Pennsylvania Department of Environmental Protection
Bureau of Water Standards and Facility Regulation

Disinfectants / Disinfection Byproducts Rule (DBP Rule) Monitoring & Reporting Requirements
For Public Water Systems Treated with a Chemical Disinfectant

Note: The initial compliance dates for these requirements are as follows:

January 2002

- CWSs and NTNCWs with surface water or GUDI sources serving ≥10,000 persons
- TNCWSs with surface water or GUDI sources serving ≥10,000 persons and treating with chlorine dioxide

January 2004

- CWSs and NTNCWs with surface water or GUDI sources serving <10,000 persons
- CWSs and NTNCWSs with GW sources only
- TNCWSs with surface water or GUDI sources serving <10,000 persons and treating with chlorine dioxide
- TNCWSs with GW sources only and treating with chlorine dioxide
- BVRBs

Note: The TTHM and HAA5 tables are effective until the following dates for the systems indicated below. Starting with that date, the TTHM and HAA5 monitoring and compliance requirements under the Stage 2 DBP Rule apply.

- **For PWSs serving ≥ 100,000 people – until April 1, 2012**
- **For PWSs serving 50,000-99,999 people - until October 1, 2012**
- **For PWSs serving 10,000-49,000 people - until October 1, 2013**
- **For PWSs serving < 10,000 people if no Cryptosporidium monitoring required under LT2SWTR – until October 1, 2013**
- **For PWSs serving < 10,000 people if Cryptosporidium monitoring is required under LT2SWTR – until October 1, 2014**

Consecutive or wholesale systems that are part of a combined distribution system must comply with the schedule of the system serving the largest number of customers in the combined distribution system.

Abbreviations

A = Annually	M = Maximum Residence	
ACC = Alternative Compliance Criteria	MCL = Maximum Contaminant Level	Q = Quarter or Quarterly
BVRB = Bottled, Vended, Retail, and Bulk Water Hauling Systems	M/R = Monitoring/Reporting	R = Raw Water
CWS = Community Water System	Mo = Monthly	RAA = Running Annual Average
D = Distribution System	MRDL = Maximum Residual Disinfectant Level	SUVA = Specific Ultraviolet Absorption at 254 nm
E or EP = Entry Point	NTNCWS = Nontransient Noncommunity Water	SW = Surface Water
GUDI = Groundwater Under the Direct Influence of SW	System	TOC = Total Organic Carbon
GW = Groundwater	P = Plant	TTHM = Total Trihalomethanes
HAA5 =Haloacetic Acids (sum of 5 Haloacetic Acid compounds)	PWS = Public Water System	TNCWS = Transient Noncommunity Water System

Chlorine (0999) or Chloramines (1006) (Distribution System)

PWSs Required To Monitor	MRDL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Reporting Frequency	It is a violation if:
All CWSs & NTNCWSs (incl. consecutive systems)	4.0 mg/L	Same as for total coliform monitoring [1]	Mo [2]	D	All samples are to be taken at the same locations and times as total coliform samples.	No altered monitoring	The monthly average of all samples on SDWA-S form. [1] If the system switches between chlorine and chloramines, include all results in the average and report the contaminant code for the most numerous samples.	Monthly [1] Within 10 days after the end of the month	**MRDL (11)** RAA of monthly averages of all samples, computed quarterly, >MRDL. **M/R (27)** Major: <90% of samples taken or reported. Minor: 90-99% of samples taken or reported.

Note: Compliance is based only on the running annual average (RAA), not individual samples or a single monthly average. For surface water systems, the monthly average may be reported on the same SDWA-S form used for reporting monthly-summarized disinfectant residual performance results. The water supplier completes the SDWA-S form as always for disinfectant residual (indicating the number of samples required, taken, and the number of samples that were out of compliance (non-detects). The difference now is that the surface water supplier must now report the average of all disinfectant residual samples taken during the month. The SDWA-S has been modified to include an "average result" field. Also, surface water suppliers should now report their disinfectant residual results as code 0999 or 1006 depending on whether they are using chlorine or chloramines respectively. To avoid monitoring violations, the state will also continue to accept code 1012 until further notice.

