceed the MRDL. The system has not committed a non-acute violation. No additional follow-up distribution system samples are required on April 5. The additional distribution system samples taken on April 4 because of the routine daily entry point exceedance on April 3 do not exceed the MRDL. The system has not committed another acute MRDL violation on April 4.

Example #5 Worksheet

Chlorine Dioxide Monitoring Worksheet									
MRDL for Chlorine Dioxide: 0.8 mg/L (as ClO_2)									
Routine Monitoring				**Additional Monitoring**					
Date Samples Collected	**Location**	**Result**	**Date Monitoring Report Sent to State**	**Additional Sample and Date**		**Location**	**Result**	**Violation Type**	**Follow-up Action Taken**
Day, month, and year	*Must be taken at EPTDS*	*Circle if above MRDL*	*Routine or violation report*	*Must be taken day after exceedance*		*Varies by system type*	*Circle if above MRDL*	*Check appropriate box*	*Check appropriate box*
4/2/04	EPTDS	1.1 mg/L						☐ Acute ☐ Non-acute	☐ Notify the State ☐ Notify the Public
4/3/04	EPTDS	0.8 mg/L	acute violation 4/3/04	1	4/3/04 6:00 am	First customer	1.1 mg/L	✖ Acute ☐ Non-acute	✖ Notify the State ✖ Notify the Public
				2	4/3/04 12:00 pm	First customer	0.9 mg/L		
				3	4/3/04 6:00 pm	First customer	0.8 mg/L		

BROMATE

Example #6: *A GWUDI System Monitors for Bromate*

This example discusses bromate monitoring, reporting, and compliance issues for a system using ozone.

This GWUDI system uses ozone for disinfection, so it must monitor for bromate each month. On April 18, 2005 the system takes its monthly sample at the EPTDS. Since compliance is calculated at the end of each quarter, no further action is required. The system continues to collect one bromate sample each month.

June 2005 marks the end of the second quarter of 2005. After collecting its sample for the month, the system must calculate its running annual average to determine compliance using monthly results for the last 12 months. The monthly results for July of 2004 through June of 2005 are as follows: 0.012 mg/L, 0.006 mg/L, 0.009 mg/L, 0.008 mg/L, 0.009 mg/L, 0.012 mg/L, 0.009 mg/L, 0.009, 0.015 mg/L, 0.009 mg/L, 0.010 mg/L, and 0.011 mg/L. Since the system did not collect a sample in May, it only has 11 samples available to calculate its running annual average. To determine whether the system has violated the MCL, the system sums all available monthly samples for the last 12 months (12 samples) and divides it by the total number of samples taken (12):

$$\frac{0.012+0.006+0.009+0.008+0.009+0.012+0.009+0.009+0.015+0.009+0.010+0.011 \text{ mg/L}}{12} = 0.010 \text{ mg/L} \leq \text{MCL}$$

Four of the individual monthly results in the last four quarters exceed the MCL. However, the system is in compliance because none of these results cause the RAA to violate the MCL (0.010 mg/L). No further action is required except to report to the state on or before the 10th day after the end of the quarter. For this example, the routine monitoring report is due on July 10, 2005. The system reports to the state on July 1, 2005, the same day it issues its CCR.

Example #9 Worksheet

Bromate/Bromide Monitoring Worksheet					
MCL for Bromate: 0.010 mg/L				**RAA for Reduced Monitoring (Bromide): 0.05 mg/L**	
Date Sample Collected	**Location**	**Result**	**Compliance Calculation**	**Follow-up Action Taken**	**Date Report Sent to State**
Day, month, and year	*Must be taken at EPTDS (bromate) or source (bromide)*	*Use for avg.*	*Running annual average computed quarterly*	*Check appropriate box*	*Routine or violation report*
4/18/05	EPTDS	0.009 mg/L		☐ Notify the State ☐ Notify the Public	
5/18/05	EPTDS	0.010 mg/L		☐ Notify the State ☐ Notify the Public	
6/18/05	EPTDS	0.011 mg/L	(0.012+0.006+0.009+0.008+0.009+0.012+0.009+0.009+ 0.015+0.009+0.010+0.011)/12 = 0.010 mg/L	✖ Notify the State ☐ Notify the Public	routine – 7/01/05

Appendix B: Sample Monitoring Worksheets

The following worksheets are designed to help you keep track of your Stage 1 DBPR sampling and results. These worksheets are designed to allow you to record both the results from your routine monitoring and the results from additional monitoring (where applicable). While these worksheets may be a useful management tool, system operators should also keep the original laboratory results on file.

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

Each worksheet includes an explanation of how to complete it and how to use it to calculate compliance. Review the examples in Appendix A to help you understand how the worksheets would be used in real-world situations.

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

Daily Chlorite Monitoring Worksheet Instructions

Step #1 Note when you took the routine daily entry point sample.
In the column labeled 'Date Sample Collected,' record the day, month, and year you took the sample.

Step #2 Record where you took the sample.
In the column labeled 'Location,' record where you collected the sample. Your daily chlorite samples must be taken at the entrance to the distribution system.

Step #3 Record result.
In the column labeled 'Result,' record the sample analytical result, including units of measure.

- If your result is below the MCL, no further action is required.
- If your result exceeds the MCL, you must take 3 additional samples on the next day and complete the 'Additional Monitoring' portion of the worksheet using the results from these samples.

Step #4 Monitoring report.
All systems must report to their state both routinely and after committing a violation. Enter the date you send your report to the state in the column labeled 'Date Report Sent to State.'

- Systems monitoring for chlorite daily must report within 10 days of the end of the quarter.
- Systems that have committed a violation must report within 48 hours.

Step #5A Record date and result of additional distribution system samples.
In the column labeled 'Additional Sample and Date,'record the day, month, and year that each of the 3 additional samples were taken. In addition, record the location and result for each of the samples in their respective columns.

- You must take one sample as close as possible to the first customer, one at the point of ART, and one at the point of MRT.

•

•

Step #5B Calculate average of additional samples.
Add the results of the 3-sample set you have taken and divide that number by 3. You will use this average to determine if you are in compliance. In the column labeled 'Compliance Calculation,' enter the calculated average.

- If your result is $\leq$ MCL, no further action is required.
- If your result is > MCL, you have violated the MCL and must notify your state and your customers. Circle the result if it is greater than the MCL.

