

# Microbial/Disinfection Byproducts (M-DBP) Federal Advisory Committee

## STAGE 2 M-DBP AGREEMENT IN PRINCIPLE

For more background, see [Federal Register Notice](#).

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#### 1.0 Introduction

Pursuant to requirements under the Safe Drinking Water Act (SDWA), the Environmental Protection Agency (EPA) is developing interrelated regulations to control microbial pathogens and disinfectants/disinfection byproducts (D/DBPs) in drinking water. These rules are collectively known as the microbial/disinfection byproducts (M-DBP) rules.

The regulations are intended to address complex risk trade-offs between the two different types of contaminants. In keeping with a phased M-DBP strategy agreed to by stakeholders during the 1992-93 negotiated rulemaking on these matters and affirmed by Congress as part of the 1996 Amendments to the Safe Drinking Water Act, EPA issued the final Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR) and Interim Enhanced Surface Water Rule (IESWTR) in December 1998. These two rules built upon stakeholder agreements reached in 1993 but also reflected the more recent 1997 Agreement in Principle signed by stakeholders who participated in an intensive Stage 1 M-DBP Federal Advisory Committee Act (FACA) negotiation process from March to July 1997.

As part of the 1996 amendments to the SDWA, Congress established deadlines for the M-DBP rules, beginning with a November 1998 deadline for promulgation of both the IESWTR and the Stage 1 D/DBP Rule. Related statutory deadlines for the Stage 2 M-DBP process require that EPA promulgate a Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR) by May 2002. The Agency plans to promulgate the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) by May 2002, as well. The central challenge of the Stage 2 M-DBP rule development process has been to assess information and research not fully considered in the Stage 1 process or only available since 1998 and evaluate whether and to what degree EPA should establish revised or additional DBP and microbial standards to protect public health.

As agreed to during Stage 1, EPA has convened a Stage 2 M-DBP Advisory Committee made up of organizational members (parties) named by EPA (see Attachment A). The purpose of the Advisory Committee is to develop recommendations for the Stage 2 DBPR and LT2ESWTR to be proposed in 2001. This Committee met from March 1999 through September 2000, with the initial objective to reach consensus. This document is the Committee's statement on the points of agreement reached. This document is separated into Part A and Part B. The recommendations in each part stand alone and are independent of one another.

## **2.0 Agreement in Principle**

The Stage 2 M-DBP Federal Advisory Committee (Stage 2 FACA) considered both the strengths and limitations of new M-DBP information as well as the related technical and policy issues involved in developing a Stage 2 DBPR and a LT2ESWTR under the Safe Drinking Water Act and recommends that the Environmental Protection Agency base the applicable sections of its anticipated Stage 2 DBPR and LT2ESWTR proposals on the elements of agreement described below.

This agreement in principle Part A and B represents the consensus of the parties on the best conceptual principles that the Committee was able to generate within the allocated time and resources available.

The \_\_\_\_\_, a party to the negotiations, agrees that:

**2.1** The person signing Part A or Part B of this agreement is authorized to commit this party to the terms of Part A or Part B, as the case may be.

**2.2** EPA agrees to develop a Proposed Rulemaking in 2001 in accordance with applicable statutes and procedural requirements that will reflect recommendations contained in this Agreement in Principle, and will obtain comments from Stage 2 FACA parties and the public.

**2.3** Each party and individual signatory that submits comments on the Stage 2 DBPR and LT2ESWTR proposals agrees to support those components of the proposals that reflect the recommendations contained in this Agreement in Principle. Each party and individual signatory reserves the right to comment, as individuals or on behalf of the organization he or she represents, on any other aspect of the proposals.

**2.4** If new information becomes available that significantly affects the basis for provisions in this Agreement in Principle, EPA agrees to publish this information in a NODA and will consider whether it is necessary to reconvene the FACA.

**2.5** EPA will work jointly with stakeholders while developing guidance documents in order to ensure that technical issues are adequately addressed prior to the final rule. EPA agrees to publish revised guidance documents that reflect consideration of comments on earlier drafts.

**2.6** Concurrent with publication of the proposed rules, EPA will publish a draft guidance document that includes ozone and chlorine dioxide CT tables for the inactivation of *Cryptosporidium* (UV tables are addressed in 5.0). EPA will request comment in the proposed LT2ESWTR on whether any of the CT tables or other criteria in the guidance document should be incorporated into the final LT2ESWTR.

**2.7** EPA will consider all relevant comments submitted concerning the Stage 2 DBPR and LT2ESWTR Notice(s) of Proposed Rulemaking and in response to such comments will make such modifications to the proposed rule(s) and preamble(s) as EPA determines are appropriate when issuing a final rule.

**2.8** Recognizing that under the Appointments Clause of the Constitution governmental authority may be exercised only by officers of the United States and recognizing that it is EPA's responsibility to issue final rules, EPA intends to issue final rules that are based on the provisions of the Safe Drinking Water Act, pertinent facts, and comments received from the public.