[1] One chlorine or chloramines sample must be taken for every total coliform sample that is taken. That includes all routine, check, and special total coliform samples.

[2] The exception is for groundwater NTNCWSs serving ≤1000 people. For those systems, the monitoring frequency is quarterly. This coincides with quarterly total coliform monitoring. Reporting for groundwater NTNCWs serving ≤1000 people is, therefore, also quarterly. (Report the average of all chlorine residual sample results taken during the quarter.)

TTHM (2950) & HAA5 (2456) (Distribution System)

PWSs Required To Monitor	MCL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Routine Reporting Frequency	It is a violation if:
Large surface water/ GUDI CWSs & NTNCWSs (serving ≥10,000 people) (Includes blended systems using both surface/GUDI and groundwater sources.) (Incl. consecutive systems.)	TTHM - 0.080 mg/L HAA5 - 0.060 mg/L	4 sample sets per plant [1] (Must be tested by a certified lab.)	Q	D & M	At least 25% of sample sets must be M samples; All other sample sets must be D samples representing at least average residence time.	Reduced to: 1 M sample set per Q per plant if after 1 year of monitoring: a) RAA of TTHM & HAA5 ≤ 0.040 and ≤ 0.030 mg/L respectively, and b) RAA of SW source water TOC ≤4.0 mg/L for each SW treatment plant. [2] Resume to 4 sample sets per plant beginning the following Q if: • RAA of TTHM or HAA5 > 0.060 or > 0.045 mg/L respectively.	All TTHM & all HAA5 sample results on SDWA-1 form	Q Within 10 days after the end of the month or quarter, whichever is shorter, of determining results	**MCL (02)** RAA of quarterly averages, computed quarterly, >MCL **M/R (27)** Major: <90% of samples taken or reported. Minor: 90-99% of samples taken or reported.

PWSs Required To Monitor	MCL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Routine Reporting Frequency	It is a violation if:
Small surface water/ GUDI CWSs & NTNCWSs (serving 500 to 9,999 people) (Includes blended systems using both surface/GUDI and groundwater sources.) (Incl. consecutive systems.)	TTHM - 0.080 mg/L HAA5 - 0.060 mg/L	1 sample set per plant (Must be tested by a certified lab.)	Q	M	Must be M sample If more than 1 sample is taken per plant, at least 25% of the sample sets must be M samples, others must be D samples	Reduced to: 1 annual M sample set per plant (during mo. of warmest water temp) if after at least 1 year of monitoring: a) RAA of TTHM & HAA5 ≤ 0.040 and ≤ 0.030 mg/L respectively, and b) RAA of SW source water TOC ≤4.0 mg/L for each SW treatment plant. [2] Resume to: 1 M sample set per plant per Q if: • Average of all TTHM or HAA5 samples, taken during the month of warmest water temp, is > 0.060 or > 0.045 mg/L respectively. Q monitoring must resume the very next quarter.	All TTHM & all HAA5 sample results on SDWA-1 form	Q or A, dependent upon monitoring frequency. Within 10 days after the end of the month or quarter, whichever is shorter, of determining results.	**MCL (02)** RAA of quarterly averages, computed quarterly, >MCL. **M/R (27)** Major: <90% of samples taken or reported. Minor: 90-99% of samples taken or reported. PWSs on annual monitoring will be evaluated at the end of each year for M/R violation.

Note: A plant is defined as:

- Any filtration plant where a disinfectant is added.
- Any disinfection treatment facility for a groundwater source. All treatment facilities associated with wells within the same aquifer may be considered as single plant.
- A purchased water connection with another public water system that uses a disinfectant. More than one connection delivering the same water from the same seller may be considered as a single plant.

Booster chlorination stations do not count as plants. Emergency filtration plants, treatment facilities, and purchased water connections are not counted unless they are put into service.
For consecutive water systems, monitoring is performed based upon wholesaler's source water type and the consecutive system's population.

[1] Large systems using surface water must take 4 sample sets per plant, regardless of whether the plants distribute surface water or groundwater. However, it is possible for a groundwater plant to distribute water to a portion of the distribution system that is hydraulically separate from other parts of the distribution system. If the PWS demonstrates, through a hydraulic study, that surface water contribution is absent or insignificant in the groundwater portion of the distribution system, then the sampling plan may provide for just one sample set to be taken in association with the groundwater plant.