Step #6 Follow-up action taken.
Specific follow-up actions need to be taken if a sampling result is > MCL or if you fail to take a sample (a monitoring violation). In the column labeled 'Follow-up Action Taken:'

- Check 'Notify the State' **AND** 'Notify the Public' if you fail to take a required sample.
- Check 'Notify the State' **AND** 'Notify the Public' if the average of your 3-sample set is > MCL. Notify the state within 48 hours and your customers within 30 days.

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Daily Chlorite Monitoring Worksheet

MCL for Chlorite: 1.0 mg/L

Routine Daily Monitoring				Additional Distribution System Monitoring					
Date Sample Collected	**Location**	**Result (a)(b)**	**Date Report Sent to State**		**Additional Sample and Date**	**Location (c)**	**Result**	**Compliance Calculation (d)**	**Follow-up Action Taken**
Day, month, and year	*Must be taken at EPTDS*	*Circle if above MCL*	*Routine or violation report*		*Must be taken day after entry point exceedance*	*1st customer, ART, MRT*		*Average of 3-sample set (circle if above the MCL)*	*Check appropriate box*
				1					☐ Notify the State
				2					☐ Notify the Public
				3					
				1					☐ Notify the State
				2					☐ Notify the Public
				3					
				1					☐ Notify the State
				2					☐ Notify the Public
				3					
				1					☐ Notify the State
				2					☐ Notify the Public
				3					
				1					☐ Notify the State
				2					☐ Notify the Public
				3					
				1					☐ Notify the State
				2					☐ Notify the Public
				3					
				1					☐ Notify the State
				2					☐ Notify the Public
				3					
				1					☐ Notify the State
				2					☐ Notify the Public
				3					
				1					☐ Notify the State
				2					☐ Notify the Public
				3					
				1					☐ Notify the State
				2					☐ Notify the Public
				3					

(a) If you fail to take a required sample, you have committed a monitoring violation and must notify the state and your customers.
(b) If your daily entry point sample exceeds the MCL, you must conduct follow-up monitoring in the distribution system on the day after the exceedance.
(c) You must take your additional samples in the distribution system at the first customer, the location of ART, and the location of MRT.
(d) If the average of your 3-sample set in the distribution system exceeds the MCL, you have committed an MCL violation and must notify the state within 48 hours and your customers within 30 days.

Monthly Chlorite Monitoring Worksheet Instructions

Step #1 Check monitoring frequency.
In the column labeled 'Monitoring Frequency,' check the box corresponding to the monitoring frequency of the sample. If you have qualified for reduced monitoring, you will monitor each quarter. Otherwise, you will monitor each month.

Step #2 Note when you took the samples.
In the column labeled 'Date Samples Collected,' record the day, month, and year you collected the sample.

Step #3 Enter the location where you took the sample.
In the column labeled 'Location,' enter the location where you took the sample. Monthly chlorite samples must be collected at the first customer, the location of ART, and the location of MRT.

Step #4 Record result.
In the column labeled 'Results,' record the sample analytical results, including units of measure. Record each sample on the line corresponding with the appropriate sample location.

Step #5 Calculate average of monthly samples.
Add the results of the 3-sample set you have taken and divide the sum by 3. You will use this average to determine if you are in compliance. Enter this average in the column labeled 'Compliance Calculation.'

- If your result is $\leq$ MCL, no further action is required.
- If your result is > MCL, you have violated the MCL and must notify your state and your customers. Circle all averages that are above the MCL.

Step #6 Follow-up action taken.
Specific follow-up actions need to be taken if a sampling result is > MCL or if you fail to take a sample (a monitoring violation). In the column labeled 'Follow-up Action Taken:'

- Check 'Notify the State' **AND** 'Notify the Public' if you fail to take a required sample.
- Check 'Notify the State' **AND** 'Notify the Public' if your monthly average is > MCL. Notify the state within 48 hours and your customers within 30 days.

Step #7 Monitoring report.
All systems must report to their state both routinely and after committing a violation. Enter the date you send your report to the state in the column labeled 'Date Monitoring Report Sent to State.'

- Systems monitoring for chlorite monthly or quarterly must report within 10 days of the end of the quarter.
- Systems that have committed a violation must report within 48 hours.

Monthly and Quarterly Distribution System Chlorite Monitoring Worksheet

MCL for Chlorite: 1.0 mg/L

Monitoring Frequency	Date Sample Collected		Location	Results (a)	Compliance Calculation (b)	Follow-up Action Taken	Date Report Sent to State
Check box	*Day, month, and year*		*Must be taken at first customer, ART, and MRT*	*Circle if above MCL*	*Average of 3-sample set; circle if above MCL*	*Check appropriate box*	*Routine or violation report*
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					
☐Monthly ☐Quarterly		1				☐ Notify the State ☐ Notify the Public	
		2					
		3					

(a) If you fail to take a required sample, you have committed a monitoring violation and must notify the state and your customers.
(b) If the average of your 3-sample set exceeds the MCL, you have committed an MCL violation and must notify the state within 48 hours and your customers within 30 days.

Chlorine Dioxide Monitoring Worksheet Instructions

Step #1 Note when you took the entry point sample.
In the column labeled 'Date Sample Collected,' record the day, month, and year you took the sample.

Step #2 Record where you took the samples.
In the column labeled 'Location,' record where you collected the sample. Your routine chlorine dioxide samples must be taken at the EPTDS.

Step #3 Record result.
In the column labeled 'Result,' record the sample analytical result, including units of measure.

- If your result is ≤ MRDL, no further action is required.
- If your result is > MRDL, you must take 3 additional samples the next day and complete the 'Additional Monitoring' portion of the worksheet (circle the result).
- If two consecutive daily samples exceed the MRDL, you have committed a non-acute violation. Check the box labeled 'Non-acute.' You must notify your state and your customers.

Step #4 Monitoring report.
All systems must report to their state after each quarter in which they collected samples. Systems that commit a violation must also report to the state. Enter the date you send your report to the state in the column labeled 'Date Report Sent to State.' Also note the type of report and violation and the submission date.

- Systems monitoring for chlorine dioxide must submit a report within 10 days of the end of each quarter.

Step #5A Record date, location, and result of additional samples.
If your daily sample exceeds the MRDL, you must take 3 additional distribution system samples the following day. Record the day, month, and year you took the samples in the column labeled 'Additional Sample and Date.' Where you take the samples depends on what type of system you operate. Record the location of each sample in the column labeled 'Location or Time.'

- Systems not operating a booster chlorination station after the first customer must take 3 samples in the distribution system as close to the first customer as possible with at least 6 hours between samples. Enter one sample on each available line (marked 1, 2, and 3).
- Systems operating booster chlorination stations after the first customer must take one sample at the EPTDS, one at the point of ART in the distribution system, and

  one at the point of MRT in the distribution system. Enter one sample on each available line (marked 1, 2, and 3).