**2.9** Each party agrees not to take any action to inhibit the adoption of final rule(s) to the extent it and corresponding preamble(s) have the same substance and effect as the elements of the Agreement in Principle Part A or Part B or both parts as evidenced by the signature following each part.

**2.10** EPA will hold a stakeholder meeting during the comment period to update stakeholders on new information germane to the Stage 2 DBPR and LT2ESWTR.

#### **2.11 Implementation Schedule**

**2.11.a** Compliance schedules for the LT2ESWTR will be tied to the availability of sufficient analytical capacity at approved laboratories for all large and medium affected systems to initiate *Cryptosporidium* and *E.coli* monitoring, and the availability of software for transferring, storing, and evaluating the results of all microbial analyses.

1) If the availability of adequate laboratory capacity or data management software for microbial monitoring under LT2ESWTR for large or medium systems is delayed then monitoring, implementation, and compliance schedules for both the LT2ESWTR and Stage 2 DBPR described under 2.11.c will be delayed by an equivalent time period.

**2.11.b** The principle of simultaneous compliance reflected in the Stage 1 M-DBP rules will be continued in the Stage 2 M-DBP rules.

1) The principle of simultaneous compliance means that systems will address the Stage 2 DBPR and LT2ESWTR requirements concurrently in order to protect public health and optimize technology choice decisions.

#### **2.11.c Implementation Schedule**

1) Once the Stage 2 M-DBP rules have been promulgated, systems will conduct *Cryptosporidium* (Section 4.1) and IDSE (Section 3.1.a) monitoring and submit the results to their States/Primacy Agency. Large and medium systems must submit a report with the results of the Initial Distribution System Evaluation (IDSE) (including any monitoring) and the results of the *Cryptosporidium* monitoring two years and two and a half years after rule promulgation, respectively. Small systems must submit a report recommending new DBP compliance monitoring locations and supporting data with the results of their IDSE, including any monitoring, and *Cryptosporidium* monitoring 4 years and 5 years after rule promulgation respectively. [\(U\)](#)

2) *Systems will comply with the Stage 2 DBPR MCL for TTHMs/HAA5 in two phases:*

*a) Phase 1: 3 years after rule promulgation (with an additional 2 year extension available for systems requiring capital improvements), all systems must comply with a 120/100 locational running annual average (LRAA) based on Stage 1 monitoring sites and also continue to comply with the Stage 1 80/60 running annual average.*

b) Phase 2: Systems must comply with 80/60 LRAA based on new sampling sites identified under the IDSE. This will begin 6 years after rule promulgation (with an additional 2 year extension available for systems requiring capital improvements) for large and medium systems. For small systems required to do *Cryptosporidium* monitoring, compliance with the 80/60 LRAA will begin 8.5 years after rule promulgation (with an additional 2 year extension available for systems requiring capital improvements). For all other small systems, compliance with the 80/60 LRAA will begin 7.5 years after rule promulgation (with an additional 2 year extension available for systems requiring capital improvements).

## **PART A**

### **3.0 DISINFECTION BYPRODUCTS**

The requirements in the Stage 2 DBPR will apply to all community water systems and non-transient non-community water systems that add a disinfectant other than UV or deliver water that has been disinfected.

The Stage 2 DBPR is designed to reduce DBP occurrence peaks in the distribution system based on changes to compliance monitoring provisions. Compliance monitoring will be preceded by an initial distribution system monitoring (IDSE)/study to select site-specific optimal sample points for capturing peaks. The FACA recognizes that TTHM and HAA5 concentrations vary over time and space and therefore agrees that compliance monitoring locations should reflect this variability.

#### **3.1 TTHM/HAA5**

Compliance with each MCL will be determined based on a Locational Running Annual Average (a running annual average must be calculated at each sample location). Systems will comply with the Stage 2 DBPR MCL in two phases:

Phase 1: 3 years after rule promulgation (with an additional 2 year extension available for systems requiring capital improvements), all systems must comply with a 120/100 locational running annual average (LRAA) based on Stage 1 monitoring sites and also continue to comply with the Stage 1 80/60 running annual average.

Phase 2: 6 years after rule promulgation (with an additional 2 year extension available for systems requiring capital improvements) large and medium systems must comply with an 80/60 LRAA based on new sampling sites identified under the IDSE. For small systems required to do *Cryptosporidium* monitoring, compliance with the 80/60 LRAA will begin 8.5 years after rule promulgation (with an additional 2 year extension available for systems requiring capital improvements). For all other small systems, compliance with the 80/60 LRAA will begin 7.5 years after rule promulgation (with an additional 2 year extension available for systems requiring capital improvements).

