

Implementation Guidance for the Stage 2 Disinfectants and Disinfection By-Products Rule

**Idaho Department of Environmental Quality
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Preface

This guidance provides a concise summary of the requirements of the Stage 2 DBP Rule. The primary audience is water system owners and operators who need to learn about their obligations under this rule, but it may be helpful to regulatory personnel, professional consultants, and interested customers of public drinking water systems. It may be particularly useful to those who prefer to read rule requirements in a narrative format. However, whenever a question of interpretation arises, it is the rule language itself that must be consulted. Use of this guidance is not mandatory. Interested persons may learn about these rules by reading the appropriate sections of the Code of Federal Regulations, or by referring to a variety of guidance documents that have been prepared by the U.S. EPA. Information on obtaining the EPA publications is provided on page 31 of this document.

The Stage 2 Disinfectants and Disinfection By-Products Rule (Stage 2 DBP) was promulgated by the U.S. Environmental Protection Agency on January 4, 2006. The Idaho Department of Environmental Quality is in the process of adopting this rule in the *Idaho Rules for Public Drinking Water Systems*. A copy of these rules may be downloaded from the Internet at:

<http://adm.idaho.gov/adminrules/rules/idapa58/58index.htm>. Pertinent language from these rules is included in this guidance as Appendix A.

The State of Idaho is fortunate in that most public water systems have generally high quality source water. This diminishes the likelihood that Idaho water systems will detect significant levels of disinfection by-products (DBPs) in their water. However, a small percentage of systems may find DBPs in concentrations that are high enough to require corrective actions. These actions may involve optimizing the disinfection process, removing DBP precursors from source water, implementation of a systematic distribution system flushing program, or even the addition of treatment processes to remove DBPs prior to distributing finished water.

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Abbreviations and Definitions

Consecutive System. A public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

Dual Sample Set. A set of two (2) samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an Initial Distribution System Evaluation (40 CFR Part 141, Subpart U) and for determining compliance with the TTHM and HAA5 MCLs under the Stage 2 Disinfection Byproducts Requirements (40 CFR Part 141, Subpart V).

DBPs stands for “disinfection by products.” The Stage 1 and Stage 2 disinfection by product rules require monitoring for DBPs of two types: total trihalomethanes and a group of five haloacetic acids. These chemicals serve to represent a large and complex mix of compounds that are produced when chemical disinfectants react with organic precursors in source water.

Stage 1 DBP Rule is a shortened form of Stage 1 Disinfectants and Disinfection Byproducts Rule.

Stage 2 DBP Rule is a shortened form of Stage 2 Disinfectants and Disinfection Byproducts Rule.

Subpart H refers to Subpart H of 40 Code of Federal Regulations Part 141—the Surface Water Treatment rule. Also used as an identifier, i.e. a “Subpart H System” is shorthand for a public water system that obtains some or all of its water from a surface water source or a source that has been identified as ground water under the direct influence of surface water.

Subpart L refers to Subpart L of 40 Code of Federal Regulations Part 141—the Stage 1 Disinfectants and Disinfection Byproducts Rule. Subpart designations are often used to describe actions taken under a rule, i.e. “Subpart L monitoring” is the same as saying “monitoring that was conducted under the requirements of the Stage 1 DBP rule.”

Subpart U refers to Subpart U of 40 Code of Federal Regulations Part 141—the Initial Distribution System Evaluation (IDSE) requirements of the Stage 2 DBP Rule.

Subpart V refers to Subpart V of 40 Code of Federal Regulations Part 141—the monitoring and compliance requirements of Stage 2 DBP rule.

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Section 1—Rule Overview and Compliance Timetable

This section presents a brief outline of the rule requirements and a timetable for compliance.

1.A. Water Systems Affected by this Rule

The requirements of this rule apply to community water systems and non-transient non-community water systems that add a primary or residual disinfectant other than ultraviolet light, or deliver water that has been treated by a primary or residual disinfectant other than ultraviolet light.

1.B. General Requirements

For the purposes of this rule, public water systems are divided into classes by population served. During national negotiations concerning this rule, agreements were reached between U.S. EPA and various interest groups that provided for early implementation of certain Stage 2 requirements. As a result of these agreements, U.S. EPA will interact directly with some of Idaho's largest systems to implement the early requirements, since Idaho is legally unable to implement this rule until it has promulgated a state regulation and been awarded primacy by EPA.

DEQ has started the rule making process to adopt the Stage 2 DBP Rule and, after DEQ Board adoption and legislative approval, expects to begin implementing this rule by early 2008. Once EPA issues primacy to DEQ, all systems will work with either DEQ or the local Idaho Health Districts as their regulatory agency (see Table 1, below). Idaho has only thirteen water systems in the top three population classifications. There are about 277 systems serving fewer than 10,000 customers, making a total of about 290 systems in all four population classes that are affected by this rule.