In the column marked 'Result,' enter the analytical result of each additional distribution system sample on the line corresponding to the appropriate sample location. Circle any results above the MRDL.

Step #5B Determine compliance for additional samples.
Compare all three results to the MRDL. In the column labeled 'Violation Type:'

- If all your results are ≤ MRDL, no further action is required.
- If any of your results are > MRDL, you have committed an acute MRDL violation. Check the box labeled 'Acute.' You must notify your state and your customers.

If none of your results are > MRDL, but your routine sample has exceeded the MRDL on successive days, you have committed a non-acute violation. Check the box labeled 'Non-acute.' You must notify your state and your customers.

Step #6 Follow-up action taken.
Specific follow-up actions need to be taken if a sampling result is > MRDL or if you fail to take a sample (a monitoring violation). In the column labeled 'Follow-up Action Taken:'

- Check 'Notify the State' **AND** 'Notify the Public' if you fail to take a required sample.
- If you have committed a non-acute violation, check 'Notify the State' **AND** 'Notify the Public.' Notify the state within 48 hours and your customers within 30 days.
- If you have committed an acute violation, check 'Notify the State' **AND** 'Notify the Public.' Notify the state and customers as soon as possible but within 24 hours.

Chlorine Dioxide Monitoring Worksheet

MRDL for Chlorine Dioxide: 0.8 mg/L (as ClO_2)

Routine Monitoring				Additional Monitoring					
Date Sample Collected	**Location**	**Result (a)(b)**	**Date Report Sent to State**	**Additional Sample and Date (c)(d)**		**Location or Time (e)**	**Result (f)**	**Violation Type**	**Follow-up Action Taken**
Day, month, and year	*Must be taken at EPTDS*	*Circle if above MRDL*	*Routine or violation report*	*Must be taken day after exceedance*		*Varies by system type*	*Circle if above MRDL*	*Check appropriate box*	*Check appropriate box*
				1				☐ Acute	☐ Notify the State
				2				☐ Non-acute	☐ Notify the Public
				3					
				1				☐ Acute	☐ Notify the State
				2				☐ Non-acute	☐ Notify the Public
				3					
				1				☐ Acute	☐ Notify the State
				2				☐ Non-acute	☐ Notify the Public
				3					
				1				☐ Acute	☐ Notify the State
				2				☐ Non-acute	☐ Notify the Public
				3					
				1				☐ Acute	☐ Notify the State
				2				☐ Non-acute	☐ Notify the Public
				3					
				1				☐ Acute	☐ Notify the State
				2				☐ Non-acute	☐ Notify the Public
				3					
				1				☐ Acute	☐ Notify the State
				2				☐ Non-acute	☐ Notify the Public
				3					
				1				☐ Acute	☐ Notify the State
				2				☐ Non-acute	☐ Notify the Public
				3					
				1				☐ Acute	☐ Notify the State
				2				☐ Non-acute	☐ Notify the Public
				3					

(a) If you fail to take a required entry point sample, you have committed a monitoring violation and must notify the state and your customers.
(b) If your daily entry point sample exceeds the MRDL, you must conduct additional distribution system monitoring on the day after the exceedance.
(c) If you do not operate a booster chlorination station after the first customer, indicate the time when you took the samples.
(d) If you fail to take follow-up distribution system samples, you have committed an acute MRDL violation.
(e) If you do not operate a booster chlorination station after the first customer, take samples at the EPTDS with at least 6 hours between samples. If you operate booster chlorination stations after the first customer, take distribution system samples at the first customer, ART, and MRT locations.
(f) If any of your three additional samples exceeds the MRDL, you have committed an acute MRDL violation and must notify the state and your customers within 24 hours.

Bromate/Bromide Monitoring Worksheet Instructions

Step #1 Circle whether you are monitoring for bromate or bromide.
In the worksheet title, circle whether you are using this worksheet for bromate monitoring or for additional bromide monitoring in order to qualify for reduced bromate monitoring. **Track each analyte on a separate worksheet**.

Step #2 Note when you took the sample.
In the column labeled 'Date Sample Collected,' record the day, month, and year you took the sample.

Step #3 Record where you took the sample.
In the column labeled 'Location,' record where you collected the sample. Your bromate sample must be taken at the entrance to the distribution system and your bromide sample must be taken from your source water.

Step #4A Record result.
In the column labeled 'Result,' record the sample analytical result, including units of measure.

Step #4B Determine compliance/reduced monitoring eligibility.
In the column labeled 'Compliance Calculation,' record the RAA, calculated at the end of each quarter. Use your monthly bromate/bromide samples for the last 12 months to calculate your running annual average.

Step #4C Determine if further action is required (bromate).
If you are monitoring for bromate, compare your RAA to the MCL.
- If the result is ≤ MCL, no further action is required.
- If the result is > MCL, you have committed an MCL violation and must notify the state and your customers.

Step #4D Determine if you are eligible for reduced monitoring (bromide).
If you are monitoring for bromide, compare your RAA to the RAA required to qualify for reduced monitoring (0.05 mg/L).

- If the result is < qualifying level and your average is based on 1 year (12 months) of monitoring, contact your state to see if you are eligible for reduced bromate monitoring.
- If the result is ≥ qualifying level, you are not eligible for reduced monitoring. You will have to wait for another quarter of results to see if you qualify.

•

Step #5A Follow-up action taken (bromate).
Specific follow-up actions need to be taken if a bromate RAA is > MCL or if you fail to take a sample (a monitoring violation). In the column labeled 'Follow-up Action Taken:'

- Check 'Notify the State' **AND** 'Notify the Public' if you fail to take a required sample.
- Check 'Notify the State' **AND** 'Notify the Public' if you have committed an MCL violation. Notify the state within 48 hours and your customers within 30 days.

Step #5B Follow-up action taken (bromide).
If your RAA is below the RAA required to qualify for reduced bromate monitoring, you may wish to contact your state to see if you qualify for reduced monitoring. Check 'Notify the State.' You do not have to contact your state if the average is higher than the average required to qualify for reduced monitoring.

Step #6 Monitoring report.
All systems must routinely report to their state. Systems that commit a violation must report the violation to their state. In the column labeled 'Date Report Sent to State,' enter the day, month, and year you send your report to the state.

- Systems monitoring for bromate must report within 10 days of the end of each quarter.
- If you are monitoring for bromide, you are not required to report, but you may contact your state if you think your system is eligible for reduced monitoring.

