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SMALL SYSTEM REQUIREMENTS FOR THE STAGE 1 DISINFECTANTS AND DISINFECTION BYPRODUCTS RULE

SMALL ENTITY COMPLIANCE GUIDE

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Abbreviations used in this document

BAT:	Best available technology
CDC:	Centers for Disease Control and Prevention
CWS:	Community water system
DBP:	Disinfection byproducts
DBPP:	Disinfection byproduct precursor
DBPR:	Disinfectants and Disinfection Byproducts Rule
DOC:	Dissolved organic carbon
DWSRF:	Drinking Water State Revolving Fund
EPA:	United States Environmental Protection Agency
ESWTR:	Enhanced Surface Water Treatment Rule
FACA:	Federal Advisory Committee Act
FR:	Federal Register
GAC10:	Granular activated carbon with ten minute empty bed contact time and 180 day reactivation frequency
HAA5:	Haloacetic acids (five)
ICR:	Information Collection Rule
IESWTR:	Interim Enhanced Surface Water Treatment Rule
MCL:	Maximum contaminant level
MCLG:	Maximum contaminant level goal
M-DBP:	Microbial and Disinfectants/Disinfection Byproducts
mg/L:	Milligrams per liter
MRDL:	Maximum residual disinfectant level
MRDLG:	Maximum residual disinfectant level goal
NTNCWS:	Nontransient noncommunity water system
PWS:	Public water system
Reg-Neg:	Regulatory Negotiation
RUS:	Rural Utilities Service
SBREFA:	Small Business Regulatory Enforcement Fairness Act
SDWA:	Safe Drinking Water Act, or the "Act," as amended in l986 and 1996
SUVA:	Specific ultraviolet absorbance
SWTR:	Surface Water Treatment Rule
TOC:	Total organic carbon
TTHM:	Total trihalomethanes
TNCWS:	Transient noncommunity water systems
UV:	Ultraviolet light

I. INTRODUCTION

This document is published by the Environmental Protection Agency (EPA) as our official compliance guide for small public water systems, as required by the Small Business Regulatory Enforcement Fairness Act of 1996. Before you begin using the guide, you should know that the information in this guide was compiled and published on October 31, 2001. EPA is continually improving and upgrading its rules, policies, compliance programs, and outreach efforts. You can determine whether EPA has revised or supplemented the information in this guide by calling the Safe Drinking Water Hotline at 800-426-4791.

A. Who should use this guide?

This guide is intended for use by small public water systems - those serving fewer than 10,000 people. It is specifically intended for small community water systems (CWS) and nontransient noncommunity water systems (NTNCWS) that add a chemical disinfectant or oxidant, such as chlorine, chloramines, ozone, or chlorine dioxide, as part of the drinking water treatment process. Finally, there are a limited number of requirements that apply to transient noncommunity water systems that add chlorine dioxide as part of their drinking water treatment process.

B. What does the guide cover?

This guide contains a general introduction to the background, development, and benefits of this rule. Section II contains background information on the development of this rule, along with a general explanation of the rule's requirements and a brief discussion of other rules that EPA is developing that will help address pathogen and chemical byproduct risks that are not addressed in this rule. Section III contains a detailed explanation of the regulatory requirements of the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) for systems serving fewer than 10,000 people, including sections specifically addressing requirements for systems based on source water type and disinfectant or treatment used. Section IV includes questions and answers about provisions in the rule. Section V is an overview of EPA's compliance assurance process.

Appendix A contains a glossary of terms used in the rule and in this guide. Appendix B contains instructions on how to order the technical guidance manuals and other publications that EPA has developed to support implementation of and compliance with this rule. Appendix C is a questionnaire on how to make future versions of this guide more useful. Appendices D, E, and F contained detailed explanations of requirements for technologies that few small systems use (chlorine dioxide, ozone, and conventional filtration treatment, respectively), but are required to comply with if used.

C. How do I use the Guide?

We suggest that you read through the entire guide. Refer to Appendix A if you find a term that

you are not familiar with. After looking at the entire guide, go back to Section III to begin to identify specific requirements that apply to your system.

D. How do I obtain a complete copy of the rule?

The Stage 1 Disinfectants/Disinfection Byproducts Rule was published in the Federal Register on December 16, 1998 (63 FR 69390). You may call the Safe Drinking Water Hotline at 800-426-4791 to request a copy. You may also download an electronic copy from the following internet address; http://www.epa.gov/safewater/mdbp/dbpfr.html. Appendix B has further information on ordering the guidance manuals that support this rule or downloading them from the Internet. The Code of Federal Regulation will also provide needed information, refer to the following sections in 40 CFR Ch. 1 displayed in exhibit I-1.

Exhibit I-1 Stage 1 DBPR Regulatory Requirements

Title	CFR Section number
Maximum contaminant level goals for disinfection byproducts.	141.53
Maximum residual disinfectant level goals for disinfectants.	141.54
Maximum contaminant levels for disinfection byproducts.	141.64
Maximum residual disinfectant levels.	141.65
General requirements.	141.130
Analytical requirements.	141.131
Compliance requirements.	141.132
Reporting and recordkeeping requirements.	141.134
Treatment technique for control of disinfection byproduct (DBP) precursors.	141.135

The Code of Federal Regulation can be accessed on the internet at http://www.gpo.gov/nara/cfr/index.html.

II WHAT DOES THIS REGULATION REQUIRE?

A. What human health issues does this rule address and why is it important?

In 1990, EPA's Science Advisory Board, an independent panel of experts established by Congress, cited drinking water contamination as one of the most important environmental risks and indicated that disease-causing microbial contaminants (i.e., bacteria, protozoa, and viruses) - also known as pathogens - are probably the greatest remaining health-risk management challenge for drinking water suppliers. Data from the Centers for Disease Control (CDC) confirm this concern and indicate that between 1980 and 1994, 379 waterborne disease outbreaks were reported, with over 500,000 cases of disease. During this period, a number of agents were implicated as the cause, including protozoa, viruses, bacteria, and several chemicals. Most of the cases (but not most of the outbreaks) were associated with surface water, including a 1993 outbreak of 400,000 cases of cryptosporidiosis (caused by the protozoan *Cryptosporidium*) in Milwaukee.

One of the key regulations EPA has developed to date to counter pathogens in drinking water is the 1989 Surface Water Treatment Rule (SWTR). Among its provisions, the rule requires that a surface water system have sufficient treatment to reduce the source water concentration of *Giardia lamblia* and viruses by at least 99.9 percent (3 log) and 99.99 percent (4 log), respectively. The goal of the SWTR is to reduce risk to less than one infection per year per 10,000 people. However, the SWTR's limitations include: 1) some systems have high pathogen concentrations that, when reduced by the levels required under the rule, still may not meet this health goal, and 2) the rule does not specifically control for the protozoan *Cryptosporidium*.

In addition to these microbial issues, there is another potentially complicating public health concern. Many water systems treat their water with a chemical disinfectant in order to inactivate pathogens. The public health benefits of common disinfection practices are significant and well-recognized; however, disinfection poses risks of its own. While disinfectants are effective in controlling many harmful microorganisms, they react with organic and inorganic matter (known as disinfection byproduct precursors—DBPPs) in the water and form DBPs, some of which pose health risks at certain levels. Since the discovery of chlorination byproducts in drinking water in 1974, many toxicological studies have shown some DBPs to be carcinogenic (cancer-causing) and/or to cause reproductive or developmental effects in laboratory animals. Additionally, exposure to high levels of disinfectants over long periods of time may cause health problems, including damage to blood and kidneys. While many of these studies have been conducted at high doses, the weight-of-evidence indicates that disinfectants and DBPs present a potential public health problem that must be addressed. One of the most complex questions facing water supply professionals is how to reduce risks from disinfectants and DBPs while providing increased protection against microbial contaminants. Much of the population is exposed to these risks; therefore, a substantial concern exists.