The rule has two parts:

- 1) A requirement to perform an Initial Distribution System Evaluation (IDSE) or an acceptable alternative. The purpose of the IDSE requirement is to identify locations within the distribution system that exhibit the highest concentrations of disinfection by products.
- 2) The rule specifies monitoring and compliance requirements that may be modified from those of the Stage 1 DBP rule. Monitoring locations may differ and compliance will be calculated based on a running average of sample results from specific locations (*locational running annual average*) instead of a running annual average of results from throughout the distribution system. Peaks in disinfection by product concentrations are addressed by defining *operational evaluation levels* that will trigger an investigation of causes and possible preventive measures. There are new requirements for regulated public water systems that buy some or all of their water from another public water system (*consecutive systems—see definitions*). Finally, there is a change in reduced bromate

monitoring requirements for systems that disinfect with ozone. Each of these requirements is described in greater detail in the body of this Guidance.

Maximum Contaminant Levels (MCLs) for disinfection by-products are unchanged from the Stage 1 DBP rule. Requirements for disinfection residual measurements and compliance with Maximum Residual Disinfectant Levels (MRDLs) also remain unchanged.

1.C. Timetable for Stage 2 DBP Rule Implementation

Idaho DEQ expects to assume responsibility for implementing this rule by early 2008 and will be working with water systems on the milestones that are shaded in grey. EPA is implementing the early requirements of this rule under their adopted rule authorities and those deadlines are listed in column two of Table 1. **It is important for water systems to remember that DBP and disinfectant residual monitoring under the Stage 1 DBP Rule must continue until the dates given in the right-hand column of this table.**

Table 1. Stage 2 Implementation Milestones

Population Served	Submit IDSE monitoring plan or IDSE alternative	Complete IDSE	Submit IDSE Report	Begin Stage 2 compliance monitoring
≥100,000 (Schedule 1)	October 1, 2006	September 30, 2008	January 1, 2009	April 1, 2012
50,000 - 99,999 (Schedule 2)	April 1, 2007	March 31, 2009	July 1, 2009	October 1, 2012
10,000 - 49,999 (Schedule 3)	October 1, 2007	September 30, 2009	January 1, 2010	October 1, 2013
<10,000 (Schedule 4)	April 1, 2008	March 31, 2010	July 1, 2010	October 1, 2013*

* - Small water systems with filtered surface water sources that exceed the E. Coli triggers in the LT2ESWTR will have until 10/1/2014 to begin Stage 2 compliance monitoring.

Section 2—Requirement to Conduct an Initial Distribution System Evaluation (IDSE)

2.A. Regulatory Authority

The requirements discussed in this section were promulgated as 40 CFR 141, Subpart U, of the Code of Federal Regulations and incorporated by reference in the *Idaho Rules for Public Drinking Water Systems* at IDAPA 58.01.08.321.

2.B. Applicability

The IDSE requirements apply to the following types of public water systems if they use a primary or residual disinfectant other than ultraviolet light or deliver water that has been treated with a primary or residual disinfectant other than ultraviolet light:

- 1) Community water systems.
- 2) Non-transient non-community water systems that serve at least 10,000 people.

2.C. Options for Fulfilling the IDSE Requirement

There are four ways that the IDSE requirements can be met. Each of these will be discussed in greater detail in following paragraphs.

- 1) **VSS Waiver.** A very small system waiver (VSS waiver) from the IDSE requirement is available for systems that serve <500 customers and have collected DBP data under the Stage 1 rule.
- 2) **40/30 Certification.** A system may certify that all Stage 1 DBP sample results over a specified two-year period were less than or equal to 0.040 mg/L for TTHM and less than or equal to 0.030 mg/L for HAA5 and that the system had no monitoring violations during the two-year reference period. This certification will exempt a system from the requirement to perform an IDSE.
- 3) **Standard Monitoring.** A system may conduct an IDSE that is based on DBP samples taken at selected locations designed to target areas in the distribution system expected to exhibit high concentrations of DBPs.
- 4) **System Specific Study.** A system may propose a study that is based on a combination of historical data and hydraulic modeling.

2.D. VSS Waiver

A VSS waiver, which excuses the system from the IDSE requirements, will automatically be awarded to systems serving <500 customers that have collected DBP data under the Stage 1 DBP rule. This waiver does not depend on TTHM and HAA5 sample results—samples do not need to be below any particular level for the system to receive the waiver. Systems in this size range generally have relatively small and simple distribution systems, which limits the risk of DBP occurrence. In addition, the sites chosen for

monitoring under the Stage 1 DBP rule will generally be adequate for compliance with the monitoring requirements of the Stage 2 DBP rule. This waiver does not affect monitoring under the Stage 1 DBP rule, which must continue until the Stage 2 monitoring and compliance requirements take effect in several years. The transition from Stage 1 to Stage 2 requirements is discussed on page 17 of this guidance.