Bromate/Bromide Monitoring Worksheet

MCL for Bromate: 0.010 mg/L **RAA for Reduced Monitoring (Bromide): 0.05 mg/L**

Date Sample Collected	Sample Location	Result (a)(b)	Compliance Calculation (c)(d)	Follow-up Action Taken	Date Report Sent to State
Day, month, and year	*Must be taken at EPTDS (bromate) or source (bromide)*	*Use for avg.*	*RAA computed quarterly*	*Check appropriate box*	*Routine or violation report*
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	
				☐ Notify the State ☐ Notify the Public	

(a) If you fail to take a required sample, you have committed a monitoring violation and must notify the state and your customers.
(b) If you take more than one sample in one month, you must take the average of the samples you have taken and use that number in your compliance calculations.
(c) You must use your monthly results to calculate your RAA.
(d) If your RAA exceeds the MCL, you have committed an MCL violation and must notify the state within 48 hours and your customers within 30 days.

Appendix C: 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 treatment techniques. If approved for monitoring as a consecutive system or if providing water to a consecutive system, the plan must reflect the entire distribution system. The plan must have been made available to the state and to the public by January 31, 2004. Subpart H systems serving between 3,300 and 10,000 people must have submitted the plan to the state by April 10, 2004 (40 CFR 141.132(f)). Developing a monitoring plan helps ensure that your system meets 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 for chlorine dioxide, chlorite, and bromate 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 Surface Water System Using Chlorine Dioxide to Disinfect*

Mountain View, a surface water system serving 850 persons and using chlorine dioxide to disinfect, 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, Carl Piper, completed a monitoring plan providing an overview of system characteristics as well as individual monitoring plans for the disinfectant (chlorine dioxide) and disinfection byproducts (chlorite, TTHM, and HAA5) for which it will be monitoring. Together, these plans present basic system information and describe where and when samples will be collected and how the system will determine compliance with the MCLs and MRDL. Although this information exceeds the minimum information required in a monitoring plan as described in 40 CFR 141.132(f), the operator is providing it to assist with long term, consistent operation and maintenance of the system.

First, the operator enters system contact information, including the system's name, address, and PWSID number, 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 enters the number of customers (850) and the number of service connections (285) Mountain View serves. This information can help state officials who are unfamiliar with the system determine the Stage 1 DBPR requirements with which the system must comply.

Next, the operator enters the system characteristics, including the type of system (CWS) and types of filtration (none) or disinfection used. He also indicates that the system does not operate a booster chlorination station in the distribution system. All of these can determine which Stage 1 DBPR requirements the system is required to meet and where it is required to collect its samples. Since Mountain View is a CWS using chlorine dioxide for disinfection, it is required to monitor for chlorine dioxide, chlorite, TTHM, and HAA5.

The operator then makes note of the system's source and source type (i.e., surface water), its purpose (primary), its period of operation (year-round), and how it is treated (with chlorine dioxide at Mountain View Water Treatment Plant). This information will give the state a better understanding of how and when the system operates and how the system's source water characteristics affect its Stage 1 DBPR compliance requirements. This information is also useful should Mountain View hire a new operator who is less familiar with the system.

Stage 1 Disinfectants and Disinfection Byproducts Monitoring Plan

System Information

System Name:	Mountain View PWS	Contact Person:	Carl Piper	Population Served:	850
PWSID Number:	MV98765	Phone Number:	(555) 555-5432	Service Connections:	285
Address:	633 Mountain View Rd.	Email:	cpiper@mountainview.com		
	Mountain View, Any State				

System Characteristics

Type of System:

- ✓ CWS
- ☐ NTNCWS
- ☐ TNCWS
- ☐ Purchased

Type of Filtration:

- ☐ Conventional Filtration
- ☐ Softening
- ☐ Other
- ✓ None

Type of Disinfectant:

- ☐ Chlorine and/or Chloramines
  - Booster Chlorination? ☐ Yes ✓ No
- ✓ Chlorine Dioxide
- ☐ Ozone
- ☐ Other (please specify)

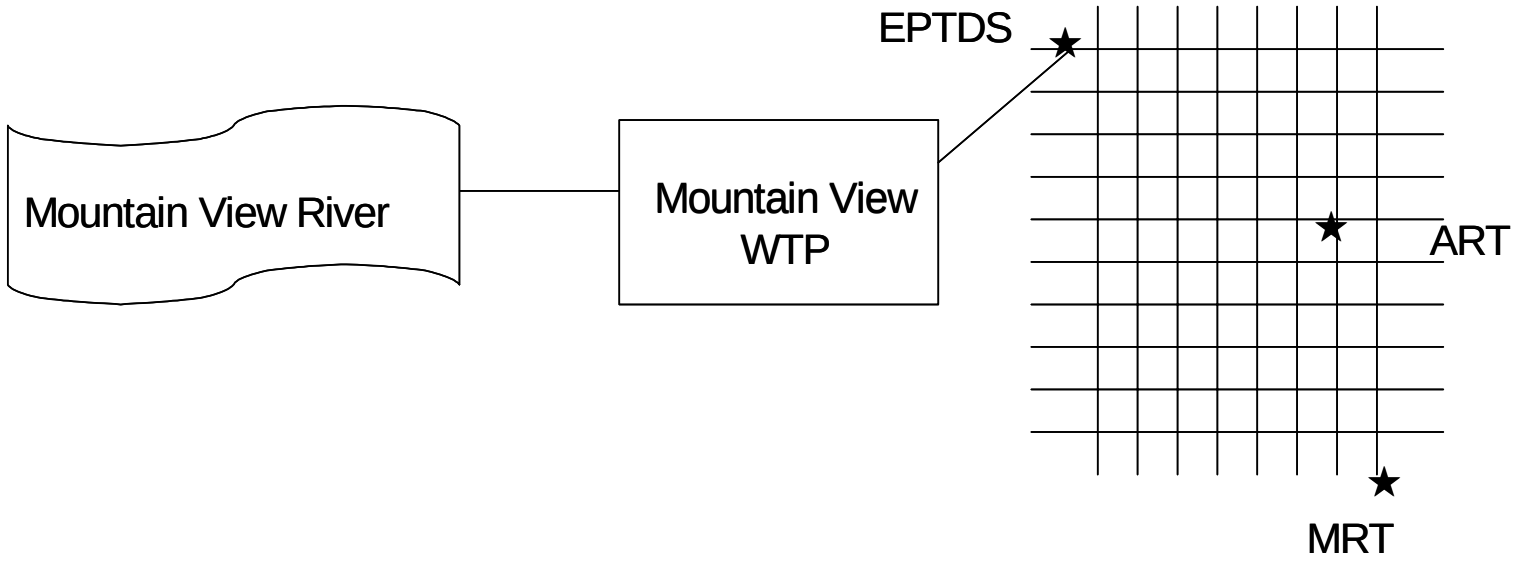
Source Water Characteristics

Source Name	Source Type (GW, SW, Purch.)	Purpose (Primary, Backup)	Period of Operation	Treatment Type	Treatment Plant
Mountain View River	SW	Primary	Year-round	Chlorine dioxide	Mountain View 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: *Mountain View's Chlorine Dioxide and Chlorite Monitoring Plans*