Health risks associated with some DBPs are currently addressed by the regulation of total

trihalomethanes (TTHM) at public water systems (PWSs) serving 10,000 or more people. EPA, however, believes that the Stage 1 DBPR will significantly decrease the risks posed by DBPs and disinfectants. The Stage 1 DBPR will broaden public health protection by 1) reducing the TTHM allowable level, 2) regulating disinfectants and additional DBPs, 3) reducing risks from unregulated DBPs, and 4) extending coverage to all systems, including small PWSs not currently regulated for TTHM or other DBPs.

The new rules are a product of six years of collaboration among water suppliers; environmental, consumer, and public health groups; local elected officials; and local, State, and Federal regulatory and public health agencies. To address the complex issues associated with regulating pathogens, EPA first launched a rule-making process in 1992 and convened a Regulatory Negotiation (RegNeg) Advisory Committee under the Federal Advisory Committees Act (FACA), representing a range of stakeholders affected by possible regulation. The RegNeg Committee met over a period of 10 months and arrived at a consensus proposal for taking incremental steps toward addressing both DBPs and microbial pathogens. The 1992 consensus-building process resulted in the three following regulatory proposals—

- A staged approach to regulation of DBPs (referred to as the Stage 1 and Stage 2 DBPRs) incorporating maximum contaminant levels (MCLs), maximum residual disinfectant levels (MRDLs), and treatment technique requirements;

- A companion Enhanced Surface Water Treatment Rule (ESWTR), to be finalized at different times for large (those serving at least 10,000 people) and small systems, designed to improve control of pathogens and prevent inadvertent reductions in microbial safety as a result of DBP control efforts; and,

- An Information Collection Rule (ICR) to collect information necessary to reduce many key uncertainties (about issues such as health effects and formation and occurrence of DBPs) prior to subsequent negotiations for the Stage 2 DBPR.

Congress amended the Safe Drinking Water Act (SDWA) in 1996 and affirmed the strategy developed by the RegNeg Committee. Congress also established a series of new statutory deadlines for the rules.

In 1997, a similar FACA process was implemented with the Microbial-Disinfectants/Disinfection Byproducts (M-DBP) Advisory Committee. The M-DBP Committee convened to collect, share, and analyze new information available since the rules were proposed in 1994 and review previous assumptions made during the RegNeg process, as well as build consensus on the regulatory implications of this new information. The Stage 1 DBPR and the IESWTR are the result of the FACA process.

B. Summary of the new regulation

This section contains a summary of the major requirements of this rule, but does not include specific monitoring requirements or how to calculate compliance. Compliance for some regulated compounds is based on a running annual average, while compliance for others is based on shorter periods. See Section III for details.

MCLGs and MCLs for disinfection byproducts

The Stage 1 DBPR sets maximum contaminant level goals (MCLGs) for some of the regulated DBPs, a more stringent maximum contaminant level (MCL) for total trihalomethanes (TTHM), and new MCLs for haloacetic acids (five) (HAA5), bromate, and chlorite. MCLGs are set at concentrations at which no known or anticipated adverse health effects are expected to occur, with an adequate margin of safety. They are non-enforceable public health goals. MCLs are enforceable contaminant standards set as close as is feasible to MCLGs. These MCLs, along with the maximum residual disinfectant levels (MRDLs) and the treatment technique explained in the following paragraphs, will help reduce exposure to DBPs and disinfectants and their associated health effects. Exhibit II-1 displays disinfection byproducts with their MCLG and MCL.

Exhibit II-1 MCLGs and MCLs for Disinfection Byproducts

Disinfection Byproduct	MCLG (mg/L)	MCL (mg/L)
Total Trihalomethanes (TTHM), consisting of:	**ND**	**0.080**
Chloroform	ND	ND
Bromodichloromethane	0	ND
Bromoform	0	ND
Dibromochloromethane	0.06	ND
Five Haloacetic Acids (HAA5), consisting of:	**ND**	**0.060**
Monochloroacetic Acid	ND	ND
Dichloroacetic Acid	0	ND
Trichloroacetic Acid	0.3	ND
Monobromoacetic Acid	ND	ND
Dibromoacetic Acid	ND	ND
Chlorite	**0.8**	**1.0**
Bromate	**0**	**0.010**

ND - not determined

MRDLGs and MRDLs for disinfectant residuals

To protect against potential health risks caused by high levels of residual disinfectants, the Stage 1 DBPR sets the following maximum residual disinfectant level goals (MRDLGs) and maximum residual disinfectant levels (MRDLs). Like MCLGs and MCLs, respectively, MRDLGs are non-enforceable, while MRDLs are enforceable and are set as close as is feasible to MRDLGs. In exhibit II-2 the MRDLG and MRDL are displayed for chlorine, chloramies, and chlorine dioxide.

Exhibit II-2 MRDLG and MRDL for Disinfectants

Disinfectant	MRDLG (mg/L)	MRDL (mg/L)
Chlorine	4	4.0
Chloramines	4	4.0
Chlorine Dioxide	0.8	0.8

Treatment technique for disinfection byproduct precursors

The rule includes an enforceable treatment technique that applies to subpart H systems (systems that use surface water or ground water under the direct influence of surface water—GWUDI—as a source) using conventional filtration treatment. There are very few small systems that will have to meet this requirement, since it does not apply if you use only ground water or if you treat surface water using a filtration technology other than conventional filtration treatment. The treatment technique was established because disinfectants can react with organic and inorganic disinfection byproduct precursors (DBPPs) to form both regulated and non-regulated DBPs. The treatment technique applies to subpart H systems with conventional filtration treatment because the Advisory Committee determined that such systems generally had higher levels of disinfection byproduct precursors and conventional filtration treatment was able to lower those levels (and consequently DBP levels) economically. The treatment technique requirements in the rule are designed to provide public health protection by reducing the production of both regulated and unregulated DBPs. Compliance with the treatment technique can be achieved by removing specified percentages of total organic carbon (TOC) using enhanced coagulation or enhanced softening. Alternatively, systems may comply by showing they meet alternative compliance criteria that indicate additional removal of DBPPs by that particular system is unnecessary or impractical. For example, there is an alternative compliance criterion for systems which have a low level of TOC in their source or treated water. The treatment technique and these alternatives are discussed in Appendix F.

Best available technology (BAT)

EPA has specified the Best Available Technology (BAT) for each MCL and MRDL established in the rule. These technologies and methods are believed to be effective in controlling chemicals in drinking water while remaining economically feasible for PWSs to employ. PWSs must use

the specified BAT if they wish to qualify for variances. **Otherwise, systems are not required to install BAT and may use any technology to achieve compliance.** The BAT for DBPs and disinfectants are shown in exhibit II-4.

Exhibit II-3 Best Available Technology for DBPs and Disinfectatns

Chemical		Best Available Technology
DBPs	TTHM and HAA5	Enhanced coagulation or granular activated carbon (GAC 10), with chlorine as the primary and residual disinfectant
	Chlorite	Control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels
	Bromate	Control of ozone treatment process to reduce production of bromate
Disinfectants	Chlorine, chloramine, and chlorine dioxide	Control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels

Public water system recordkeeping and reporting requirements

For each disinfectant, contaminant, contaminant group, and treatment technique, EPA has developed routine compliance monitoring schemes to be protective of acute and chronic health concerns. The compliance monitoring requirements vary by the size and type of system, the treatment employed, and the disinfectant used. In many cases, systems may reduce monitoring to a frequency and location that will provide a worst-case sample after establishing a baseline that demonstrates that violations are unlikely.

Systems required to sample quarterly or more frequently must report to the State within 10 days after the end of each quarter in which the samples were collected. Those required to sample less frequently than quarterly must report to the State within 10 days after the end of each monitoring period in which samples were collected. Systems that are required to conduct additional monitoring because of the disinfectant used (e.g., chlorine dioxide) are subject to additional reporting requirements if certain concentrations are exceeded. Specifics concerning monitoring and reporting are in Section III and Appendices D, E, and F.