2.E. 40/30 Certification

A system is not required to conduct an IDSE if the results of all samples taken under the Stage 1 DBP rule during a specified two-year period were less than or equal to half of the MCLs for TTHM and HAA5.

Table 2. 40-30 Eligibility Dates

If 40/30 Certification is Due.... (From the second column of the Milestone Table 1 on page 10 of this guidance)	Then system eligibility for 40/30 certification is based on eight consecutive calendar quarters of Stage 1 DBP compliance monitoring results beginning no earlier than...
Schedule 1) October 1, 2006 Schedule 2) April 1, 2007 Schedule 3) October 1, 2007 Schedule 4) April 1, 2008	January 2004 January 2004 January 2005 January 2005

To demonstrate eligibility, a system must provide to the primacy agency:

- 1) A certification that every individual compliance sample taken under the Stage 1 DBP rule during a period of eight consecutive quarters beginning not earlier than the date specified in Table 2 above was less than or equal to 0.040 mg/L for TTHM and less than or equal to 0.030 mg/L for HAA5, and that there were no TTHM or HAA5 monitoring violations during the same period. Systems monitoring less frequently than quarterly (the majority of Idaho systems) will use whatever data they have for the specified period.
- 2) *Only if requested by the primacy agency:* Compliance monitoring results on which the certification is based, a distribution system schematic, and recommended Stage 2 DBP rule compliance monitoring locations.

2.F. Standard Monitoring

Note: DEQ recommends that systems required to perform an IDSE, using either standard monitoring or a system specific study, consult the EPA’s *Initial Distribution System Evaluation Guidance Manual for the Final Stage 2 Disinfectants and Disinfection Byproducts Rule* (see references at the end of this document). The EPA manual provides detailed advice on conducting an IDSE, including helpful examples.

Owners of systems that do not qualify for a VSS waiver or 40/30 certification may submit an IDSE plan based on a standard monitoring scheme. The standard monitoring

plan must be prepared and submitted in accordance with the schedule specified in Table 1. Standard monitoring will be conducted for one year. The submittal consists of the following elements:

- 1) A schematic of the distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating locations and dates of all projected standard monitoring and all projected Stage 1 DBP compliance monitoring. Stage 1 DBP monitoring sites may not be used as standard monitoring sites, but regularly scheduled Stage 1 monitoring must continue during the IDSE study.
- 2) A justification for all standard monitoring locations selected and a summary of data relied on to select those locations.
- 3) The population served and system type (Subpart H or ground water).

Table 3—Standard Monitoring Locations

Source Type	Population Size Category	Monitoring Periods and Frequency of Sampling	Distribution System Monitoring Locations ¹				
			Total per Monitoring Period	Near Entry Points ²	Average Residence Time	High TTHM Locations	High HAA5 Locations
S U B P A R T H	<500 consecutive	One (during peak historical month)	2	1	-	1	-
	<500 non-consecutive		2	-	-	1	1
	500-3,300 consecutive	Four (every 90 days)	2	1	-	1	-
	500-3,300 non-consecutive		2	-	-	1	1
	3,301-9,999	Six (every 60 days)	4	-	1	2	1
	10,000-49,999		8	1	2	3	2
50,000-249,999	16		3	4	5	4	
G R O U N D	<500 consecutive	One (during peak historical month)	2	1	-	1	-
	<500 non-consecutive		2	-	-	1	1
	500-9,999	Four (every 90 days)	2	-	-	1	1
	10,000-99,999		6	1	1	2	2
	100,000-499,999		8	1	1	3	3

¹When choosing sites consider TTHM and HAA5 levels, Residence Time, Water Age, Disinfectant Residual, Geographic Coverage of Distribution Systems, and Hydraulic Representation.

²Near Entry Points: If you have more sites than required: choose entry points with the highest flows. If you have fewer sites than required: replace additional sites with TTHM and HAA5 sites.

Upon completion of an IDSE using standard monitoring, an IDSE report must be submitted to the primacy agency in accordance with the schedule in Table 1. This report must include:

- All Subpart L compliance monitoring and standard monitoring TTHM and HAA5 analytical results in a tabular format.
- If changed from the monitoring plan, a schematic of the distribution system, population served, and system type.
- An explanation of any deviations from the approved monitoring plan.
- Recommendations and justifications for Subpart V compliance monitoring locations and timing.

2.G. System Specific Study

A system may choose to submit an IDSE that is based on 1) existing sample data, or 2) hydraulic modeling. **A system specific study plan must be submitted to the primary agency for approval prior to initiation of studies.**

1) **Using existing data**—The rule requires a minimum number of samples and specific sampling locations in the distribution system. This is an option that may appeal to systems that have been taking a large amount of operational samples above and beyond the samples that they take for purposes of compliance with the Stage 1 DBP rule. A combination of operational and compliance samples may be used to determine the best locations for Stage 2 DBP monitoring. DEQ is not aware of any Idaho systems that have a large scale operational sampling program in place, since disinfection byproducts levels are generally quite low. The required number of samples is listed in Table 4. If a system does not have enough existing sample data, they must take additional samples to make up the required number or conduct standard monitoring as described in paragraph 2.F. above.