Mountain View's monitoring plans for chlorine dioxide and chlorite serve as both sampling plans for the system operator and staff's own reference, and as guides for the state to determine whether the system is sampling at the correct frequency and locations. Mountain View's operator determined that the system is required by the state to include sampling site locations, sampling schedules, and a description of compliance determination methods in its monitoring plans.

First, the operator indicates how often the chlorine dioxide and chlorite samples will be taken ('Sample Frequency') and at which sites ('Sample Location'). The system is required to take one daily sample for chlorine dioxide and one daily sample for chlorite, both at the EPTDS. The system is also required to take three samples for chlorite consisting of one sample as close as possible to the first customer, one sample at the point of ART, and one sample at the point of MRT.

Next, the operator notes the scheduled sample times. For daily samples, the operator will attempt to take the samples as early in the morning as possible. The system will take its three monthly samples near the end of the month, because, should the system have to take additional distribution system samples as a result of an exceedance of the MCL at the EPTDS, it can substitute the results of the additional distribution system samples for its three monthly samples.

The operator also notes sampling locations and develops a sampling schedule for additional chlorine dioxide and additional chlorite monitoring should a routine daily entrance point sample exceed the MRDL or MCL, and for reduced monthly chlorite monitoring, should the system qualify. In this example, the EPTDS and the first customer locations are the same, since the WTP uses its own finished water for toilets, showers, and drinking fountains. Next, the operator writes down a brief description of how the system will determine compliance with the chlorine dioxide MRDL and chlorite MCL. Lastly, the operator fills 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, etc.) he will indicate the date that changes were made as a reference for system staff and the state.

Chlorine Dioxide Monitoring Plan			
Sample Frequency	**Sample Location**	**Number of Samples Collected**	**Scheduled Sample Times**
Routine Monitoring – Entry Point			
Daily	Mountain View WTP	1	Between 7am and 12pm
Additional Monitoring – Distribution System			
The day after a routine daily sample MRDL exceedance	Mountain View WTP	One 3-sample set	6 a.m, 12 p.m, and 6 p.m. on the day after an MRDL exceedance.
	Mountain View WTP		
	Mountain View WTP		

Compliance Determination

To determine whether Mountain View is in compliance with the MRDL, Mountain View will compare consecutive daily samples to the MRDL (0.8 mg/L).

Acute Violations

- If a routine daily entry point sample exceeds the MRDL and one of the required additional distribution system samples exceeds the MRDL as well, the violation is **acute**.
- If two consecutive routine daily samples (collected at the entrance point to the distribution system) exceed the MRDL, but none of the additional distribution system samples exceed the MRDL, the violation is non-acute. If a routine entry point sample is missed the day after a routine entry point sample exceeds the MRDL, it is considered a non-acute MRDL violation. If an additional sample (i.e., distribution system sample) is missed the day after a routine entry point sample exceeds the MRDL, it is considered an acute violation.

Date Last Modified: September 30, 2003

Chlorite Monitoring Plan			
Sample Frequency	**Sample Location**	**Number of Samples Collected**	**Scheduled Sample Times**
Routine Monitoring			
Daily	Mountain View WTP	1 entry point	Between 7am and 12pm
Monthly	Mountain View WTP	3	Third week of month
	65 Oak Ave.		
	54 Walnut St.		
Reduced Monitoring[1]			
Quarterly	Mountain View WTP	3	Third week of third month of quarter
	65 Oak Ave.		
	54 Walnut St.		
Additional Monitoring			
The day after a routine daily sample MCL exceedance	Mountain View WTP	3	As soon as possible on the day after an MCL exceedance.
	65 Oak Ave.		
	54 Walnut St.		

[1] Reduced monitoring is only permitted for monthly distribution system chlorite monitoring. There is no reduced monitoring for daily entry point chlorite monitoring.

Compliance Determination

Mountain View will determine the average of the distribution system 3-sample set (either additional daily or monthly) taken in the distribution system by summing the results of the 3-sample set and dividing by three. If the average of any distribution system 3-sample set exceeds the MCL, the system is in violation.

Date Last Modified: September 30, 2003

Monitoring Plan Example #3: *A Surface Water System Using Ozone to Disinfect*

Blue Pines, a surface water system serving 1,725 persons and using ozone to disinfect, 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, Mary Creek, completed a monitoring plan providing an overview of system characteristics as well as individual monitoring plans for DBPs (bromate, TTHM, and HAA5), and any additional substances (bromide) for which it will be monitoring. Together, these plans present basic system information and describe where and when samples will be collected and how the system will determine compliance with the MCLs. Although this information exceeds the minimum information required in a monitoring plan as described in 40 CFR 141.132(f), the operator is providing it to assist with long term, consistent operation and maintenance of the system.

First, the operator enters system contact information, including the system's name, address, and PWSID number, 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 enters the number of customers (1,725) and the number of service connections (523) Blue Pines serves. This information can help state officials who are unfamiliar with the system determine the Stage 1 DBPR requirements with which the system must comply.

Next, the operator enters the system characteristics, including the type of system and types of filtration (none) or disinfection used. All of these can determine which Stage 1 DBPR requirements the system is required to meet. Blue Pines is a CWS using ozone for disinfection. Therefore, it is required to monitor for bromate, TTHM, and HAA5.

The operator then makes note of the system's source and source type (i.e., surface water), its purpose (primary), its period of operation (year-round), and how it is treated (with ozone at Blue Pines WTP). This will give the state a better understanding of how and when the system operates and how the system's source water characteristics affect its Stage 1 DBPR compliance requirements. This information is also useful should Blue Pines hire a new operator who is less familiar with the system.