Laboratory methods and certification

The rule specifies analytical methods for measuring each relevant water quality parameter, disinfectant, contaminant, and DBPP. Consistent with current regulations, only certified laboratories can analyze samples for compliance with the MCLs. For disinfectants and other specified parameters that EPA believes can be adequately measured by other than certified laboratories, and for which there is good reason to allow on-site analysis (e.g., for samples that may deteriorate before reaching a certified laboratory), EPA requires that analyses be conducted by a party approved by the State.

Benefits of the Rule

The Stage 1 DBPR is expected to reduce the risks associated with exposure to disinfectants and DBPs. The MCLs will reduce exposure to specific DBPs from the use of ozone (byproduct: bromate), chlorine dioxide (byproduct: chlorite), and chlorine (byproducts: TTHM and five haloacetic acids - HAA5). In addition, the implementation of a treatment technique (enhanced coagulation/ enhanced softening) will reduce overall exposure to the broad range of non-specified DBPs. In the Regulatory Impact Analysis for the Stage 1 DBPR, EPA estimated that the rule will result in a national annual average reduction in TTHM levels of 24 percent. As many as 140 million people will have increased protection from DPBs and their potential health risks, including bladder cancer and adverse developmental and reproductive health effects.

C. Compliance timetable

The 1979 Total Trihalomethane (TTHM) Rule requirements apply only to systems serving 10,000 or more people. The Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR) covers a larger number of PWSs, applying to *all* community water systems (CWSs) and nontransient noncommunity water systems (NTNCWSs) that add a chemical disinfectant for either primary or residual treatment or as an oxidant. In addition, certain requirements apply to transient noncommunity water systems (TNCWSs) that use chlorine dioxide.

Subpart H systems (systems that use surface water or ground water under the direct influence of surface water—GWUDI—as a source) serving 10,000 or more people must comply with the requirements of the Stage 1 DBPR no later than January 1, 2002. Subpart H systems that serve fewer than 10,000 people, and all affected ground water systems, must comply with the requirements no later than January 1, 2004. The timetable for the Stage 1 DBPR is presented in Table 1.

Exhibit II-4 Timetable for the Stage 1 DBPR Requirements for Systems serving fewer than 10,000 People

Date	Rule Requirement[1]
December 16, 1998	Rule published in Federal Register.
February 16, 1999	Methods specified in §141.131 for analyzing disinfection byproducts, disinfection residuals, and DBP precursors effective.
January 2003	Subpart H systems using conventional filtration treatment may begin optional monitoring to determine Step 1 TOC removals before the compliance date.
January 1, 2004	- Requirements effective for systems serving fewer than 10,000 people. - Monitoring requirements - Reporting and recordkeeping requirements - Compliance - MCLs for TTHM, HAA5, bromate[2], and chlorite[3] - MRDLs for chlorine, chloramines, and chlorine dioxide[3] - Treatment technique for control of DBP precursors[4] - Subpart H and ground water TNCWSs that use chlorine dioxide must comply with requirements for chlorine dioxide.
June 30, 2005	Systems that made a clear and irrevocable financial commitment before the applicable compliance date to install technologies that limit TTHM and HAA5 to 0.040 mg/L and 0.030 mg/L, respectively, must have these technologies installed and operating.

NOTES:
1. Compliance monitoring must begin when noted. The first compliance calculations are made based on whether compliance is monthly or more frequently (such as chlorine dioxide and chlorite) or as a running annual average (such as TTHM and bromate). Systems are not required to use data collected prior to the date noted in this table for compliance determinations.
2. Only for systems that use ozone
3. Only for systems that use chlorine dioxide
4. Only for subpart H systems that use conventional filtration treatment

D. How does this rule relate to other federal, State, and local requirements?

The Stage 1 DBPR and the IESWTR were published simultaneously to address the inherent tradeoffs between protection from microbial contamination and the potential health effects from disinfectants and their byproducts. These rules are the first in a series of rules that will continue to address the public health concerns associated with microbial pathogens and chemical disinfectants. **Of course, you are still required to continue to meet all existing requirements.** There are other rules being developed that may apply to your system. The future regulations intended for the control of pathogens and DBPs are listed below. You may call the Safe Drinking Water Hotline at 1-800-426-4791 for more information on or the current status of these rules or other drinking water rules.

Long Term 1 Enhanced Surface Water Treatment Rule

While the Stage 1 DBPR applies to systems of all sizes, the IESWTR generally applies only to subpart H systems serving at least 10,000 people. The exception is that the State is required to conduct a sanitary survey at your system every three to five years. The LT1ESWTR will strengthen microbial protection for subpart H systems serving fewer than 10,000, while also addressing the risk tradeoff issue as small systems implement the Stage 1 DBPR. This rule will generally track the approaches in the IESWTR for improved turbidity control (including individual filter monitoring) and disinfection benchmarking and profiling.

Filter Backwash Recycling Rule

EPA is also required to develop standards for recycling of filter backwash. The Agency published the final rule on June 8, 2001 (66 FR 31086).

Long Term 2 Enhanced Surface Water Treatment/Stage 2 Disinfection Byproducts Rules

In the 1996 Amendments to the Safe Drinking Water Act, EPA is required to finalize the Stage 2 DBPR to further address risks from disinfection byproducts, based on new health effects research, occurrence data, and treatment information. EPA plans to also develop a Long Term 2 ESWTR to ensure that microbial protection is not compromised and may include site-specific treatment requirements if data are available to make decisions. EPA began discussions with stakeholders on the development of these rules in December 1998 and set up an advisory committee in March 1999 and is currently developing rule proposals for public comment.

Ground Water Rule

EPA is also developing a rule to ensure microbial protection for ground water systems through the use of disinfection and other barriers to fecal contamination.

III STEP-BY-STEP PROCEDURES FOR COMPLIANCE WITH THIS RULE

A. How can I tell if I am subject to this rule?

The Stage 1 DBPR applies to all community water systems and nontransient noncommunity water systems that add a chemical disinfectant, as well as transient noncommunity water systems that use chlorine dioxide (since chlorine dioxide has short-term health effects that may occur based on limited exposure). However, systems will monitor at various frequencies depending on source water type (subpart H and ground water) and size. Additionally, chemicals monitored may also vary depending on system type and the primary disinfectant used. For this reason, tables that outline the monitoring and reporting requirements are presented for each system size and type.

If you do not know what type of water system you operate, contact your State Drinking Water regulatory agency. If you do not know who your State agency is, call the Safe Drinking Water Hotline at 800-426-4791.

B. What requirements am I subject to?

This section includes the federal requirements that you must comply with. The requirements for monitoring and compliance are found in section III.D., while those for recordkeeping are found in section III.E. and those for reporting are found in III.F.

Your State may impose different requirements, as long as those requirements are at least as stringent as the federal requirements. Your State may also impose more requirements than the federal requirements, such as additional monitoring or compliance with stricter standards.

Exhibit III-1 Stage 1 DBPR Requirements

You must conduct the monitoring, compliance determinations, reporting , and recordkeeping specified in this section. In addition, you are required to conduct additional monitoring, compliance determinations, reporting and recordkeeping if:

1. You use chlorine dioxide in treating your water. This includes any use of chlorine dioxide, not just chlorine dioxide used for meeting disinfection requirements. Additional requirements are found in Appendix D.

2. You use ozone in treating your water. This includes any use of ozone, not just ozone used for meeting disinfection requirements. Additional requirements are found in Appendix E.

3. You are a subpart H system (you treat either surface water or ground water under the direct influence of surface water) and you use conventional filtration treatment (consisting of coagulation, flocculation, sedimentation, and filtration) in treating your water. Additional requirements are found in Appendix F.

In addition, you must develop and implement a monitoring plan that specifies 1) location and schedules for collecting all required samples, 2) procedures for calculating compliance with MCLs, MRDLs, and treatment techniques, and 3) if receiving water as a consecutive system, or supplying water to a consecutive system, how the entire distribution system is represented by the monitoring plan. If you are a subpart H system serving more than 3,300 people, you must submit your monitoring plan to the State with your first monitoring report. If you are a ground water system or a subpart H system serving 3,300 or fewer people, you are just required to keep your monitoring plan on file.

Finally, your system must be operated by a qualified operator. Your State will set criteria for qualification; EPA expects that many States will have different levels of qualification, based on type of source water, type of treatment, and population served. You should contact the State to get further information.