##### **3.1.a Initial Distribution System Evaluation (IDSE)**

IDSEs are studies conducted by Community Water Systems and are intended to select new compliance monitoring sites that more accurately reflect sites representing high TTHM and HAA5 levels. The studies will be based either on system specific monitoring or other system specific data that provides equivalent or better information on site selection. Systems will recommend new or revised monitoring sites to their State/Primacy Agency based on their IDSE study. IDSE results will not be used for compliance purposes.

*Systems conducting IDSE monitoring shall monitor for one year under a schedule determined by source water type (e.g., surface water vs. ground water) and system size as discussed in 1-3 below. As a part of the monitoring schedule, all systems conducting IDSE monitoring must monitor during the peak historical month for DBP levels or water temperature. All IDSE samples will be paired (i.e., TTHM and HAA5 sample at each site).*

*1) Surface Water Systems 10,000:*

*Systems must monitor bimonthly on a regular schedule of approximately every 60 days<sup>(2)</sup> for one year at 8 distribution system sites per plant (at sites that are in addition to the Stage 1 DBPR compliance monitoring sites).*

The location of the 8 sites will be determined by residual disinfectant type as follows:

a) for plants with chloramine distribution systems: 2 near distribution system entry point, 2 at average residence time, & 4 at points representative of highest THM and HAA5 concentrations;

b) for plants with chlorine distribution systems: 1 near distribution system entry point, 2 at average residence time, & 5 at points representative of highest THM and HAA5 concentrations.

2) Surface Water Systems < 10,000:

a) 500 - 9,999: Systems must monitor quarterly on a regular schedule of approximately every 90 days for one year at 2 distribution system sites per plant (at sites that are in addition to the Stage 1 DBPR compliance monitoring sites).

b) under 500: System must monitor semi-annually on a regular schedule of approximately every 180 days for one year at 2 distribution system sites per plant (at sites that are in addition to the Stage 1 DBPR compliance monitoring sites).

i) This monitoring requirement for systems under 500 may be waived if the State/Primacy Agency determines that the monitoring site approved for Stage 1 DBPR compliance is sufficient to represent both the highest HAA5 and the highest TTHM concentrations. The State/Primacy Agency must submit criteria for this determination to EPA as part of their Primacy application.

3) Ground Water Systems

Multiple wells drawing water from a single aquifer may, with State/Primacy Agency approval, be considered one treatment plant.

a) 10,000: Systems must monitor quarterly on a regular schedule of approximately every 90 days for one year at 2 distribution system sites per plant (at sites that are in addition to the Stage 1 DBPR compliance monitoring sites)

b) <10,000: Systems must monitor semi-annually on a regular schedule of approximately every 180 days for one year at 2 distribution system sites per plant (at sites in addition to the Stage 1 DBPR compliance monitoring sites).

i) This monitoring requirement for systems under 500 may be waived if the State/Primacy Agency determines that the monitoring site approved for Stage 1 DBPR compliance is sufficient to represent both the highest HAA5 and the highest TTHM concentrations. The State/Primacy Agency must submit criteria for this determination to EPA as part of their Primacy application.

4) System Specific Studies - In lieu of the IDSE monitoring, systems may perform an IDSE study based on other system specific monitoring or system specific data which will provide comparable or superior selection of new monitoring sites that target high DBP levels. EPA agrees to work with stakeholders to develop guidance on criteria for system specific studies.

5) Systems that certify to their State/Primacy Agency that all samples taken in the last 2 years were below 40/30 are not required to conduct the IDSE.

### **3.1.b. Long Term Compliance Monitoring (Phase 2)**

Principles of the reduced compliance monitoring strategy reflected in the Stage 1 DBPR shall be continued in the Stage 2 DBPR. These principles are designed for systems with very low DBP levels.

Systems will collect paired samples (TTHM and HAA5) at each compliance monitoring sample site with the possible exception of some systems serving < 500 people.

#### **1) Surface Water Systems 10,000:**

Systems must monitor quarterly on a regular schedule of approximately every 90 days<sup>(3)</sup> at 4 distribution system sites per plant. At least 1 quarterly sample must be taken during the peak historical month for DBP levels.

The location of the 4 sites in the distribution system will be determined as follows:

- One representative average from among current Stage 1 locations
- One representative highest HAA5 identified under IDSE
- Two at highest TTHM identified during IDSE

#### **2) Surface Water Systems < 10,000**

a) 500 - 9,999: Systems must monitor quarterly on a regular schedule of approximately every 90 days at the highest TTHM and the highest HAA5 points in the distribution system as identified under the IDSE. The State/Primacy Agency may determine, based on the results of the IDSE, that the site representative of the highest TTHM is at the same location

as the site representative of the highest HAA5 and thus may determine that the system only has to monitor at a single site.

b) under 500: Systems must monitor annually at the site representing the highest TTHM and the highest HAA5 points in the distribution system as identified under the IDSE. If the State/Primacy Agency determines, based on the results of the IDSE, that this site is not representative of both the highest TTHM and HAA5 concentrations, the system should collect unpaired samples at two sites in the distribution system (i.e., TTHM only at one site and HAA5 only at another site).

i) If the State/Primacy Agency has waived the requirement to conduct the IDSE, systems under 500 will conduct annual sampling at the point of maximum residence time in the distribution system during the month of warmest water temperature.

ii) Systems under 500 have the option of moving to quarterly compliance sampling consistent with the Stage 1 sampling strategy.