Stage 1 Disinfectants and Disinfection Byproducts Monitoring Plan

System Information

System Name:	Blue Pines PWS	Contact Person:	Mary Creek	Population Served:	1,725
PWSID Number:	BP54321	Phone Number:	(000) 555-5555	Service Connections:	523
Address:	128 Reservoir Rd.	Email:	mcreek@bluepines.com		
	Mytown, Any State				

System Characteristics

Type of System:

- ✓ CWS
- ☐ NTNCWS
- ☐ TNCWS
- ☐ Purchased

Type of Filtration:

- ☐ Conventional Filtration
- ☐ Softening
- ☐ Other
- ✓ None

Type of Disinfectant:

- ☐ Chlorine and/or Chloramines
  - *Booster Chlorination?* ☐ Yes ☐ No
- ☐ Chlorine Dioxide
- ✓ Ozone
- ☐ Other (please specify)

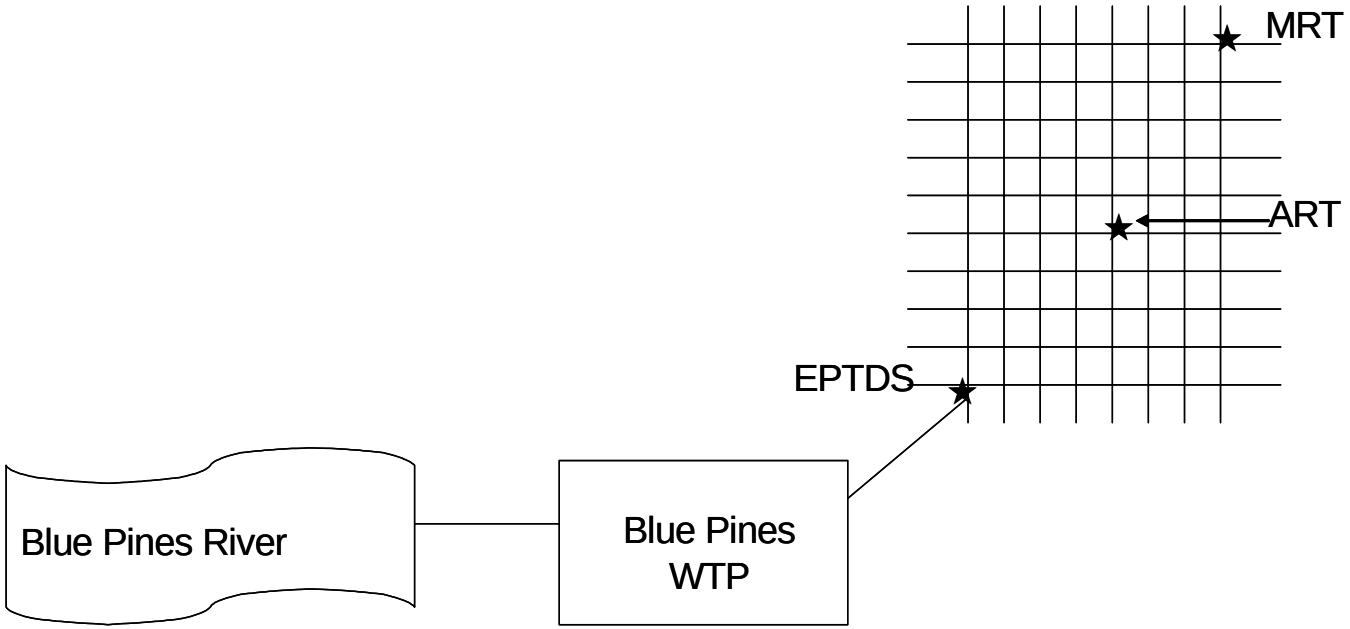
Source Water Characteristics

Source Name	Source Type (GW, SW, Purch.)	Purpose (Primary, Backup)	Period of Operation	Treatment Type	Treatment Plant	Objective
Blue Pines River	SW	Primary	Year-round	Ozone	Blue Pines WTP	Disinfection

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 #4: *Blue Pines' Bromate Monitoring Plan*

Blue Pines' monitoring plan for bromate serves as both a sampling plan for the system operator and staff's own reference and as a guide for the state to determine whether the system is sampling at the correct frequency and in the correct locations. Blue Pines' operator has determined that the system is required by the state to include sampling site locations, sampling schedules, and a description of compliance determination methods in its monitoring plans.

First, the operator indicates where she is sampling for bromate or bromide. Next, she indicates the sites at which bromate samples will be taken ('Sample Location'). The system is required to take one monthly sample for bromate at the EPTDS (in this case, the water treatment plant). The system will also be taking one monthly sample for bromide (at the source water) to attempt to qualify for reduced bromate monitoring.

The operator then notes the frequency of sampling and the number of samples that will be taken. Next, the operator notes the scheduled sample dates. Whenever possible, the operator selects dates early in the sampling period to allow for time to address any compliance problems or lab capacity issues.

The operator also notes sampling locations and develops a sampling schedule for reduced bromate monitoring should the system qualify.

Next, the operator writes down a brief description of how the system will determine compliance with the bromate MCL.

Lastly, the operator fills 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, etc.) she will indicate the date that changes were made as a reference for system staff and the state.

Bromate Monitoring Plan			
Sample	**Sample Site Location**	**Sampling Frequency**	**Scheduled Sample Dates**
Routine Monitoring			
Bromate	Blue Pines WTP	1 per month	1st week of the month
Bromide	Blue Pines River	1 per month	1st week of the month
Reduced Monitoring			
Bromate	Blue Pines WTP	1 per quarter	1st week of the first month of the quarter
Bromide	Blue Pines River	1 per month	1st week of the month
Compliance Determination			

When on a routine monitoring schedule, Blue Pines will sample monthly for bromate and monthly for bromide. At the end of every quarter, Blue Acres will sum the monthly bromate results taken in the last 12 months and divide the result by the number of months in which samples were collected. If the result is greater than the MCL, the system has committed a violation.

When on a reduced monitoring schedule, Blue Pines will calculate the RAA at the end of every quarter using the quarterly results from the most recent 4 quarters. If the result is greater than the MCL, the system has committed a violation.

Blue Pines will calculate the bromide RAA to determine eligibility for reduced monitoring for bromate using the same method. At the end of every quarter, Blue Pines will sum the monthly bromide results taken in the last 12 months and divide the result by the number of months in which samples were collected. If the result is lower than the level required to qualify for reduced monitoring status, Blue Pines will contact the state to request written permission to begin reduced monitoring for bromate.

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 and use one for each treatment plant.