Table 4. Monitoring Requirements—System Specific Study Using Existing Sample Data

Source Water Type	Population Size Category	Total per monitoring period	Minimum Number of Samples	
			TTHM	HAA5
Subpart H	<500	3	3	3
	500-3,300	3	9	9
	3,301-9,999	6	36	36
	10,000-49,999	12	72	72
	50,000-249,999	24	144	144
Ground Water	<500	3	3	3
	500-9,999	3	9	9
	10,000-99,999	12	48	48
	100,000-499,000	18	72	72

Sample results must meet the following criteria:

TTHM and HAA5 results must be based on samples collected and analyzed in accordance with the analytical requirements of the Stage 1 DBP rule. Samples must be collected within five years of the study plan submission date.

The sampling locations and frequency must meet the requirements identified in Table 4. Each location must be sampled once during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature for every 12 months of data submitted for that location. Monitoring results must include all Subpart L compliance monitoring results plus additional monitoring results as necessary to meet minimum sample requirements.

The system specific study submittal must include:

Previously collected monitoring results

Certification that the reported monitoring results include all compliance and non-compliance results generated during the time period beginning with the first reported result and ending with the most recent Subpart L results.

Certification that the samples were representative of the entire distribution system and that treatment and distribution system have not changed significantly since the samples were collected.

Schematic of the distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed or planned system specific study monitoring.

Population served and system type (Subpart H or ground water).

If a system submits previously collected data that fully meet the number of samples required for IDSE monitoring in Table 5 and some of the data are rejected due to not meeting the additional requirements, the system must either conduct additional monitoring to replace rejected data on a schedule the State approves, or conduct standard monitoring.

IDSE Report—assuming that the system specific study submittal is approved by DEQ and recommended Stage 2 monitoring locations are included, no separate IDSE report will be required. Should additional sampling be required, or the system decides to conduct a standard monitoring study instead, an IDSE report will be required, as discussed in Section 2.F., above.

2) Using hydraulic modeling—This option evaluates a system's DBP levels based on results of an Extended Period Simulation hydraulic model using water age as a surrogate for DBP formation. It is most likely to be used by systems that have a high level of technical expertise and already utilize modeling technologies outside of the IDSE process. Because few systems are likely to choose this option, the specific criteria are discussed in Appendix B. Requirements for the IDSE report are also covered in that Appendix.

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Section 3—Monitoring and Compliance Requirements

3.A. Regulatory Authority

The requirements discussed in this Section were promulgated as 40 CFR 141, Subpart V, of the Code of Federal Regulations and incorporated by reference in the *Idaho Rules for Public Drinking Water Systems* at IDAPA 58.01.08.322.

3.B. Applicability

The requirements of this Subpart V apply to community water systems and non-transient non-community water systems that add a primary or residual disinfectant other than ultraviolet light, or deliver water that has been treated by a primary or residual disinfectant other than ultraviolet light. **Affected systems must begin Stage 2 compliance monitoring in accordance with the schedule shown in Table 1.**

3.C. Transitioning from Stage 1 DBP Rule to Stage 2 DBP Rule

Monitoring and compliance under the Stage 2 DBP Rule differs from Stage 1 in two important ways. First, DBP monitoring is based on system population instead of the number of treatment plants. Second, compliance will be based on running annual average of DBP concentration at individual monitoring sites (locational running annual average) instead of on an average of samples taken throughout the distribution system. These distinctions are of greater importance to larger systems.

Provisions of the Stage 1 DBP rule that are not explicitly altered by the Stage 2 rule remain in effect. This includes TOC monitoring for certain surface water systems, and disinfectant residual monitoring.

Owners of systems that were not required to perform an IDSE (those that received a VSS Waiver, submitted an approved 40-30 Certification, or non-transient non-community water systems that serve fewer than 10,000 persons) will determine Stage 2 DBP monitoring locations based on the results of monitoring conducted under Stage 1. The majority of Idaho systems will fall into this category. Some of these systems may also need an evaluation of distribution system characteristics to identify additional monitoring locations, if required by transition from plant based to population based monitoring (i.e. big systems with few treatment plants that may now be faced with requirements for more samples than they were required to take under Stage 1).

Owners of systems that completed an IDSE will use the monitoring results from their IDSE to determine Stage 2 monitoring locations and will specify these locations as part of the IDSE report submitted to the primacy agency, as discussed in the previous Section of this guidance. Stage 2 locations may differ from those that were used under Stage 1.