### 3) Groundwater Systems

a) *10,000: Systems must monitor quarterly on a regular schedule of approximately every 90 days at the highest TTHM and the highest HAA5 points in the distribution system as identified under the IDSE. The State/Primacy Agency may determine, based on the results of the IDSE, that the site representative of the highest TTHM is at the same location as the site representative of the highest HAA5 and thus may determine that the system only has to monitor at a single site.*

b) 500 - 9,999: Systems must monitor annually at the highest TTHM and the highest HAA5 points in the distribution system as identified under the IDSE. The State/Primacy Agency may determine, based on the results of the IDSE, that the site representative of the highest TTHM is at the same location as the site representative of the highest HAA5 and thus may determine that the system only has to monitor at a single site.

i) Ground water systems under 10,000 have the option of moving to quarterly compliance sampling consistent with Stage 1 sampling strategy.

c) under 500: Systems must monitor annually at the site representing the highest TTHM and the highest HAA5 points in the distribution system as identified under the IDSE. If the State/Primacy Agency determines, based on the results of the IDSE, that this site is not representative of both the highest TTHM and HAA5 concentrations, the system should collect unpaired samples at two sites in the distribution system (i.e., TTHM only at one site and HAA5 only at another site).

i) If the State/Primacy Agency waives the requirement for systems under 500 to conduct the IDSE, they will conduct annual sampling at the point of maximum residence time in the

distribution system during the month of warmest water temperature.

ii) Ground water systems under 500 have the option of moving to quarterly compliance sampling consistent with Stage 1 sampling strategy.

### **3.1.c. Wholesale and Consecutive Systems**

The FACA has considered the issues of consecutive systems and recommends that EPA propose that all wholesale and consecutive systems must comply with provisions of the Stage 2 DBPR on the same schedule required of the wholesale or consecutive system serving the largest population in the combined distribution system.

Principles:

. Consumers in consecutive systems should be just as well protected as customers of all systems, and

. Monitoring provisions should be tailored to meet the first principle.

The FACA recognizes that there may be issues that have not been fully explored or completely analyzed and therefore recommends that EPA solicit comments.

### **3.1.d. Peaks**

Recognizing that significant excursions of DBP levels will sometimes occur, even when systems are in full compliance with the enforceable MCL, public water systems that have significant excursions during peak periods are to refer to EPA guidance on how to conduct peak excursion evaluations, and how to reduce such peaks. Such excursions will be reviewed as a part of the sanitary survey process. EPA guidance on DBP level excursions will be issued prior to promulgation of the final rule and will be developed in consultation with stakeholders.

## **3.2. Bromate MCL**

The Stage 2 M-DBP Advisory Committee has considered the present potential that reducing the bromate MCL to 0.005 mg/L would both increase the concentration of other DBPs in the drinking water and interfere with the efficacy of microbial pathogen inactivation. Therefore, the Committee recommends for purposes of Stage 2 that the bromate MCL remain at 0.010 mg/L. This recommendation is based upon current alternative technology utilization and upon current understanding of bromate formation as a result of bromide concentrations. EPA commits to review the bromate MCL as part of the 6 year review and determine whether the MCL should remain at 0.010 mg/L or be reduced to 0.005 mg/L or a lower concentration. As a part of that review, EPA will consider the increased utilization of alternative technologies and whether the risk/risk concerns reflected in today's recommendation remain valid. The FACA agrees that it is important to continue research on bromate detection, formation, treatment, and health effects.

## **4.0 LT2ESWTR**

The requirements of the LT2ESWTR will apply to all public water systems that use surface water or ground water under the direct influence of surface water.

The FACA recognizes that systems may need to provide additional protection against *Cryptosporidium*, and that such decisions should be made on a system specific basis. The LT2ESWTR incorporates system specific treatment requirements based on a 'Microbial Framework' approach. This approach generally involves assignment of systems into different categories (or bins) based on the results of source water *Cryptosporidium* monitoring. Additional treatment requirements depend on the bin to which the system is assigned. Systems will chose technologies to comply with additional treatment requirements from a 'toolbox' of options.