Stage 1 Disinfectants and Disinfection Byproducts Monitoring Plan

System Information

System Name: _____ **Contact Person:** _____ **Population Served:** _____

PWSID Number: _____ **Phone Number:** _____ **Service Connections:** _____

Address: _____ **Email:** _____

System Characteristics

Type of System:

- ☐ CWS
- ☐ NTNCWS
- ☐ TNCWS
- ☐ Purchased

Type of Filtration:

- ☐ Conventional Filtration
- ☐ Softening
- ☐ Other
- ☐ None

Type of Disinfectant:

- ☐ Chlorine and/or Chloramines
  - ***Booster Chlorination?*** ☐ Yes ☐ No
- ☐ Chlorine Dioxide
- ☐ Ozone
- ☐ Other (please specify)

Source Water Characteristics

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

Chlorine Dioxide and Chlorite Monitoring Plan Worksheet Instructions

Step #1 Set up a routine monitoring schedule for chlorine dioxide.

- Under 'Sample Frequency,' note how often you are required to sample for the disinfectant (i.e., daily).
- Under 'Sample Location,' enter the site at which you will be sampling.
- Under 'Number of Samples Collected,' enter the number of compliance samples you will be taking.
- Under 'Scheduled Sample Times,' indicate when you will be sampling for chlorine dioxide.

Step #2 Set up a schedule for additional chlorine dioxide monitoring.

- Under 'Sample Frequency,' note when you are required to conduct additional sampling for chlorine dioxide.
- Under 'Sample Location,' enter the site(s) at which you will be conducting additional sampling.
- Under 'Number of Samples Collected,' enter the number of additional samples you are required to take.
- Under 'Scheduled Sample Times,' indicate when, within the required period, you will be conducting additional sampling.

Step #3 Describe how you will determine compliance with the chlorine dioxide MRDL.

Enter a narrative description of how you will calculate compliance with the chlorine dioxide MRDL. Discuss how you will determine whether a violation of the MRDL is acute or non-acute.

Step #4 Set up a schedule for routine chlorite monitoring.

- Under 'Sample Frequency,' note how often you are required to sample for chlorite (i.e., daily and monthly).
- Under 'Sample Location,' enter the sites at which you will be sampling.
- Under 'Number of Samples Collected,' enter the number of compliance samples you will be taking.
- Under 'Scheduled Sample Times,' indicate when you will be sampling for chlorite.

Step #5 Set up a schedule for reduced chlorite monitoring.

- Under 'Sample Frequency,' note how often you are required to sample for chlorite on a reduced schedule. Remember, only monthly chlorite sampling can be reduced.
- Under 'Sample Location,' enter the sites at which you will be sampling.
- Under 'Number of Samples Collected,' enter the number of compliance samples you will be taking.
- Under 'Scheduled Sample Times,' indicate when you will be sampling for chlorite.

Step #6 Set up a schedule for additional chlorite monitoring.

- Under 'Sample Frequency,' note when you are required to conduct additional sampling for chlorite.
- Under 'Sample Location,' enter the site at which you will be conducting additional sampling.
- Under 'Number of Samples Collected,' enter the number of follow-up samples you are required to take.
- Under 'Scheduled Sample Times,' indicate when, within the required period, you will be conducting additional sampling.

Step #7 Describe how you will determine compliance with the chlorite MCL.

Enter a narrative description of how you will calculate compliance with the chlorite MCL.

Step #4 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.

Chlorine Dioxide Monitoring Plan			
Sample Frequency	**Sample Location**	**Number of Samples Collected**	**Scheduled Sample Times**
Routine Monitoring – Entry Point			
Additional Monitoring – Distribution System			
Compliance Determination			

Chlorite Monitoring Plan			
Sample Frequency	**Sample Location**	**Number of Samples Collected**	**Scheduled Sample Times**
Routine Monitoring			
Reduced Monitoring[1]			
Additional Monitoring			
[1] Reduced monitoring is only permitted for monthly chlorite monitoring. There is no reduced monitoring for daily chlorite monitoring.			
Compliance Determination			

Date Last Modified:_____

Bromate Monitoring Plan Worksheet Instructions

Step #1 Set up a routine monitoring schedule for bromate.

- Under 'Sample,' indicate the substance for which you will be sampling (include bromide if you will be attempting to qualify for reduced bromate monitoring).
- Under 'Sample Location,' enter the locations at which you will be sampling.
- Under 'Sample Frequency,' indicate how often you are required to sample.
- Under 'Scheduled Sample Dates,' enter when you will be taking the required samples.

Step #2 Set up a reduced monitoring schedule for bromate.

- Under 'Sample,' indicate the substance for which you will be sampling (including bromide).
- Under 'Sample Location,' enter the locations at which you will be sampling when on a reduced monitoring schedule.
- Under 'Sample Frequency,' indicate how often you are required to sample on the reduced schedule.
- Under 'Scheduled Sample Dates,' enter when you will be taking the required samples.

Step #3 Describe how you will determine compliance.

Enter a narrative description of how you will calculate compliance with the bromate MCL. Discuss how you will calculate the RAA.

Step #4 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.

Bromate Monitoring Plan			
Sample	**Sample Site Location**	**Sampling Frequency**	**Scheduled Sample Dates**
Routine Monitoring			
Reduced Monitoring			
Compliance Determination			

Date Last Modified:_____

Appendix D: 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.

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.

The Federal Register Minor Corrections to the Stage 1 DBPR: Revisions to the LT1ESTWR, SWTR, 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.

Documents

EPA's MDBP Rules Implementation Activities Web site: 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
(800-926-7337)

Association of State Drinking Water Administrators:
www.asdwa.org
(202-293-7655)

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

National Rural Water Association:
www.nrwa.org
(580-252-0629)

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

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

State Agency	Web Site	Phone Number
Delaware Delaware Health & Social Services: Division of Public Health	www.state.de.us/dhss/dph/about.html	(302) 744-4700
District of Columbia Environmental Health Administration: Water Resources Management Division	www.epa.gov/reg3wapd/drinkingwater	(215) 814-2300
Florida Department of Environmental Protection: Drinking Water Program	www.dep.state.fl.us/water/drinkingwater/index.htm	(850) 245-8335
Georgia Department of Natural Resources: Water Resources Branch	www.gaepd.org	(404) 657-5947
Guam Guam Environmental Protection Agency: Water Programs Division	www.guamepa.govguam.net/programs/water	(671) 475-1658
Hawaii Department of Health: Environmental Health Division	www.hawaii.gov/health/environmental/water/sdwb/index.html	(808) 586-4258
Idaho Department of Environmental Quality: Water Quality Division	www.deq.state.id.us/water/	(208) 373-0194
Illinois Environmental Protection Agency: Division of Public Water Supplies	www.epa.state.il.us/water/index-pws.html	(217) 785-8653
Indiana Department of Environmental Management: Drinking Water Branch	www.in.gov/idem/water/dwb/	(317) 232-8603
Iowa Department of Natural Resources: Water Supply Program	www.iowadnr.com/water/drinking/index.html	(515) 725-0275