[2] Beginning April 1, 2008, this criterion is based on TOC samples taken every 30 days prior to treatment. To remain on reduced monitoring, the system must maintain a source water TOC RAA ≤ 4.0 mg/L (based on quarterly samples). The water supplier should submit TOC results to the state on an SDWA-1 form to document that the conditions of reduced monitoring are met.

TTHM (2950) & HAA5 (2456) (Distribution System)

PWSs Required To Monitor	MCL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Routine Reporting Frequency	It is a violation if:
Very small surface water/GUDI CWSs & NTNCWSs (serving < 500 people) (Includes blended systems using both surface/GUDI and groundwater sources.) (Incl. consecutive systems.)	TTHM - 0.080 mg/L HAA5 - 0.060 mg/L	1 sample set per plant (Must be tested by a certified lab.)	A (during mo. of warmest water temp)	M	Must be M sample If more than 1 sample is taken per plant, at least 25% of the sample sets must be M samples, others must be D samples	Increased to: 1 sample set per plant per Q if: • Average of all TTHM or HAA5 samples, taken during the month of warmest water temp, exceeds the TTHM or HAA5 MCL. Q monitoring must begin the very next Q. Resume to routine annual monitoring if after at least 4 quarters of monitoring: • RAA of TTHM & HAA5 ≤ 0.060 and ≤ 0.045 mg/L respectively. No reduced monitoring.	All TTHM & all HAA5 sample results on SDWA-1 form	Q or A, dependent upon monitoring frequency. Within 10 days after the end of the month or quarter, whichever is shorter, of determining results.	**MCL (02)** RAA of quarterly averages, computed quarterly, >MCL. **M/R (27)** Major: <90% of samples taken or reported. Minor: 90-99% of samples taken or reported. PWSs on annual monitoring will be evaluated at the end of each year for M/R violation.

PWSs Required To Monitor	MCL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Routine Reporting Frequency	It is a violation if:
Large groundwater CWSs & NTNCWSs (serving ≥10,000 people) (Using **only** groundwater sources) (incl. consecutive systems)	TTHM - 0.080 mg/L HAA5 - 0.060 mg/L	1 sample set per plant (Must be tested by a certified lab.)	Q	M	Must be M sample If more than 1 sample is taken per plant, at least 25% of the sample sets must be M samples, others must be D samples	Reduced to: 1 annual M sample set per plant (during mo. of warmest water temp) if after at least 4 quarters of monitoring: • RAA of TTHM & HAA5 ≤ 0.040 and ≤ 0.030 mg/L respectively. Resume to: 1 M sample set per plant per Q if: • Average of all TTHM or HAA5 samples, taken during month of warmest water temp, is > 0.060 or > 0.045 mg/L respectively. Q monitoring must resume the very next quarter.	All TTHM & all HAA5 sample results on SDWA-1 form	Q or A, dependent upon monitoring frequency. Within 10 days after the end of the month or quarter, whichever is shorter, of determining results.	**MCL (02)** RAA of quarterly averages, computed quarterly, >MCL. **M/R (27)** Major: <90% of samples taken or reported. Minor: 90-99% of samples taken or reported. PWSs on annual monitoring will be evaluated at the end of each year for M/R violation.

Note: A plant is defined as:

- Any filtration plant where a disinfectant is added.
- Any disinfection treatment facility for a groundwater source. All treatment facilities associated with wells within the same aquifer may be considered as single plant.
- A purchased water connection with another public water system that uses a disinfectant. More than one connection delivering the same water from the same seller may be considered as a single plant.

Booster chlorination stations do not count as plants. Emergency filtration plants, treatment facilities, and purchased water connections are not counted unless they are put into service.
For consecutive water systems, monitoring is performed based upon wholesaler's source water type and the consecutive system's population.