#### **4.1. Monitoring and Treatment Requirements for Filtered Systems**

##### **4.1.a Monitoring for Bin Classification**

###### **1) Systems 10,000**

For purposes of bin classification, source water *Cryptosporidium* monitoring shall be conducted using EPA Method 1622/23 and no less than 10L samples. EPA will provide guidance for those cases where it is not possible to process a 10 L sample.

a) *Cryptosporidium*, *E. coli*, and turbidity source water sampling shall be carried out on a predetermined schedule for 24 months with two choices:

i) Bin classification based on highest 12 month running annual average if monthly samples, OR

ii) Optional bin classification based on 2 year mean if facility conducts twice per month monitoring for 24 months (i.e. 48 samples). Systems may carry out additional sampling but it must be evenly distributed over the 2 year monitoring period.

b) Systems with at least 2 years of historical *Cryptosporidium* data that is equivalent in sample number, frequency, and data quality (e.g. volume analyzed, percent recovery) to data that would be collected under the LT2ESWTR with EPA Method 1622/23 may use those data to determine bin classification in lieu of further monitoring. Systems which are able to use historical data in lieu of conducting new monitoring must submit such *Cryptosporidium* data to the State/Primacy Agency for consideration in selecting bin placement.

c) Systems that provide 2.5 logs of treatment for *Cryptosporidium* (equivalent to Bin 4, including inactivation) in addition to conventional treatment are exempt from monitoring for purposes of selecting bin placement. Conventional treatment is defined as coagulation, flocculation, sedimentation and granular media filtration.

d) EPA agrees to work with stakeholders to develop a guidance manual with appropriate QA/QC procedures for *Cryptosporidium* sampling

###### **2) Systems < 10,000**

a) Based on the large system monitoring under 4.1.a, EPA will work with stakeholders to evaluate alternative indicators and system characterization scenarios for predicting *Cryptosporidium* occurrence in small systems. This evaluation will include new information on surrogates, including *E. coli*, and will assess whether *E. coli* concentrations of 10 and 50 per 100ml are appropriate values to trigger

*Cryptosporidium* monitoring in lakes/reservoirs and flowing streams, respectively.

b) In the absence of an alternative indicator specified by the State/Primacy Agency, based on EPA guidance, source water *E. coli* levels trigger *Cryptosporidium* monitoring as described below:

i) Systems must begin one year of biweekly *E. coli* source water monitoring 2 years after large systems initiate *Cryptosporidium* monitoring.

ii) Systems must conduct *Cryptosporidium* monitoring if *E. coli* concentrations exceed the following levels:

- annual mean > 10/100 ml for lakes and reservoirs

- annual mean > 50/100 ml for flowing streams

c) Systems that provide 2.5 logs of treatment for *Cryptosporidium* (equivalent to Bin 4, including inactivation) in addition to conventional treatment are exempt from monitoring for purposes of selecting bin placement.

d) The FACA recommends that *E. coli* monitoring for small systems will begin two and one half years after rule promulgation and also that *Cryptosporidium* monitoring be comprised of 24 samples over 1 year. The FACA also recommends that EPA solicit comment on any additional approaches to expedite small system compliance.

e) EPA will work with stakeholders to explore the feasibility of developing alternative, lower frequency, *Cryptosporidium* monitoring criteria for providing a conservative mean estimate.

#### **4.1.b Action Bins (for conventional treatment plants):**

1) The bins have been structured considering the total *Cryptosporidium* oocyst count, uncorrected for recovery, as measured using EPA Method 1623 and 10 L samples.

2) Systems have 3 years following initial bin classification to meet the treatment requirements associated with the bin (see Bin Requirements Table below). The State/Primacy Agency may grant systems an additional 2 year extension to comply when capital investments are necessary.

3) Systems currently using ozone, chlorine dioxide, UV, or membranes in addition to conventional treatment may receive credit for those technologies towards bin requirements.

4) Bin requirements table is shown below:

#### **Bin Requirements Table**

Bin Number	Average <i>Cryptosporidium</i> Concentration	Additional treatment requirements for systems with conventional treatment that are in full compliance with IESWTR <sup>(4)</sup>
1	<i>Cryptosporidium</i> < 0.075/L	No action
2	0.075/L ≤ <i>Cryptosporidium</i> < 1.0/L	1-log treatment (systems may use any technology or combination of technologies from toolbox as long as total credit is at least 1-log)
3	1.0/L ≤ <i>Cryptosporidium</i> < 3.0/L	2.0 log treatment (systems must achieve at least 1-log of the required 2-log treatment using ozone, chlorine dioxide, UV, membranes, bag/cartridge filters, or in-bank filtration)
4	<i>Cryptosporidium</i> 3.0/L	2.5 log treatment (systems must achieve at least 1-log of the required 2.5-log treatment using ozone, chlorine dioxide, UV, membranes, bag/cartridge filters, or in-bank filtration)

5) The additional treatment requirements in the bin requirement table are based, in part, on the assumption that conventional treatment plants in compliance with the IESWTR achieve an average of 3 logs removal of *Cryptosporidium*. The total *Cryptosporidium* removal requirements for the action bins with 1 log, 2 log, and 2.5 log additional treatment correspond to total *Cryptosporidium* removals of 4, 5, and 5.5 log respectively.