State Agency	Web Site	Phone Number
Kansas Department of Environmental Protection: Bureau of Water	www.kdhe.state.ks.us/pws/	(785) 296-5503
Kentucky Department for Environmental Protection: Division of Water	www.water.ky.gov/dw	(502) 564-3410
Louisiana Office of Public Health: Safe Drinking Water Program	www.oph.dhh.louisiana.gov/engineerservice/safewater	(225) 765-5038
Maine Maine Department of Human Services: Drinking Water Program	www.state.me.us/dhs/eng/water/	(207) 287-2070
Maryland Department of the Environment: Public Drinking Water Program	www.mde.state.md.us/programs/WaterPrograms/Water_Supply/index.asp	(410) 537-3000
Massachusetts Department of Environmental Protection: Drinking Water Program	www.mass.gov/dep/brp/dws/dwshome.htm	(617) 292-5770
Michigan Department of Environmental Quality: Water Bureau	www.michigan.gov/deq	(517) 373-7917
Minnesota Department of Health: Drinking Water Protection Section	www.health.state.mn.us/divs/eh/water/index.html	(651) 215-0770
Mississippi Department of Health: Division of Water Supply	www.msdh.state.ms.us/msdhsite/index.cfm/44.0.76.html	(601) 576-7518
Missouri Department of Natural Resources: Water Protection and Soil Conservation Division	http://www.dnr.mo.gov/wpscd/wpcp/dw-index.htm	(573) 751-1300

State Agency	Web Site	Phone Number
Montana Department of Environmental Quality: Public Water Supply Program	www.deq.state.mt.us/wqinfo/PWS/index.asp	(406) 444-4071
Nebraska Department of HHS: Public Water Supply Program	www.hhs.state.ne.us/enh/pwsindex.htm	(402) 471-0521
Nevada Department of Environmental Services: Safe Drinking Water Program	http://ndep.nv.gov/bsdw/index.htm	(775) 687-6353
New Hampshire Department of Environmental Services: Water Division	www.des.state.nh.us/wseb/	(603) 271-2513
New Jersey Department of Environmental Protection: Water Supply Administration	www.state.nj.us/dep/watersupply/	(609) 292-5550
New Mexico Environment Department: Drinking Water Bureau	www.nmenv.state.nm.us/dwb/dwbtop.html	(505) 827-1400
New York Department of Health: Bureau of Water Supply Protection	www.health.state.ny.us/nysdoh/water/main.htm	(518) 402-7650
North Carolina Department of Environment and Natural Resources: Public Water Supply Section	www.deh.enr.state.nc.us/pws/	(919) 733-2321
North Dakota Department of Health: Division of Water Quality	www.health.state.nd.us/mf	(701) 328-5211
Ohio Environmental Protection Agency: Division of Drinking & Ground Water	www.epa.state.oh.us/ddagw/	(614) 644-2752

State Agency	Web Site	Phone Number
Oklahoma Department of Environmental Quality: Water Quality Division	www.deq.state.ok.us/WQDnew/index.htm	(405) 702-8100
Oregon Department of Human Services: Drinking Water Program	http://oregon.gov/DHS/ph/dwp/index.shtml	(971) 673-0405
Pennsylvania Department of Environmental Protection: Office of Water Management	www.dep.state.pa.us/dep/deputate/watermgt/wsm/WSM.htm	(717) 772-4018
Puerto Rico Department of Health: Public Water Supply Supervision Program	www.epa.gov/region02/cepd/prlink.htm	(787) 977-5870
Rhode Island Department of Health: Office of Drinking Water Quality	www.health.ri.gov/environment/dwq/index.php	(401) 222-6867
South Carolina Department of Health & Environmental Control: Drinking Water Program	www.scdhec.net/eqc/water/html/dwater.html	(803) 898-4300
South Dakota Department of Environment & Natural Resources: Drinking Water Program	www.state.sd.us/denr/des/drinking/dwprg.htm	(605) 773-3754
Tennessee Department of Environment & Conservation: Division of Water Supply	www.state.tn.us/environment/dws/index.html	(615) 532-0191
Texas Texas Commission on Environmental Quality	www.tceq.state.tx.us/nav/util_water/	(512) 239-4691
Utah Department of Environmental Quality: Division of Drinking Water	www.drinkingwater.utah.gov	(801) 536-4200
Vermont Vermont Agency of Natural Resources	www.anr.state.vt.us/dec/watersup/wsd.htm	(802) 241-3400

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

Appendix F: Tribal Contacts

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

U.S. EPA Headquarters		
American Indian Environmental Office	www.epa.gov/indian	(202) 564-0303

U.S. EPA Regional Tribal Capacity Development Coordinators		
U.S. EPA Region 1	www.epa.gov/region01/topics/government/tribal.html	(888) 372-7341
U.S. EPA Region 2	www.epa.gov/region02/nations/index.html	(212) 637-3600
U.S. EPA Region 4	www.epa.gov/region04/ead/indian/index.htm	(404) 562-6939
U.S. EPA Region 5	www.epa.gov/region5/water/stpb/	(312) 353-2123
U.S. EPA Region 6	www.epa.gov/region06/6xa/tribal.htm	(800) 887-6063
U.S. EPA Region 7	www.epa.gov/region07/government_tribal/index.htm	(913) 551-7030
U.S. EPA Region 8	www.epa.gov/region08/tribes	(303) 312-6116
U.S. EPA Region 9	www.epa.gov/region09/cross_pr/indian/index.html	(415) 744-1500
U.S. EPA Region 10	yosemite.epa.gov/r10/tribal.NSF/webpage/tribal+office+homepage?opendocument	(206) 553-4011

Other Contacts		
Administration for Native Americans	www.acf.dhhs.gov/programs/ana/	(877) 922-9262
Bureau of Indian Affairs	www.doi.gov/bureau-indian-affairs.html	(202) 208-3710
Indian Health Service	www.ihs.gov	(301) 443-3024
Native American Water Association	www.nawainc.org	(775) 782-6636

Appendix G: Other STEP Documents

This Supplement, the Basic Guide, and Supplement B 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.

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