TTHM (2950) & HAA5 (2456) (Distribution System)

PWSs Required To Monitor	MCL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Routine Reporting Frequency	It is a violation if:
Small groundwater CWSs & NTNCWSs (serving < 10,000 people) (Using **only** groundwater sources) (incl. consecutive systems)	TTHM - 0.080 mg/L HAA5 - 0.060 mg/L	1 sample set per plant (Must be tested by a certified lab.)	A (during mo. of warmest water temp)	M	Must be M sample If more than 1 sample is taken per plant, at least 25% of the sample sets must be M samples, others must be D samples	Increased to: 1 sample set per plant per Q if: • Average of all TTHM or HAA5 samples, taken during the month of warmest water temp, exceeds the TTHM or HAA5 MCL. Q monitoring must begin the very next Q. Resume to routine annual monitoring if after at least 4 quarters of monitoring: • RAA of TTHM & HAA5 ≤ 0.060 and ≤ 0.045 mg/L respectively. Reduced to: 1 M sample set per plant every 3 years (during mo. of warmest water temp) if: a) After at least 1 year of routine monitoring, the average of all samples taken during the month of warmest water temp for TTHM & HAA5 is ≤ 0.020 and ≤ 0.015 mg/L, respectively, or b) After at least 2 consec. years of routine monitoring, the average of all samples taken during the month of warmest water temp for TTHM & HAA5 is ≤ 0.040 and ≤0.030 mg/L, respectively. Resume to: 1 annual sample set per plant if: • Average of all TTHM or HAA5 samples, taken during the month of warmest water temp, is > 0.060 or > 0.045 mg/L respectively. Annual monitoring must resume the following year. Increased to: 1 sample set per plant per Q (regardless of whether on annual or triennial frequency) if:	All TTHM & all HAA5 sample results on SDWA-1 form	Q or A, dependent upon monitoring frequency. Within 10 days after the end of the month or quarter, whichever is shorter, of determining results.	**MCL (02)** RAA of quarterly averages, computed quarterly, >MCL. **M/R (27)** Major: <90% of samples taken or reported. Minor: 90-99% of samples taken or reported. PWSs on annual monitoring will be evaluated at end of each year for M/R violation. PWSs on triennial monitoring will be evaluated at end of each 3-year period for M/R violation. End date of 3-year period is calculated to be 3 years from December of year in which reduction to triennial frequency was determined.

PWSs Required To Monitor	MCL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Routine Reporting Frequency	It is a violation if:
						• Average of all TTHM or HAA5 samples, taken in any year during the month of warmest water temp, exceeds the TTHM or HAA5 MCL. Q monitoring must begin the very next Q.			

Note: A plant is defined as:

- Any filtration plant where a disinfectant is added.
- Any disinfection treatment facility for a groundwater source. All treatment facilities associated with wells within the same aquifer may be considered as single plant.
- A purchased water connection with another public water system that uses a disinfectant. More than one connection delivering the same water from the same seller may be considered as a single plant.

Booster chlorination stations do not count as plants. Emergency filtration plants, treatment facilities, and purchased water connections are not counted unless they are put into service.
For consecutive water systems, monitoring is performed based upon wholesaler's source water type and the consecutive system's population.

Additional important information about TTHM and HAA5 monitoring for all system types and sizes:

- Blended systems (i.e., systems with both SW/GUDI and GW sources) are considered SW systems under this rule. For TTHM/HAA5 monitoring, these systems must refer only to the surface water tables to determine their requirements.
- The state will compute altered monitoring determinations at the end of each quarter. For a system on annual monitoring, this means that altered monitoring determinations will generally be revealed after the July-September quarter. That is the quarter that systems on annual monitoring will most likely do their monitoring since the month of warmest water temperature will undoubtedly occur during that quarter. PWSs should indicate on their monitoring plans that, when on annual monitoring, the samples will be taken during the month of warmest water temperature during that quarter.
- The state will compute M/R compliance:
  - at the end of each quarter for systems on quarterly monitoring;
  - at the end of each calendar year for systems on annual monitoring; and
  - at the end of each 3 calendar-year period for systems on 3-year monitoring.
- The state will compute TTHM and HAA5 MCL compliance only when a system is on quarterly monitoring. That is, a PWS can only incur a violation when on quarterly monitoring. The one exception is when a system on annual monitoring exceeds four times the MCL. Since that will trigger quarterly monitoring, and the annual sample will count as the first quarter of quarterly monitoring, the system will already be in violation because it will be impossible for any results in the subsequent three quarters to cause the RAA to be less than the MCL.