6) FACA recommends that EPA request public comment on whether current guidance regarding *Giardia* treatment requirements for meeting the Surface Water Treatment Rule need to be revised (to be consistent with multiple barrier concept in the current guidance and the FACA recommendations herein).

#### 4.1.c Toolbox

1) Meeting the log treatment requirements identified for each "Action Bin" may necessitate one or more actions from an array of management strategies which include watershed control, reducing influent *Cryptosporidium* concentrations, improved system performance, and additional treatment barriers.

2) Based on available information, the FACA recommends that LT2ESWTR employ a "toolbox" approach, and that the following tools when properly designed and implemented receive the following log credit (or range of credit). As recognized previously in this Agreement, EPA must employ the best information available in developing the final rule and will request comment on the proposed log credits assigned in the following table.

3) EPA will provide guidance for determining if toolbox options are properly designed and implemented.

4) Table with microbial toolbox components and associated potential log credit is shown on the next page:

<b>Microbial Toolbox Components</b>
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To Be Used in Addition to Existing Treatment,

*Please See Next Page*

**Microbial Toolbox Components**

To Be Used in Addition to Existing Treatment

	<b>Potential Log Credit</b>			
	<b>0.5</b>	<b>1</b>	<b>2</b>	<b>&gt;2.5</b>
<b>APPROACH</b>				
<b>Watershed Control</b>				
Watershed Control Program (1)	X			
Reduction in oocyst concentration (3)				As measured
Reduction in viable oocyst concentration (3)				As measured
<b>Alternative Source</b>				
Intake Relocation (3)				As measured
Change to Alternative Source of Supply (3)				As measured
Management of Intake to Reduce Capture of Oocysts in Source Water (3)				As measured
Managing Timing of Withdrawal (3)				As measured
Managing Level of Withdrawal in Water Column (3)				As measured
<b>Pretreatment</b>				
Off-Stream Raw Water Storage w/ Detention ~ X days (1)	X			
Off-Stream Raw Water Storage w/ Detention ~ Y weeks (1)		X		
—→ Pre-Settling Basin w/Coagulant	X			
————→ Lime Softening (1)				
————→ In-Bank Filtration (1)		X		
<b>Improved Treatment</b>				
Lower Finished Water Turbidity (0.15 NTU 95% tile CFE)	X			
Slow Sand Filters (1)				X
————→ Roughing Filter (1)	X			
Membranes (MF, UF, NF, RO) (1)				X
————→ Bag Filters (1)		X		
Cartridge Filters (1)			X	
<b>Improved Disinfection</b>				
Chlorine Dioxide (2)	X	X		
Ozone (2)	X	X	X	
UV (2)				X
<b>Peer Review / Other Demonstration / Validation or System Performance</b>				
Peer Review Program ( <i>ex. Partnership Phase IV</i> )		X		
<i>Performance studies demonstrating reliable specific log removals for</i>				As

*technologies not listed above. This provision does not supercede other inactivation requirements.*

demonstrated

**Key to table symbols:** (X) indicates potential log credit based on proper design and implementation in accordance with EPA guidance. Arrow indicates estimation of potential log credit based on site specific or technology specific demonstration of performance.

**Table footnotes:** (1) Criteria to be specified in guidance to determine allowed credit, (2) Inactivation dependent on dose and source water characteristics, (3) Additional monitoring for *Cryptosporidium* after this action would determine new bin classification and whether additional treatment is required.

#### **4.1.d Reassessment and Future Monitoring**

- 1) Systems that provide a total of 2.5 logs of treatment (equivalent to Bin 4 including inactivation) for *Cryptosporidium* in addition to conventional treatment are exempt from reassessment and future monitoring.
- 2) Four years after initial bin characterization, EPA will initiate a stakeholder process to review available methods and the bin characterization structures. EPA will conduct a stakeholder process to determine the appropriate analytical method, monitoring frequency, monitoring location, etc., for this second round of national assessment monitoring.
- 3) Six years after completion of the initial bin characterization, systems will conduct a second round of monitoring, equivalent or superior to the initial round from a statistical perspective, as part of a national reassessment . In the absence of an improved *Cryptosporidium* method (specified by the State/Primacy Agency, based on EPA guidance or rule and appropriate adjustment factors) site-specific reassessment monitoring will utilize method 1623 and site specific re-binning will occur under the current bin structure and time interval. If a new monitoring method is used, or the assumptions underlying the current bin structure change, the resulting data will be used for a site specific risk characterization in accordance with a revised bin structure (may require a revised rule) reflecting the changes in the underlying method.
- 4) As part of the three-year sanitary survey process, the Primacy Agency will assess any significant changes in the watershed and source water. The Primacy Agency will determine with the systems what follow-up action is appropriate. Actions that may be deemed appropriate include those outlined in the toolbox in this agreement.