C. When do I need to comply?

You must begin to comply with the requirements in the rule as of January 1, 2004. For those chemicals that you must monitor for monthly or more frequently (such as chlorine), you must take your first samples in January 2004. For those chemicals that you must monitor for quarterly (such as TTHM for some systems), you must take your first samples in the January-March 2004 quarter. For those chemicals that you must monitor for annually (such as TTHM for some systems), you must take your first samples in the month of warmest water temperature in 2004 (generally in the July-September quarter, since that is probably the period of warmest water temperature). You need to develop and follow a monitoring plan that indicates the location and

timing of all monitoring required by this rule by the time you take your first compliance sample.

There are no requirements for you to conduct any monitoring prior to 2004 under the Stage 1 DBPR, and failure to conduct monitoring prior to 2004 is not a violation. However, EPA believes that you should conduct monitoring on your own to see whether you need to modify your treatment practices to meet the requirements of this rule prior to the compliance date. This will allow you to fully consider many low-technology, lower-cost alternatives and to conduct necessary bench- or pilot-scale testing to improve performance without going into violation.

D. What, when, and how must I monitor or test?

There are three categories of small systems that have monitoring requirements under this rule. They are:

- Subpart H systems that serve 500 to 9,999 people.
- Subpart H systems that serve fewer than 500 people.
- Ground water systems that serve fewer than 10,000 people.

Note: A subpart H system is a system using surface water or ground water under the direct influence of surface water as a source

If you do not know what type of system you are, you should contact your State agency to confirm this information.

Exhibit III-2 General Monitoring Requirements for the Stage 1 DBPR

Monitored Parameters	System Type		
	Subpart H 500-9,999 people	**Subpart H <500people**	**Ground water <10,000 people**
TTHM	yes	yes	yes
HAA5	yes	yes	yes
Chlorine	only if chlorine is used as residual disinfectant	only if chlorine is used as residual disinfectant	only if chlorine is used as residual disinfectant
Chloramines	only if chloramines are used as residual disinfectant	only if chloramines are used as residual disinfectant	only if chloramines are used as residual disinfectant
Chlorine dioxide	only if chlorine dioxide is used	only if chlorine dioxide is used	only if chlorine dioxide is used
Bromate	only if ozone is used	only if ozone is used	only if ozone is used
Chlorite	only if chlorine dioxide is used	only if chlorine dioxide is used	only if chlorine dioxide is used
DBPP precursor removal (enhanced coagulation/enhanced softening	only if conventional filtration treatment[1] is used	only if conventional filtration treatment[1] is used	No

NOTES:
1. "Conventional filtration treatment" consists of coagulation, flocculation, sedimentation, and filtration.

Exhibit III-1 displays the general monitoring requirements for Stage 1 DBPR for each of the groups that require monitoring, these groups have different monitoring requirements. Monitoring for TTHM and HAA5 is based on the number of treatment plants that you operate. Generally, this is equal to the number of entry points into the distribution system. However, the State can consider multiple entry points from the same aquifer as a single treatment plant for monitoring purposes. Contact the State if you think this may apply to you.

You may also elect to do optional monitoring in order to qualify for reduced monitoring for certain parameters. You are not required to conduct this monitoring and conducting this monitoring does not guarantee that you will qualify for reduced monitoring. Since not all systems are required to do the basic monitoring, make sure that you are required to do the basic monitoring before you decide to do the optional monitoring. Exhibit III-2 illiterates the optional monitoring for Stage 1 DBPR.

Exhibit III-3 Optional Monitoring for the Stage 1 DBPR

Optional Parameter	Purpose of Monitoring	Type of System
Bromide	Qualify for reduced bromate monitoring	Any system that uses ozone
TOC	Qualify for reduced TTHM and HAA5 monitoring	Any subpart H system that does not use conventional filtration treatment [1]
Ultraviolet (UV) absorbance	Qualify for one of the alternative compliance criteria for DBP precursor removal compliance [2]	Any subpart H system that uses conventional filtration treatment
Dissolved organic carbon (DOC)	Qualify for one of the alternative compliance criteria for DBP precursor removal compliance [2]	Any subpart H system that uses conventional filtration treatment

NOTES:
1. Subpart H systems that use conventional filtration treatment are required to conduct TOC monitoring under the DBP precursor removal (enhanced coagulation/enhanced softening) requirements. Other subpart H systems can use the data to qualify for reduced monitoring.
2. UV absorbance and DOC monitoring are used to determine whether a system can meet the alternative compliance criteria for either source water specific UV absorbance (SUVA) or treated water SUVA.

Exhibit III-4 *What* ROUTINE TTHM, HAA5, CHLORINE, AND CHLORAMINE MONITORING *must I conduct under the Stage 1 DBPR?*

Chemical	Routine Frequency	Where monitoring must be conducted
TTHM and HAA5	*Subpart H system serving 500-9,999 people*	
	1 sample per plant per quarter	Location representing maximum residence time[1].
	Subpart H system serving fewer than 500 people	
	1 sample per plant per year, during the month of warmest water temperature [2]	Location representing maximum residence time[1].
	Ground water system serving fewer than 10,000 people	
	1 sample per plant per year, during the month of warmest water temperature [2]	Location representing maximum residence time[1].
Chlorine and Chloramines[3]	*All systems serving fewer than 10,000 people*	
	Same time as total coliform samples are taken	Same points as total coliform samples are taken.

NOTES:
1. If you decide to sample more frequently than the minimum required, at least 25% of all samples collected each quarter (including those taken in excess of the required frequency) must be taken at locations that represent the maximum residence time of the water in the distribution system. The remaining samples must be taken at locations representative of at least average residence time in the entire distribution system (account for number of people served, different sources of water, different treatment methods)
2. If your one sample per year exceeds either 0.080 mg/L for TTHM or 0.060 mg/L for HAA5, you are not immediately in violation. You must begin to take samples at this same location every quarter. Once you have four quarterly samples, you will make your first compliance determination.
3. If you are a subpart H system, you may use the results of residual disinfectant concentration sampling conducted under §141.74(b)(6)(i) for systems that do not filter or §141.74(c)(3)(i) for systems that filter, in lieu of taking separate samples.

Exhibit III-5 *What* REDUCED MONITORING FOR TTHM, HAA5, CHLORINE, AND CHLORAMINES *may I conduct under the Stage 1 DBPR?*

Chemical	Reduced Frequency	Where monitoring must be conducted	Conditions to qualify for reduced monitoring
TTHM and HAA5	*Subpart H system serving 500-9,999 people*		
	1 sample per plant per year during month of warmest temperature [1]	In the distribution system at a location representing maximum residence time.	- Annual average source water TOC # 4.0 mg/L and - Annual average TTHM # 0.040 mg/L and - Annual average HAA5 # 0.030 mg/L
	Subpart H system serving fewer than 500 people		
	You may **NOT** reduce your monitoring to less than the routine frequency of one time per year per plant.		
	Ground water system serving fewer than 10,000 people		
	1 sample per plant per three year cycle during month of warmest temperature [2]	In the distribution system at a location representing maximum residence time.	- Annual average TTHM # 0.040 mg/L and annual average HAA5 # 0.030 mg/L for two consecutive years **OR** - Annual average TTHM # 0.020 mg/L and annual average HAA5 # 0.015 mg/L for one year
Chlorine and Chloramines	*All systems*		
	You may **NOT** reduce monitoring for disinfectant residuals.		

NOTES:
1. You may remain on reduced monitoring frequency as long as your TTHM concentration does not exceed 0.060 mg/L, your HAA5 concentration does not exceed 0.045 mg/L, and your annual average source water TOC level does not exceed 4.0 mg/L. If you exceed any of these concentrations, you must revert to routine monitoring.
2. You may remain on reduced monitoring frequency as long as your TTHM concentration does not exceed 0.060 mg/L and your HAA5 concentration does not exceed 0.045 mg/L. If you exceed either the TTHM or HAA5 concentrations, you must revert to routine monitoring if you do not exceed 0.080 mg/L for TTHM and 0.060 mg/L for HAA5. You must go to increased (quarterly) monitoring if you exceed either 0.080 mg/L for TTHM or 0.060 mg/L for HAA5.