3.D. Routine Monitoring

Owners of systems with IDSE results recommend Stage 2 monitoring locations generally by arraying results of IDSE standard monitoring (or system specific study) and Stage 1 results from highest to lowest locational running annual average (LRAA) for both TTHM and HAA5. Using the protocol described below, systems then select the required number of locations. Systems may recommend locations that would not be selected under the protocol if they can provide a rationale (such as ensuring better distribution system coverage—not having all sample locations in the same area—or maintaining existing locations with DBP levels that are nearly as high as those that would be selected under the protocol).

Table 5 Required Stage 2 Monitoring for Subpart H Systems

Population	Frequency	Total/Monitoring Period	Highest TTHM Locations	Highest HAA5 Locations	Existing Subpart L Locations
<500	Per year	2	1	1
500-3300	Per quarter	2	1	1
3301-9999	Per quarter	2	1	1
10,000-49,999	Per quarter	4	2	1	1
50,000-249,999	Per quarter	8	3	3	2

Table 6 Required Stage 2 Monitoring for Ground Water Systems

Population	Frequency	Total/Monitoring Period	Highest TTHM Locations	Highest HAA5 Locations	Existing Stage 1 Locations
<500	Per year	2	1	1
500-9,999	Per year	2	1	1
10,000-99,999	Per quarter	4	2	1	1
100,000-499,999	Per quarter	6	3	2	1

From the applicable table above, determine the number of monitoring locations appropriate for your system population and source water type. Follow the protocol in the box below to select the number of locations you need. Small systems will not need to proceed all the way through the protocol. Large systems may need to pass through the steps more than once, skipping steps 3 and 7 during subsequent iterations. In the protocol, the phrase “not previously selected as a Stage 2 monitoring location” only applies to large systems that must repeat the protocol in order to identify the required number of monitoring locations. Systems that did not perform an IDSE will use results from Stage 1 monitoring to select Stage 2 monitoring locations.

Protocol Steps

- (1) Select a location with the highest TTHM LRAA not previously selected as a Stage 2 monitoring location.
- (2) Select a location with the highest HAA5 LRAA not previously selected as a Stage 2 monitoring location.
- (3) Select an existing subpart L average residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water systems) with the highest HAA5 LRAA not previously selected as a Stage 2 monitoring location.
- (4) Select a location with the highest TTHM LRAA not previously selected as a Stage 2 monitoring location.
- (5) Select a location with the highest TTHM LRAA not previously selected as a Stage 2 monitoring location.
- (6) Select a location with the highest HAA5 LRAA not previously selected as a Stage 2 monitoring location.
- (7) Select an existing subpart L average residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water systems) with the highest TTHM LRAA not previously selected as a Stage 2 monitoring location.
- (8) Select a location with the highest HAA5 LRAA not previously selected as a Stage 2 monitoring location.

All system owners must monitor during month of highest DBP concentrations, based on available monitoring history.

Owners of systems on quarterly monitoring must take dual sample sets (see definitions at the beginning of this guidance) every 90 days at each monitoring location, except for Subpart H systems serving 500-3300. Owners of systems on annual monitoring and Subpart H systems serving 500-3300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. Only one location with a dual sample set per monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location, and month, if monitored annually.

Idaho DEQ has the flexibility to specify alternative Stage 2 compliance monitoring requirements (but not alternative IDSE monitoring requirements) for multiple consecutive systems in a combined distribution system. As a minimum, each consecutive system must collect at least one sample among the total number of samples required for the combined distribution system and will base compliance on samples collected within its distribution system.

Consecutive systems not already conducting disinfectant residual monitoring under the Stage 1 DBPR must comply with the monitoring requirements and MRDLs for chlorine and chloramines. DEQ may modify reporting requirements. For example, DEQ may

require that only the consecutive system distribution system point-of-entry disinfectant concentration be reported to demonstrate MRDL compliance, although monitoring requirements may not be reduced.

3.E. Monitoring Plan

System owners are required to develop a monitoring plan to be kept on file for review by the primacy agency or the public. Subpart H systems serving >3300 customers must submit their monitoring plan to the state prior to the date that monitoring is scheduled to begin (unless an IDSE report containing this information has been submitted). The plan must contain the following elements:

- 1) Monitoring locations
- 2) Monitoring dates
- 3) Compliance calculation procedures

Owners of systems that were not required to complete an IDSE and that do not have enough Stage 1 monitoring locations to identify the number of monitoring locations required under Stage 2 must identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of Stage 2 monitoring locations have been identified. This provision applies to large systems that may need to increase the number of samples they take as a result of the change from plant based to population based monitoring.

The primacy agency may require modifications to a Stage 2 monitoring plan. After consulting with the primacy agency, systems may modify their monitoring plan in response to changes in operation or treatment.

3.F. Reduced Monitoring

Monitoring may be reduced to the levels specified in Table 7 anytime the LRAA is ≤ 0.040 mg/L for TTHM and ≤ 0.030 mg/L for HAA5 *at all monitoring locations*. In addition, source water TOC before any treatment must be ≤ 4.0 mg/L at each surface water treatment plant based on monitoring conducted under the Stage 1 DBP rule.