#### **4.2 Unfiltered Systems**

##### **4.2.a Unfiltered systems must:**

- 1) Continue to meet filtration avoidance criteria, and
- 2) Provide 4 log virus inactivation, and
- 3) Provide 3 log *Giardia lamblia* inactivation, and
- 4) Provide 2 log *Cryptosporidium* inactivation.

##### **4.2.b Overall inactivation requirements must be met using a minimum of 2 disinfectants.**

**4.2.c** Ongoing monitoring and any eventual reassignment to risk bins for unfiltered systems will be consistent with requirements for other systems of their size, with the provision that unfiltered systems must demonstrate that their *Cryptosporidium* occurrence level continues to be less than or equal to 1 in 100 liters (or equivalent, using advanced methods) or provide 3 logs of *Cryptosporidium* inactivation.

### **4.3 Uncovered Finished Water Reservoirs**

**4.3.a** Systems with uncovered finished water reservoirs must:

- 1) Cover the uncovered finish water reservoir, or
- 2) Treat reservoir discharge to the distribution system to achieve a 4 log virus inactivation, unless
- 3) State/Primacy Agency determines that existing risk mitigation is adequate.

a) Systems must develop and implement risk mitigation plans.

i) Risk mitigation plans must address physical access, surface water run-off, animal and bird waste, and on-going water quality assessment.

ii) Risk mitigation plans must account for cultural uses by tribes.

## **5.0 Ultraviolet Light**

**5.1** Based on available information, EPA believes that ultraviolet (UV) disinfection is available and feasible. However, information is needed in order to clarify how UV disinfection will be used as a tool for compliance with the proposed LT2ESWTR. Issues of particular importance include engineering issues like: hydraulic control, reliability, redundancy, monitoring, placement of sensors, lamp cleaning and replacement, and lamp breakage, as well as confirmation of the information underlying EPA's assessment that UV is available and feasible.

**5.2** Concurrent with publication of the proposed rules, EPA will publish the following:

**5.2.a** Tables specifying UV doses (product of irradiance (I) and exposure time (T)) needed to achieve up to 3 logs inactivation of *Giardia, lamblia*, up to 3 logs inactivation of *Cryptosporidium*, and up to 4 logs inactivation of viruses.

**5.2.b** Minimum standards to determine if UV systems are acceptable for compliance with drinking water disinfection requirements. These standards will address the following:

1) A UV Validation Protocol to be established for drinking water applications of UV technology.<sup>(5)</sup> Protocol to be premised on post-filter application of UV.

Protocol will include the following:

a) Water quality criteria and site specific performance demonstration requirements for alternative placement of UV treatment in WTP.

b) Demonstration of adherence with the UV dose tables for inactivation per the identified protocols

c) Testing of UV reactors to validate performance under worst case conditions (These independent testing protocols would necessarily

encompass a range of worst case conditions appropriate to the range of WTPs that must comply with the LT2ESWTR).

d) Minimum UV sensor performance characteristics (e.g. accuracy, stability, sensitivity).

5) Description of on-site monitoring required to ensure ongoing compliance with required dose, including necessary testing and calibration of UV sensors.

**5.2.c** *UV Guidance Manual, the purpose of which is primarily to facilitate design and planning of UV installations by familiarizing State/Primacy Agencies and utilities with important design and operational issues, including:*

1) Redundancy, reliability and hydraulic constraints in UV system design including design limitations with respect to plant/pipe size

2) Design considerations to account for water quality (e.g. UV absorbance, turbidity), lamp fouling and aging

3) Appropriate operations and maintenance protocols to ensure performance of UV lamp (e.g., sleeve cleaning systems).

4) Recommendations for water systems when soliciting UV disinfection systems to ensure conformance to criteria described under **5.2.b**.

5) Instructions on routine equipment and water quality monitoring practices used to assure reliable UV performance over time.

**5.3** The availability of UV disinfection is a fundamental premise of this Agreement in Principle. The FACA recommends that EPA incorporate into the final LT2ESWTR provisions in **5.2** that will facilitate the approval of UV technology by Primacy Agencies. EPA agrees in the proposed LT2ESWTR to request comment on which criteria should be incorporated into the final LT2ESWTR.

**5.4** EPA agrees to publish revised IT tables and revised guidance manuals as part of the final LT2ESWTR that reflect comments on earlier drafts.

**5.5** EPA agrees to conduct a stakeholder meeting during the comment period for the proposed LT2ESWTR to update stakeholders on a range of issues including the status of UV and any outstanding guidance manual issues.

**5.6** If EPA identifies substantial new information related to the availability or feasibility of UV, EPA agrees to publish this information in a NODA. If EPA determines that this information significantly impacts the basis for provisions in this agreement, EPA agrees to reconvene the FACA to address feasibility and availability of UV.