Exhibit III-6 *How do I* DETERMINE IF MY SYSTEM IS IN COMPLIANCE *with the TTHM and HAA5 MCLs and MRDLs in the Stage 1 DBPR?*

Chemical	Compliance is based on...
TTHM and HAA5	*If you monitor each plant at least once per quarter*
	Running annual arithmetic average, computed quarterly, of quarterly arithmetic averages of all samples collected (routine monitoring). - If annual arithmetic average of quarterly averages covering any consecutive 4-quarter period exceeds the MCL, then you are in violation. - You must notify the public and report to the State if in violation.
	If you monitor each plant no more than once per year
	Annual arithmetic average of all samples collected (routine and reduced monitoring). - If annual sample (or average of annual samples, if you have more than one plant) exceeds the MCL, then you must begin quarterly monitoring at each plant. - If an annual average exceeds the MCL and you are on reduced monitoring, you must revert to routine monitoring immediately.
Chlorine and Chloramines	*All systems*
	Running annual arithmetic average, computed quarterly, of quarterly averages of all samples collected. - If annual arithmetic average of quarterly averages covering any consecutive 4-quarter period exceeds the MRDL, then you are in violation. - You must notify the public and report to the State if in violation. - If you switch between chlorine and chloramines for residual disinfection during the year, compliance must be determined by including together all monitoring results of both chlorine and chloramines.

NOTES:
1. Where compliance is based on a running annual average of monthly or quarterly samples or averages and your failure to monitor makes it impossible to determine compliance with the MCLs or MRDLs, this failure to monitor will be treated as a violation for the entire period covered by the annual average.
2. All samples taken and analyzed under the provisions of the monitoring plan must be included in determining compliance, even if that number is greater than the minimum required.
3. If during the first year of monitoring, any individual quarter's average will cause the running annual average of that system to exceed the MCL, you are out of compliance at the end of that quarter.

E. What records do I need to keep and for how long?

You must keep records of chemical monitoring and compliance determination for10 years. You must keep your monitoring plan as long as it is current. You must also keep superceded monitoring plans for as long as you are required to keep monitoring results collected under those monitoring plans.

F. What, when, and to whom must I report?

Exhibit III-7 What must be reported

Chemical	What must be reported [1, 2, 3]
TTHM and HAA5	*If you monitor each plant at least once per quarter*
	- Number of samples taken during last quarter (routine monitoring) - Location, date, result of each sample taken during last quarter - Arithmetic average of all samples taken in last quarter - Annual arithmetic average of quarterly averages for last 4 quarters - Whether MCL was violated
	If you monitor each plant no more than once per year
	- Number of samples taken during last quarter (routine monitoring) - Location, date, result of each sample taken during last quarter - Arithmetic average of all samples taken in last quarter - Annual arithmetic average of quarterly averages for last 4 quarters - Whether MCL was violated
Chlorine and Chloramines	*All systems*
	- Number of samples taken during each month of last quarter - Monthly arithmetic average of all samples taken in each month - Arithmetic average of all monthly averages for last 12 months - Whether MRDL was violated

NOTES:
1. If you are required to sample quarterly or more frequently, you must report to the State within 10 days after the end of each quarter in which samples were collected.
2. If you are required to sample less frequently than quarterly, you must report to the State within 10 days after the end of each monitoring period in which samples were collected.
3. The State may choose to perform calculations and determine whether the MCL, MRDL, or treatment technique was met in lieu of having you report that information.

G. What do I have to do if I use chlorine dioxide, ozone, or conventional filtration treatment?

If you use chlorine dioxide, ozone, or conventional filtration treatment, you have additional requirements under this rule. The additional requirements if you use chlorine dioxide are in Appendix D. The additional requirements if you use ozone are in Appendix E. The additional requirements if you use conventional filtration treatment are in Appendix F.

H. How do I minimize harm if I think I am out of compliance?

If you are out of compliance, you are required to contact your State agency within 48 hours of the failure to comply. When you contact the State, explain the situation fully and ask for recommendations on what to do. There are many actions that you might take that will cause the problem to get worse. For example, if you stop adding a disinfectant if you have a TTHM violation, you risk compromising the protection from disease-causing microorganisms. If you stop water from entering the distribution system, you risk losing pressure in the distribution system needed for fire fighting and to prevent infiltration. Therefore, it is important to work with the State to address your unique circumstances.

I. Where do I go for help?

There are many sources of information available to help you meet the requirements in this rule. You can review EPA's guidance manuals (see Appendix B on how to order these manuals). You can contact your State drinking water agency. You can contact your State or regional chapters of such organizations such as the National Rural Water Association and the American Water Works Association. You can contact a larger water supplier in your area who might be willing to help. You can also contact EPA's regional offices or the Safe Drinking Water Hotline at 800-426-4791.

J. Are there opportunities for flexibility?

There are opportunities for systems to apply for variances and exemptions from the requirements of this rule. You should contact your State to see what is necessary for approval. Also, the 1996 Amendments to the Safe Drinking Water Act allow for the use of point-of-use or point-of-entry devices for compliance if the units are owned, controlled, and maintained by the public water system or by a person under contract to the system to ensure proper operation and maintenance and compliance with the MCL or treatment technique and the units are equipped with mechanical warnings to ensure that customers are automatically notified of operational problems. Again, you should contact your State for more information.

IV. QUESTIONS AND ANSWERS ABOUT THE STAGE 1 DBPR

A. Am I in violation of the MRDL if I have to increase my chlorine or chloramine concentration in the distribution system following a line break?

No. You are allowed to increase residual disinfectant levels in the distribution system above the MRDLs for chlorine and chloramines (but not for chlorine dioxide) to a level and for a time necessary to address specific microbiological contamination problems caused by circumstances such as line breaks or cross-connection events. Compliance is not based on an individual measurement, but on the average of all measurements taken over the previous year.

B. How do I conduct a self-audit of my drinking water system to help me evaluate whether I am in compliance with the Stage 1 DBPR?

Since compliance is based on monitoring results, the best way to evaluate compliance is to conduct monitoring prior to the compliance date in 2004 for any requirements that you will be required to meet. This will allow you to evaluate your options for meeting requirements to ensure compliance in 2004. Your options may include (but are not limited to) improved operation of your existing treatment processes, modification of existing processes, or capital improvements such as new technologies.

C. What are the implications of this rule for my existing permits?

You should contact the State to determine whether there are any implications.

D. How do I finance system improvements to comply with these regulations?

There are two major sources of Federal financial assistance available for water systems: the Drinking Water State Revolving Fund (DWSRF) and the Water and Waste Disposal Loan and Grant Program of the Rural Utilities Service (RUS) of the U. S. Department of Agriculture.

The 1996 SDWA Amendments authorized $9.6 billion for the DWSRF program. To date, Congress has appropriated $4.2 billion, which includes $825 million for the program in Fiscal Year 2001. By the end of September 2000, States had been awarded $3.2 billion in capitalization grants and, from that, had provided more than $2.8 billion in assistance to eligible drinking water systems. The Federal capitalization grant, together with State matching funds, is currently making available about $1 billion per year. States have considerable discretion in designing their DWSRF program, and have the option of offering special assistance to systems that the State considers to be disadvantaged. Special assistance may include principal forgiveness, a negative interest rate, an interest rate lower than that charged to non-disadvantaged systems, and extended repayment periods of up to 30 years. Federal law allows DWSRF assistance to be provided to both publicly- and privately-owned systems, although some States are unable or choose not to provide assistance to privately-owned systems.