Systems may remain on reduced monitoring as long as the TTHM LRAA is ≤ 0.040 mg/L and the HAA5 LRAA is ≤ 0.030 mg/L at each monitoring location for systems with quarterly reduced monitoring, or each TTHM sample is ≤ 0.060 mg/L and each HAA5 sample is ≤ 0.045 mg/L for systems with annual or less frequent reduced monitoring. In addition, source water annual average TOC level before any treatment must be ≤ 4.0 mg/L based on monitoring specified for surface water plants under the Stage 1 DBP rule.

If the conditions for remaining on reduced monitoring are exceeded, systems must return to routine monitoring unless the conditions requiring increased monitoring apply, as described later in this guidance.

3.G. Reduced Monitoring for Systems Using Ozone

Systems that disinfect with ozone have been eligible for reduced monitoring under the Stage 1 DBP Rule if they demonstrate low levels of bromide. Sensitive analytical methods have become available for bromate. The Stage 2 rule specifies that systems using ozone and on reduced monitoring must begin in April 2009 to demonstrate a running annual average bromate concentration ≤ 0.0025 mg/L in order to remain on reduced monitoring.

Table 7. Reduced Monitoring

Population	Monitoring Frequency	Distribution System Monitoring Location per Monitoring Period
Subpart H Systems:		
<500	Monitoring may not be reduced.
500-3300	Per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year of the highest TTHM and HAA5 measurements occurred at the same location and quarter.
3301-9999	Per year	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
10,000-49,999	Quarterly	2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs.
50,000-249,999	Quarterly	4 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs
Ground Water Systems:		
<500	Every third year	**See note below. 1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year of the highest TTHM and HAA5 measurements occurred at the same location and quarter.
500-9999	Per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year of the highest TTHM and HAA5 measurements occurred at the same location and quarter.
10,000-99,999	Per year	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.

**Monitoring requirements for this group of systems may change as a result of future EPA rulemaking. This guidance will be revised to reflect these changes when they occur.

3.H. Conditions Requiring Increased Monitoring

If a system owner is required to monitor at a particular location annually or less frequently than annually under either routine or reduced monitoring, the system must increase monitoring to dual sample sets once per quarter (taken every 90 days) at all locations if a THHM sample is >0.080 mg/L or a HAA5 sample is >0.060 mg/L at any location.

If the MCL for either class of DBPs is exceeded, increased monitoring is also required for four quarters, after which the system may return to routine monitoring.

Owners of systems that are on increased monitoring under the Stage 1 rule at the time they are scheduled to transition to Stage 2 monitoring must remain on increased monitoring until they qualify to return to routine monitoring under the provisions of Stage 2.

3.I. Additional Requirements for Consecutive Systems

Consecutive systems that do not add a disinfectant but deliver water that has been treated with a primary or residual disinfectant other than UV light must comply with the requirements for monitoring of disinfectant residuals and DBPs by April 1, 2009. The primacy agency will inform the few systems in this category of their obligations under this rule.

3.J. Compliance with the Stage 2 DBP Rule

A system is in compliance when the annual sample LRAA of quarterly samples is less than or equal to the MCLs. If an annual sample exceeds the MCL, the system owner must conduct increased (quarterly) monitoring, but is not immediately in violation of the MCL. The system is out of compliance if the LRAA of the quarterly samples for the past four quarters exceeds the MCL.

For Consecutive Systems: If monitoring results in a consecutive system indicate an MCL violation, the system is in violation because it has the legal responsibility for complying with the MCL. If a consecutive system has hired its wholesale system under contract to monitor in the consecutive system and the wholesale system fails to monitor, the consecutive system is in violation because it has the legal responsibility for monitoring. If a wholesale system has a violation and provides the water to a consecutive system, whether or not the consecutive system is in violation depends on the situation. The consecutive system will also be in violation unless it conducted monitoring to show that the violation was not present in the consecutive system.

DEQ may require a system owner to revise the IDSE plan, IDSE report, or the Stage 2 DBPR monitoring plan at any time.

3.K. Operational Evaluation Levels

A system that is in full compliance with the Stage 2 DBPR LRAA MCL may still have individual DBP measurements that exceed the MCLs, since compliance is based on individual DBP measurements at a location averaged over a four-quarter period.

The operation evaluation level is determined by the sum of the two previous quarters' TTHM results plus twice the current quarters' TTHM result, at that location, divided by 4 to determine an average, and the same for HAA5. If the average TTHM exceeds 0.080 mg/L at any monitoring location or the average HAA5 exceeds 0.060 mg/L at any monitoring location, the system must conduct an operational evaluation and submit a written report of the operational evaluation to the state within 90 days of receiving the analytical result that triggered the evaluation.