## **6.0 Health Risk Reduction and Cost Analysis (HRRCA)**

EPA agrees to include in the Stage 2 DBPR and LT2ESWTR proposals an estimate of public health effects, and a health risk reduction and cost analysis (HRRCA). EPA agrees to use costing analysis that was developed to support the FACA process as part of its HRRCA analysis and where there is a significant difference in costing information EPA will use HRCCA to explain the difference. EPA also agrees to request comments from the Science Advisory Board prior to proposal.

## **STAGE 2 M-DBP AGREEMENT IN PRINCIPLE**

### **PART A, Section 1.0 - 6.0 agreed to by:**

Name, Organization date

### **PART B**

#### **7.0 DISTRIBUTION SYSTEMS**

**7.1** The FACA recognizes that finished water storage and distribution systems may have an impact on water quality and may pose risks to public health.

**7.2** The FACA recognizes that cross connections and backflow in distribution systems represent a significant public health risk

**7.3** The FACA recognizes that water quality problems can be related to infrastructure problems and that aging of distribution systems may increase risks of infrastructure problems.

**7.4** The FACA recognizes that distribution systems are highly complex and that there is a significant need for additional information and analysis on the nature and magnitude of risk associated with them.

**7.5** Therefore, the FACA recommends that beginning in January 2001, as part of the 6-year review of the Total Coliform Rule, EPA should evaluate available data and research on aspects of distribution systems that may create risks to public health and, working with stakeholders, initiate a process for addressing cross connection control and backflow prevention requirements and consider additional distribution system requirements related to significant health risks.

#### **8.0 Microbial Water Quality Criteria**

The FACA recommends the development of national water quality criteria funded by EPA under the Clean Water Act for microbial pathogens for stream segments designated by states/tribes for drinking water use. The FACA recognizes that both nonpoint sources and point sources may be a significant contributor to microbial contamination of drinking water and both must be responsible for reducing their individual contributions to microbial contamination to achieve water quality standards.

## **STAGE 2 M-DBP AGREEMENT IN PRINCIPLE**

### **PART B, Section 1.0 - 8.0 agreed to by:**

Name, Organization date

**ATTACHMENT A**

**Stage 2 M/DBP FACA Committee Members**

International Ozone Association

*Michael Dimitriou, Aquasource*

U.S. Environmental Protection Agency

Cynthia Dougherty, Office of Ground Water and Drinking Water, Office of Water

All Indian Pueblo Council, Pueblo Office of Environmental Protection

Dave Esparza, All Indian Pueblo Council

Physicians for Social Responsibility

Cathey Falvo, New York Medical College

Chlorine Chemistry Council

*Peggy Geimer, MD, Arch Chemicals, Inc.*

National Association of People with AIDS

Jeffrey K. Griffiths, Tufts Univ. Schools of Medicine & Veterinary Medicine

Association of State Drinking Water Administrators

Richard L. Haberman, CA Dept. of Health Services - Drinking Water Field Operations Branch

Environmental Council of the States

Barker G. Hamill, Bureau of Safe Drinking Water

National Association of State Utility Consumer Advocates

*Christine Hoover, Office of Consumer Advocate, PA*

Unfiltered Systems

Rosemary Menard, Water Resources Management Group, Portland Water Bureau

National Association of Water Companies

*Richard Moser, American Water Works Service Company*

Natural Resources Defense Council

Erik Olson, Natural Resources Defense Council

Conservation Law Foundation

David Ozonoff, School of Public Health, Boston University

American Water Works Association

*David Paris, Manchester Water Works*

Association of Metropolitan Water Agencies

*Brian Ramaley, Newport News Waterworks*

Water and Wastewater Equipment Manufacturers Association

*Charles Reading, Jr., Safewater Solutions*

National Rural Water Association

Rodney Tart, Harnett County Public Utility, NC

National League of Cities

Bruce H. Tobey, Mayor of Gloucester, Massachusetts

National Environmental Health Association  
National Association of County and City Health Officials

*Chris Wiant, TriCounty Health Department*

National Association of Regulatory Utility Commissioners

John Williams, Florida Public Service Commission

Clean Water Action

Marguerite Young, Clean Water Action

1. *Systems which monitor for an indicator organism (e.g. E. coli) and do not monitor for Cryptosporidium must submit the results of the indicator monitoring three and one half years after rule promulgation.*
2. *The objective of this monitoring provision and similar monitoring provisions herein after is to prevent systems from avoiding monitoring during peak occurrence.*
3. *The objective of this monitoring provision and similar monitoring provisions herein after is to prevent systems from avoiding monitoring during peak occurrence.*

*4. FACA has not addressed direct filtration systems. EPA will address direct filtration systems in connection with bins 2-4 in the proposed LT2ESWTR and request comment.*

*5. The FACA recommends that EPA analyze the Deutscher Verein des Gas und Wasserfaches (DVGW) Technical Guidelines W 294 in developing the validation protocol.*