EPA recognizes that public water systems and States face a significant challenge in implementing new requirements that are needed to ensure the continued provision of safe drinking water. While the DWSRF program is proving to be a significant source of funding, it

cannot be viewed as the only source of funding. It will take a concerted effort on the part of Federal, State and local governments, private business, and utilities to address the significant infrastructure needs identified by public water systems. In order to ensure that the DWSRF program is used to focus attention on the highest priority needs, all States must give priority to those drinking water infrastructure improvement projects that will have the greatest public health benefit or ensure compliance with SDWA. State DWSRF programs are currently making loans available to the highest ranked projects on their lists and are also using a portion of the grants to support other important drinking water program activities.

The RUS program is focused on providing a safe, reliable water supply and wastewater treatment to residents of rural America. The program offers a combination of low interest loans and grants to systems serving rural areas and cities and towns of up to 10,000 persons and which are publicly owned (including Native American systems) or operated as not-for-profit corporations. In recent years the RUS program has typically offered assistance totaling about $1.3 billion per year, about 60% of which is directed to drinking water projects. Thus, about $780 million per year is available for rural drinking water systems from this program. Together with the approximately $1 billion per year being made available through the DWSRF, this results in a total of about $1.78 billion per year of Federal financial assistance available for drinking water.

Other Federal financial assistance programs exist that may help systems with SDWA compliance related expenditures. However, these other programs are not generally as large or focused on drinking water as are the DWSRF and RUS programs. EPA's Environmental Financial Advisory Board has developed a "Guidebook of Financial Tools", which offers a comprehensive summary of public and private programs and mechanisms for paying for drinking water and other environmental systems. The handbook is available through EPA's web site at: http://www.epa.gov/efinpage/guidbk98/index.htm.

The Federal financial assistance programs described previously clearly face numerous, competing demands on their resources. EPA's 1995 Drinking Water Infrastructure Needs Survey identified a total 20-year need for all systems of $138.4 billion. The single largest category of need (accounting for over half of the total need) is installation and rehabilitation of transmission and distribution systems. Treatment needs constitute the second largest category of need, accounting for over 1/4 of total needs. Storage and source rehabilitation and development constitute the remaining major categories of needs. Thus, systems seeking financial assistance for installation of DBP treatment are competing for resources with systems seeking assistance for compliance with other rules and with systems seeking resources for basic infrastructure repair and replacement. In seeking to meet these numerous and competing needs, the Agency recognizes the importance of priority setting for financial assistance programs. Systems having the financial capability to secure funding through the capital markets should do so, leaving the Federal financial assistance programs to assist the truly needy systems. Since the demand for assistance will likely outstrip the supply of assistance, you may want to discuss an exemption with your State, which, if granted, will provide additional time for you to secure financial assistance.

V. THE COMPLIANCE ASSURANCE PROCESS

A. How is my system's compliance with the Stage 1 DBPR requirements determined?

Compliance calculations are based on the results of the monitoring you are required to conduct (see Section III for details). Some States conduct monitoring for small systems, either on a regulatory basis or on a fee-for-service basis. You calculate compliance using the procedures identified in Section III; States also may just require you to submit your analytical results and the State will calculate compliance.

B. If I discover a violation, how can I work with my State to correct it?

If you discover that you have violated the Stage 1 Disinfectants and Disinfection Byproducts Rule, you need to call the primacy agency (generally your State drinking water agency, but it may be EPA or an approved tribe) to discuss the situation. The primacy agency is the entity which is responsible for enforcing drinking water regulations.

You remain ultimately responsible for resolving the violation. However, if the violation can be easily and expeditiously resolved, the primacy agency may be willing to work with you to remedy the problem. If the cause of the violation is unknown, you may choose to work with the primacy agency and/or a third-party contractor to determine how to correct the violation and create a long-term compliance solution.

The primacy agency may issue a Notice of Violation (NOV), Administrative Order (AO), and/or a Bilateral Compliance Agreement (BCA) notifying you of the violation and ordering you to resolve the problem causing the violation(s). The primacy agency is authorized to demand a penalty for any violation of the Stage 1 Disinfectants and Disinfection Byproducts Rule. Failure to expeditiously remedy the cause of the violation(s) may result in a federal or State civil judicial enforcement action demanding both injunctive relief and a significant penalty.

You may also be required to provide public notice and/or provide an alternate water source, such as bottled water, if the violation impacts public health or may cause an imminent and substantial endangerment to public health or the environment. Public notice means providing health impact information to people who consume the water your system treats.

C. If EPA or the State discovers a violation, what might be its response?

To maximize compliance, EPA and States implement a balanced program of compliance assistance, compliance incentives, and traditional law enforcement through the courts. Small systems that must comply with complicated new statutes or rules often want to do the right thing, but may lack the requisite knowledge, resources, or skills. Compliance assistance information and technical advice helps small systems to understand and meet their obligations. Compliance incentives, such as EPA's Small Business Policy, encourage persons to voluntarily discover, disclose, and correct violations before they are identified by the government. A strong law enforcement program protects all of us by targeting persons who neither comply nor cooperate to address their problems.

EPA and States use a variety of methods to determine whether systems are complying, including inspecting facilities, reviewing records and reports, and responding to citizen complaints. If EPA or a State learns that a system is violating the law, we may file an enforcement action seeking penalties of up to $27,500, per violation, per day. The proposed penalty in a given case will depend on many factors, including the number, length, and severity of the violations, the economic benefit obtained by the violator, and its ability to pay. EPA has policies in place to ensure penalties are calculated fairly. These policies are available to the public. In addition, any system charged with a violation has the right to a public hearing.

In summary, EPA recognizes that we can achieve the greatest possible protection by encouraging small systems to work with the State or us to discover, disclose, and correct violations. That is why we have issued self disclosure, small business, and small community policies to eliminate or reduce penalties for small and large entities that cooperate with EPA to address compliance problems. In addition, we have established compliance assistance centers to serve over a million small businesses. For more information on these and other programs for small businesses, please contact the Small Business Ombudsman Clearinghouse/Hotline at 800-368-5888 (or 202-260-1211 from the Washington, DC metropolitan calling area).

D. What is the legal status of the guide?

A judge can look at a compliance guide to help determine what penalty is appropriate or reasonable. The content of the guide cannot otherwise be reviewed by the court.

In this compliance guide, we have tried to make clear what you must do to comply with the Stage 1 Disinfectants and Disinfection Byproducts Rule, as required by SBREFA. We hope you find this presentation of regulatory requirements useful and the additional information helpful in reaching and maintaining compliance.

APPENDICES

A. Glossary of terms used in this guide

B. Where to obtain more information

C. Questionnaire - How useful was this guide?

D. Requirements for systems that use chlorine dioxide.

E. Requirements for systems that use ozone.

F. Requirements for systems that use conventional filtration treatment.

APPENDIX A - GLOSSARY OF SELECTED TERMS USED IN THIS GUIDE

Alternative compliance criteria means the eight criteria in the Stage 1 DBPR that systems may use to demonstrate compliance with the disinfection byproduct precursor (TOC) removal requirements in lieu of the requirement to remove specified levels of disinfection byproduct precursors.

Conventional filtration treatment means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in significant particulate removal.

Disinfection byproduct precursors means organic or inorganic compounds that react with disinfectants to form disinfection byproducts.

Enhanced coagulation means the addition of sufficient coagulant for improved removal of disinfection byproduct precursors by conventional filtration treatment.

Enhanced softening means the improved removal of disinfection byproduct precursors by precipitative softening.

GAC10 means granular activated carbon filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days.

Ground water under the direct influence of surface water (GWUDI) means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium* or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. States were required to determine whether ground water was under the influence of surface water for all systems by 1999.

Haloacetic acids (five) (HAA5) mean the sum of the concentrations in milligrams per liter of the haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid), rounded to two significant figures after addition.

Maximum residual disinfectant level (MRDL) means a level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. For chlorine and chloramines, a PWS is in compliance with the MRDL when the running annual average of monthly averages of samples taken in the distribution system, computed quarterly, is less than or equal to the MRDL. For chlorine dioxide, a PWS is in compliance with the MRDL when daily samples are taken at the entrance to the distribution system and no two consecutive daily samples exceed the MRDL. MRDLs are enforceable in the same manner as maximum contaminant levels under the Safe Drinking Water Act. There is convincing evidence that addition of a disinfectant is necessary for control of waterborne microbial contaminants. Operators may increase residual disinfectant levels of chlorine or

chloramines (but not chlorine dioxide) in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as distribution line breaks, storm runoff events, source water contamination, or cross-connections.