If $(Q_1 + Q_2 + 2Q_3) / 4 > \text{MCL}$ then operational evaluation report is required, where

Q_3 = current quarter measurement

MCL = 80 TTHM 60 HAA5

Q_2 = previous quarter measurement

Q_1 = quarter before previous quarter measurement

The operational evaluation includes an examination of system treatment and distribution operational practices, including changes in sources or source water quality, storage tank operations, and excess storage capacity, that may contribute to high DBP formation. Systems must also identify what steps could be considered to minimize future operational evaluation exceedances. In situations where the system can identify the cause of the exceedance, based on factors such as water quality data, plant performance data, and distribution system configuration, the system may request the state to allow limiting the evaluation to the identified cause. DEQ must issue a written determination approving the limited scope of the operational evaluation.

3.L. Reporting, Recordkeeping, and Public Notification Requirements for Water Systems

1) **Reporting**—the following information must be reported to the primacy agency within 10 days of the end of any quarter in which monitoring is required. In this section, the term “compliance date” refers to the date specified for each system size and type in Table 1.

- Number of samples taken during the last quarter.
- Date and results of each sample taken during the last quarter.
- Arithmetic average of quarterly results for the last four quarters for each monitoring location (LRAA), beginning at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter.

- Systems that monitor less frequently than quarterly must make compliance calculations beginning with the first compliance sample taken after the compliance date, unless the system has been placed on increased monitoring (as described in paragraph 3.G.).
- State whether or not the MCL was violated at any monitoring location.
- Any operational evaluation levels that were exceeded during the quarter and, if so, the location and date and the calculated TTHM and HAA5 values.

Owners of Subpart H systems seeking to qualify for or remain on reduced monitoring are required to report the following TOC information within 10 days following the end of any quarter in which monitoring is required:

- The number of source water TOC samples taken each month during the last quarter.
- The date and results of each sample taken during the last quarter.
- The quarterly average of monthly samples taken during the last quarter or the results of the quarterly sample.
- The running annual average of quarterly averages from the past four quarters.
- Whether the RAA exceeded 4.0 mg/L.

DEQ may choose to perform calculations and determine whether the MCL was exceeded or the system is eligible for reduced monitoring in lieu of having the system report that information. DEQ's decision in this matter will be based on the capabilities of the state data management system in place at the time Stage 2 compliance begins. This part of the guidance may be modified as needed at that time.

2) Recordkeeping—System owners must keep records of their Stage 2 monitoring plan and results of sample analyses conducted under this rule for not less than five years.

3) Public Notification—The public notification rule has been modified in small ways as a result of this rule, but public notification requirements have not changed from those of the Stage 1 DBP Rule. Systems must notify their customers if they fail to monitor on schedule, if they exceed the MCL for disinfection byproducts, and if they exceed the MRDL for disinfectant residual. Assistance in developing public notices, when necessary, is available from DEQ or the local Health District.

3.M. Primacy Agency Recordkeeping and Special Primacy Requirements

The primacy agency will maintain the following records:

- Any decisions made pursuant to this rule.
- IDSE monitoring plans, plus any modifications required by the state, must be kept until replaced by approved IDSE reports.

- IDSE reports and 40-30 Certifications, plus any modifications required by the state, must be kept until replaced or revised in their entirety.
- Operational evaluations submitted by a water system must be kept for ten (10) years following submission.

The Stage 2 DBP Rule is accompanied by a single primacy provision, which gives the state the option of modifying consecutive system monitoring requirements. DEQ believes that this option is intended by EPA to apply primarily to states where consecutive systems are very large and the networks of consecutive distribution systems are complex. These conditions do not prevail in Idaho and DEQ will not exercise this authority. This provision was opened to public negotiations as part of the process of adopting the Stage 2 Rule. No persons attended the negotiations and no formal comments were received.

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Appendix A—Selected Excerpts from *Idaho Rules for Public Drinking Water Systems*

Definitions:

Combined Distribution System. The interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

Consecutive System. A public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

Dual Sample Set. A set of two (2) samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an Initial Distribution System Evaluation (40 CFR Part 141, Subpart U) and for determining compliance with the TTHM and HAA5 MCLs under the Stage 2 Disinfection Byproducts Requirements (40 CFR Part 141, Subpart V).

Finished Water. Water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals).

GAC10. Granular activated carbon filter beds with an empty bed contact time of ten (10) minutes based on average daily flow and a carbon reactivation frequency of every one hundred eighty (180) days, except that the reactivation frequency for GAC10 used as a best available technology for compliance with MCLs established in the Stage 2 Disinfection Byproducts Requirements (40 CFR Part 141, Subpart V) shall be one hundred twenty (120) days.

GAC20. Granular activated carbon filter beds with an empty-bed contact time of twenty (20) minutes based on average daily flow and a carbon reactivation frequency of every two hundred forty (240) days.

Locational Running Annual Average (LRAA). The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters, as set forth in the Stage 2 Disinfection Byproducts Requirements (40 CFR Part 141, Subpart V).