Maximum residual disinfectant level goal (MRDLG) means the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MRDLGs are nonenforceable health goals and do not reflect the benefit of the addition of the chemical for control of waterborne microbial contaminants.

Pathogens means disease-causing organisms, such as some bacteria, viruses, and protozoa.

Subpart H systems means public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to the requirements of the Surface Water Treatment Rule.

SUVA means Specific Ultraviolet Absorption at 254 nanometers (nm), an indicator of the humic content of a water. It is a calculated parameter obtained by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV_{254}) (in m^{-1}) by its concentration of dissolved organic carbon (DOC) (in mg/L).

Total Organic Carbon (TOC) means total organic carbon in mg/L measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures.

APPENDIX B - WHERE TO OBTAIN MORE INFORMATION

EPA has developed a series of guidance manuals to support the Stage 1 Disinfectants and Disinfection Byproducts Rule. The manuals will aid EPA, State agencies, and you in implementing the rule, and will help to ensure that implementation is consistent.

Guidance Manual for Enhanced Coagulation and Enhanced Precipitative Softening (EPA 815-R-99-012)
Objective: To assist utilities in implementing, monitoring, and complying with the treatment technique requirements in the final Stage 1 Disinfectants and Disinfection Byproducts Rule and to provide guidance to State staff responsible for implementing the treatment requirements.
Contents: The manual provides detailed information on the total organic carbon (TOC) removal requirement; explains how to set an alternative TOC removal percentage under the Step 2 procedure; details monitoring, reporting, and compliance requirements; and discusses strategies that can be employed to mitigate the potential secondary effects on plant performance due to implementation of the treatment technique.

Alternative Disinfectants and Oxidants Guidance Manual (EPA 815-R-99-014)
Objective: To provide technical data and engineering information on disinfectants and oxidants that are not as commonly used as chlorine, so that systems can evaluate options for developing disinfection schemes to control water quality problems such as zebra mussels and Asiatic clams, and oxidation to control water quality problems associated with iron and manganese.
Contents: The manual discusses six disinfectants and oxidants: ozone, chlorine dioxide, potassium permanganate, chloramines, ozone/hydrogen peroxide combinations, and ultraviolet light. A decision tree is provided to assist in evaluating which disinfectant(s) is most appropriate given certain site-specific conditions (e.g., water quality conditions, existing treatment and operator skill). The manual also contains a summary of existing alternative disinfectants used in the United States and cost estimates for the use of alternative disinfectants.

M/DBP Simultaneous Compliance Manual (EPA 815-R-99-015)
Objective: To assist public water systems on complying simultaneously with various drinking water regulations (e.g., Stage 1 Disinfectants and Disinfection Byproducts Rule, Interim Enhanced Surface Water Treatment Rule, Lead and Copper Rule and the Total Coliform Rule). The manual discusses operational problems you may encounter when implementing these rules.
Contents: The manual provides detailed information on the requirements in the Stage 1 Disinfectants and Disinfection Byproducts Rule and the Interim Enhanced Surface Water Treatment Rule.

For more information, contact EPA's Safe Drinking Water Hotline, 1 (800) 426-4791, or see the Office of Ground Water and Drinking Water web page at http://www.epa.gov/safewater/standards.html. The rule is available at www.epa.gov/safewater/mdbp/dbpfr.html.

To order a copy of guidance manuals you may contact the Safe Drinking Water Hotline at (800) 426-4791 or you may download an electronic version from the OGWDW website at http://www.epa.gov/safewater/mdbp/implement.html.

APPENDIX C - QUESTIONNAIRE

*Title of Rule or Program:*_____

*Name of Commenter (optional):*_____

Please take a moment to let us know if you found this guide useful by answering the following questions. Thank you; your feedback is important to us.

*1. I could easily understand what requirements I must meet.*_____

*2. The guide is written in understandable language.*_____

*3. The guide helped me understand the steps I must take to comply with the rule.*_____

4. If you have suggestions to improve the guide, please indicate below.

_____
_____
_____

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— —

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APPENDIX D. What do I have to do if I use chlorine dioxide?

Exhibit D-1 *What* ROUTINE MONITORING *must I conduct under the Stage 1 DBPR?*

Chemical	Frequency	Where monitoring must be conducted
Chlorite[1]	Daily	Entrance to the distribution system.
	1 3-sample set per month	Near first customer (1), location representative of average residence time (1), location representative of maximum residence time in distribution system (1).
	Additional: On any day following any daily sample that exceeds 1.0 mg/L, you must take a 3-sample set	Near first customer (1), location representative of average residence time (1), location representative of maximum residence time in distribution system (1). The system may use results to meet monthly 3-sample set monitoring requirement if the monthly 3-sample set has not yet been taken.
Chlorine Dioxide	Daily	Entrance to the distribution system.
	Additional: For any daily sample that exceeds 0.8 mg/L, you must take 3 samples the following day	• If chlorine dioxide or chloramines are used for residual disinfection or chlorine with no booster chlorination is used for residual disinfection: all samples as close as possible to the first customer at intervals of at least 6 hours • If chlorine with booster chlorination is used for residual disinfection: one sample as close as possible to the first customer, one sample at a location representative of average residence time, one sample as close as possible to the end of the distribution system (reflecting maximum residence time)

NOTES:
[1] Not required for transient noncommunity water systems

Exhibit D-2 *What* REDUCED MONITORING *may I conduct under the Stage 1 DBPR?*

Chemical	Frequency	Where monitoring must be conducted	Conditions for reduced monitoring
Chlorite (daily)[1]	No reduced monitoring allowed	NA	NA
Chlorite (monthly)[1]	1 3-sample set per quarter	Near first customer (1), location representative of average residence time(1), location representative of maximum residence time in distribution system. (1)	• No daily or monthly sample has exceeded the MCL and • No additional monitoring has been required and • No quarterly sample exceeds the MCL
Chlorine Dioxide	No reduced monitoring allowed	NA	NA

NOTES:
[1] Not required for transient noncommunity water systems

Exhibit D-3 *How do I* DETERMINE IF MY SYSTEM IS IN COMPLIANCE *with the MCLs and MRDLs of the Stage 1 DBPR?*

Chemical	Compliance is based on...
Chlorite	**Average of 3-sample sets.** • If arithmetic average of any 3-sample set in the month exceeds the MCL, the system is in violation. • The system must notify the public and report to the State if in violation.
Chlorine Dioxide—Acute Violation	**Consecutive daily samples collected.** • If any daily sample taken at entrance to distribution system exceeds 0.8 mg/L, and on the following day one or more of the three samples taken in the distribution system exceeds 0.8 mg/L, the system is in acute violation. • The system must take immediate corrective action to lower the level of chlorine dioxide below 0.8 mg/L, and within 24 hours notify the public and consult with the State. • Failure to take samples in the distribution system following an exceedance of the MRDL at the entrance to the distribution system is also an acute violation. System must, within 24 hours, notify public of acute violation and consult with the State.
Chlorine Dioxide—Nonacute Violation	**Consecutive daily samples collected.** • If any two consecutive daily samples taken at entrance to distribution system exceed 0.8 mg/L, and all distribution system samples are below 0.8 mg/L, the system is in nonacute violation. • The system must take immediate corrective action to lower the level of chlorine dioxide below0.8 mg/L, notify the public and report to the State. • Failure to take samples at the distribution system entrance following an exceedance of the MRDL is also a violation. System must notify public of nonacute violation and report to the State.

Exhibit D-4 *What do I have to* REPORT *to the State under the Stage 1 DBPR?*

Chemical	What must be reported[1, 2, 3]
Chlorite	• Number of entry point samples taken each month for last three months • Location, date, result of each sample (both entry point and distribution system samples) taken during last three months • For each month in the reporting period, the arithmetic average of all samples taken in each 3-sample set taken in the distribution system • Whether MCL violations occurred, in which month(s) violations occurred, and how many times MCL violations occurred each month
Chlorine Dioxide	• Dates, results, locations of samples taken during last quarter • Whether MRDL was exceeded • Whether MRDL was exceeded in any two consecutive daily samples and whether resulting violation was acute or nonacute

NOTES:
1. Systems required to sample quarterly or more frequently must report to the State within 10 days after the end of each quarter in which samples were collected.
2. Systems required to sample less frequently than quarterly must report to the State within 10 days after the end of each monitoring period in which samples were collected.
3. The State may choose to perform calculations and determine whether the MCL, MRDL, or treatment technique was met in lieu of having the system report that information.

APPENDIX E. What do I have to do if I use ozone?

Exhibit E-1 *What* ROUTINE MONITORING *must I conduct under the Stage 1 DBPR?*

Chemical	Frequency	Where monitoring must be conducted
Bromate	1 sample per ozone plant per month	Entrance to the distribution system.
Bromide	1 sample per ozone plant per month	In source water (only required if the system wishes to qualify for reduced bromate monitoring).

Exhibit E-2 *What* REDUCED MONITORING *may I conduct under the Stage 1 DBPR?*

Chemical	Frequency	Where monitoring must be conducted	Conditions for reduced monitoring
Bromate	1 sample per ozone plant per quarter	Entrance to the distribution system.	• Annual average source water bromide concentration <0.05 mg/L[1]
Bromide	No reduced monitoring if wishing to conduct reduced bromate monitoring	NA	NA

NOTES:
[1] System must base the initial qualification for reduced monitoring on at least one year's worth of monitoring and must resume monthly bromate monitoring if running annual average of source water bromide $0.05 mg/L.

Exhibit E-3 *How do I* DETERMINE IF MY SYSTEM IS IN COMPLIANCE *with the bromate MCL in the Stage 1 DBPR?*

Chemical	Compliance is based on...[1, 2]
Bromate	**Running annual arithmetic average, computed quarterly, of monthly samples (or average of all samples taken during the month if more than 1 sample was collected).** • If average of samples covering any consecutive 4-quarter period exceeds the MCL, the system is in violation. • The system must notify the public and report to the State if in violation.

NOTES:
1. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with the MCLs or MRDLs, this failure to monitor will be treated as a violation for the entire period covered by the annual average.
2. All samples taken and analyzed under the provisions of the monitoring plan must be included in determining compliance, even if that number is greater than the minimum required.
3. If during the first year of monitoring, any individual quarter's average will cause the running annual average of that system to exceed the MCL, the system is out of compliance at the end of that quarter.

Exhibit E-4 *What do I have to* REPORT *to the State under the Stage 1 DBPR?*

Chemical	What must be reported[1, 2, 3]
Bromate	• Number of samples taken during last quarter • Location, date, result of each sample taken during last quarter • Arithmetic average of monthly arithmetic averages of all samples taken in last year • Whether MCL was exceeded

NOTES:
1. Systems required to sample quarterly or more frequently must report to the State within 10 days after the end of each quarter in which samples were collected.
2. Systems required to sample less frequently than quarterly must report to the State within 10 days after the end of each monitoring period in which samples were collected.
3. The State may choose to perform calculations and determine whether the MCL, MRDL, or treatment technique was met in lieu of having the system report that information.

APPENDIX F. What do I have to do if I am a subpart H system with conventional filtration treatment?

If you are a subpart H system with conventional filtration treatment, you must (a) remove organic disinfection byproduct precursors (DBPP), measured as total organic carbon, through enhanced coagulation or enhanced softening, (b) demonstrate that your DBPP cannot be removed through these processes, or (c) demonstrate that the level or nature of your DBPP does not require their removal.

There are many ways to achieve compliance with this requirement. You should review the "Guidance Manual for Enhanced Coagulation and Enhanced Precipitative Softening "(EPA 815-R-99-012), which is available as indicated in Appendix B of this manual. This guidance manual will assist you in implementing, monitoring, and complying with the treatment technique requirements in the Stage 1 Disinfectants and Disinfection Byproducts Rule. The guidance manual provides detailed information on the total organic carbon (TOC) removal requirement; explains how to set an alternative TOC removal percentage under the Step 2 procedure; details monitoring, reporting, and compliance requirements; and discusses strategies that can be employed to mitigate the potential secondary effects on plant performance due to implementation of the treatment technique. Because the "Guidance Manual for Enhanced Coagulation and Enhanced Precipitative Softening " is so detailed, its specific guidance is not repeated here. Instead, you should review this appendix to determine whether the requirement applies to you. If this requirement applies to you, you should refer to the guidance manual.

What is the goal of enhanced coagulation and enhanced precipitative softening?

The goal of enhanced coagulation and precipitaive softening is to provide additional removal of the natural organic material (referred to as total organic carbon or "TOC") that is a precursor to DBP formation. TOC and disinfectants commonly used in drinking water treatment can react to form DBPs. Adding additional amounts of coagulant or lime to coagulation or softening treatment trains, respectively, can increase the removal of TOC and thereby lower DBP levels in finished water.

Which systems does the treatment technique apply to?

The treatment technique applies to subpart H systems (systems using surface water or groundwater under the direct influence of surface water) that use conventional treatment. Conventional treatment is defined as coagulation or lime addition, flocculation, sedimentation, and filtration.

How is the treatment technique implemented?

Public water systems (PWSs) are required to remove a specified percentage of TOC from the raw water. The percent removal is based on raw water TOC and alkalinity levels. A pair of TOC samples must be taken simultaneously in the raw water and no later than the combined filter effluent at least once per month to calculate the percent removal and demonstrate compliance via a running annual average. If a PWS is unable to meet the required TOC removal, the State may

set an alternative TOC percent removal based on jar or pilot testing that reflects the treatability of their water. PWSs may also use one of the alternative compliance criteria to demonstrate compliance.

What are alternative compliance criteria?

Some systems may have water that is low in DBPPs or have DBPPs that are non-reactive or cannot be removed through enhanced coagulation or enhanced softening. For these systems, EPA has designated different standards for demonstrating compliance, known as alternative compliance criteria. There are six alternative compliance criteria that are available to all systems, plus two more that are available only to systems that use precipitative softening. They are discussed in detail in the "Guidance Manual for Enhanced Coagulation and Enhanced Precipitative Softening".

Exhibit F-1 *What* ROUTINE MONITORING *must I conduct under the Stage 1 DBPR?*

Chemical	Frequency	Where monitoring must be conducted
TOC and Alkalinity (conventional treatment)	- Two TOC samples per plant per month - One alkalinity sample per plant per month at same time as source water TOC sample is taken	TOC (two samples) • In source water prior to any treatment • No later than the point of combined filter effluent turbidity monitoring and representative of filtered water Alkalinity • Same location as source water TOC sample is taken.

Exhibit F-2 *What* REDUCED MONITORING *may I conduct under the Stage 1 DBPR?*

Chemical	Frequency	Where monitoring must be conducted	Conditions for reduced monitoring
TOC and Alkalinity (conventional treatment)	- Two TOC samples per plant per quarter - One alkalinity sample per plant per quarter at same time as source water TOC sample is taken	TOC (two samples) • In source water prior to any treatment • No later than the point of combined filter effluent turbidity monitoring and representative of filtered water Alkalinity • Same location as source water TOC sample is taken.	Average treated water TOC < 2.0 mg/L for 2 consecutive years or <1.0 mg/L for 1 year

Exhibit F-3 *How do I* DETERMINE IF MY SYSTEM IS IN COMPLIANCE *with the TOC removal requirements of the Stage 1 DBPR?*

Chemical	Compliance is based on...
TOC (conventional treatment)	"Step 1" or "Step 2" removal targets or alternative compliance criteria [1,2] Refer to the "Guidance Manual for Enhanced Coagulation and Enhanced Precipitative Softening" for further information.

NOTES:
1. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with the treatment technique, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average.
2. All samples taken and analyzed under the provisions of the monitoring plan must be included in determining compliance, even if that number is greater than the minimum required.