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

Incorporation of the Federal Rule by Reference

321. INITIAL DISTRIBUTION SYSTEM EVALUATIONS. 40 CFR 141, Subpart U, revised as of July 1, 2006, is herein incorporated by reference. “Implementation Guidance for the Stage 2 Disinfectants and Disinfection Byproducts Rule,” as referenced in Section 002, provides advice to help public water systems understand and achieve compliance with the requirements of Subpart U.

322. STAGE 2 DISINFECTION BYPRODUCTS REQUIREMENTS. 40 CFR 141, Subpart V, revised as of July 1, 2006, is herein incorporated by reference. “Implementation Guidance for the Stage 2 Disinfectants and Disinfection Byproducts Rule,” as referenced in Section 002, provides advice to help public water systems understand and achieve compliance with the requirements of Subpart V.

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**Appendix B—Specific Criteria for System Specific Studies
based on Extended Period Simulation Hydraulic Modeling**

It is expected that few, if any, owners of systems will choose to pursue an IDSE based on this type of hydraulic modeling, and for this reason the specific requirements of this option were not included in the body of the guidance. See Section 2.G.

Hydraulic models must meet the following criteria:

- Extended period simulation hydraulic model.
- Simulate 24 hour variation in demand and show a consistently repeating 24 hour pattern of residence time.
- Represent 75% of pipe volume; 50% of pipe length; all pressure zones; all 12-inch diameter and larger pipes; all 8-inch and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps, and control valves, or are known or expected to be significant conveyors of water; all pipes 6 inches and larger that connect remote areas of a distribution system to the main portion of the system; all storage facilities with standard operations represented in the model; all active pump stations with controls represented in the model; and all active control valves.
- The model must be calibrated, or have calibration plans, for the current configuration of the distribution system during the period of high TTHM formation potential. All storage facilities must be evaluated as part of the calibration process.
- All required calibration must be completed no later than 12 months after plan submission. Submission must include:

Study Plan Submission must include:

- Tabular or spreadsheet data demonstrating percent of total pipe volume and pipe length represented in the model, broken out by pipe diameter, and all required model elements.
- A description of all calibration activities undertaken, and if calibration is complete, a graph of predicted tank levels versus measured tank levels for the storage facility with the highest residence time in each pressure zone, and a time series graph of the residence time at the longest residence time storage facility in the distribution system showing the predictions for the entire simulation period (i.e., from time zero until the time it takes for the model to reach a consistently repeating pattern of residence time).
- Model output showing preliminary 24 hour average residence time predictions throughout the distribution system.
- Timing and number of samples planned for at least one round of TTHM and HAA5 monitoring at a number of locations no less than would be required for the system under standard monitoring during the historical month of high TTHM. These samples must be taken at locations other than existing subpart L compliance monitoring locations.
- Description of how all requirements will be completed no later than 12 months after submission of the system specific study plan.
- Schematic of the distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed system specific study monitoring (if calibration is complete) and all Subpart L compliance monitoring.
- Population served and system type (Subpart H or ground water).
- If the model submitted does not fully meet the requirements, the system must correct the deficiencies and respond to State inquiries on a schedule the State approves, or conduct standard monitoring.

IDSE Report Requirements

- All Subpart L compliance monitoring and all system specific study monitoring TTHM and HAA5 analytical results conducted during the period of the system specific study in a tabular or spreadsheet form acceptable to the state.
- If changed from the study plan, a schematic of the distribution system, population served, and system type.
- If using the modeling provision, include final information for required plan submissions and a 24-hour time series graph of residence time for each Subpart V compliance monitoring location selected.
- An explanation of any deviations from the original study plan.
- All analytical and modeling results used to select Subpart V compliance monitoring locations that show that the system specific study characterized TTHM and HAA5 levels throughout the entire distribution system.
- Recommendations and justifications for Subpart V compliance monitoring locations and timing.

References and Additional Resources

The primary reference mentioned in this guidance is EPA's *Initial Distribution System Evaluation Guidance Manual for the Final Stage 2 Disinfectants and Disinfection Byproducts Rule*. Although it is expected that only a small number of Idaho public water systems will be required to conduct an IDSE, those that do will find much helpful information in this manual. It is available on the Internet at:

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

Also available at that address are fact sheets, quick reference guides, an IDSE tool, the full text of the Federal rule, and a variety of other publications. These EPA publications present the information contained in this guidance document in different formats and in some cases in much greater detail.

Persons who do not have Internet access may order the IDSE manual through the National Safe Drinking Water Hotline at (800) 426-4791.

This guidance and other DEQ publications may be found on DEQ's website at:

http://www.deq.idaho.gov/water/prog_issues/drinking_water/information_pws.cfm

Assistance with this and other drinking water rules may always be obtained by calling the regulatory agency that your system normally works with on drinking water matters—either the DEQ Regional Office or District Health Department.