Chlorine Dioxide (1008) (Entry Point)

PWSs Required To Monitor	MRDL	# Samples	Freq	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Reporting Frequency	It is a violation if:
PWSs that treat with chlorine dioxide (Exclude consecutive systems unless they treat with chlorine dioxide.)	0.8 mg/L	1	Daily (only when chlorine dioxide treatment is in use) [1]	E [2]	Each EP treated with chlorine dioxide. (Purchased water connections are excluded) [3]	No altered monitoring. However, distribution system monitoring (D) is required if an "E" sample >MRDL (see below).	SDWA-S Form: The number of entry point samples required and the number of entry point samples taken each month, based on the number of "entry point treatment days." [4] SDWA-1 Form: All entry point Chlorine dioxide detail result information (may be reported on same form as "D" samples).	Monthly Within 10 days after the end of each month. Note: When chlorine dioxide treatment is not in operation, the PWS must still report SDWA-S form information, indicating 0 samples required and 0 samples taken.	**MRDL (11/13)** Acute violation (13) if. Any "E" sample >MRDL and: 1. At least 1 of 3 "D" samples next day >MRDL; or 2. System fails to take 3 "D" samples the following day Non-acute violation (11) if: 1. Any 2 consecutive daily "E" samples >MRDL and all "D" samples ≤MRDL; or 2. Failure to take any "E" sample the day after any "E" sample is >MRDL. **M/R (27)** Major: <90% of all samples (E & D) taken or reported. Minor: 90-99% of all samples (E & D) taken or reported.

Chlorine Dioxide (1008) (Distribution System)

PWSs that treat with chlorine dioxide (Exclude consecutive systems unless they treat with chlorine dioxide.)	0.8 mg/L	3-sample set for each "E" sample that is >MRDL	Only the day after an "E" sample >MRDL	D	If no Cl booster – close to first customer. If Cl booster – close to first customer, average, and end of distribution system.	NA	All "D" Chlorine dioxide detail result information on SDWA-1 form. (May be reported on same form as "E" samples). (See above)	Monthly (only when an EP sample exceeds the MRDL, which requires that a 3-sample set be taken in the distribution system) (See above)	**MRDL (11/13)** See Chlorine dioxide entry point table above. **M/R (27)** See Chlorine dioxide entry point table above.

[1] However, if a daily "E" sample exceeds the MRDL, an "E" sample and follow-up "D" samples must be taken the next day, even if chlorine dioxide treatment isn't being used the next day.
[2] The state will not track "E" samples by specific entry point; only that the correct number of samples was taken per month
[3] If any chlorine dioxide samples exceed the MRDL in the selling system, the state may require the purchasing system to conduct chlorine dioxide monitoring.
[4] An "entry point treatment day" is equal to one entry point through which water treated with chorine dioxide was delivered to the distribution system for any portion of one day. For example, two entry points delivering chlorine dioxide treated water from two separate treatment plants for 14 days is equal to 28 "entry point treatment days."

Chlorite (1009) (Entry Point)

PWSs Required To Monitor	MCL	# Samples	Freq	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Reporting Frequency	It is a violation if:
CWSs & NTNCWSs that treat with chlorine dioxide (Exclude consecutive systems unless they treat with chlorine dioxide.)	1.0 mg/L	1	Daily (only when chlorine dioxide treatment is in use)	E[1]	Each EP treated with chlorine dioxide (Purchased water connections are excluded.) [2]	No altered monitoring	All daily entry point chlorite results on SDWA-1 form. Note: The state will use the chlorine dioxide sample information reported on an SDWA-S form to determine how many chlorite samples are required for the month.	Monthly Within 10 days after the end of each month that Chlorine dioxide treatment is used	**MCL (02)** None. MCL exceedance used only as trigger. For any "E" result >MCL, additional 3-sample "D" sample set required, and return to routine distribution system monitoring if on reduced. **M/R (27)** See distribution system chlorite table below.

Chlorite (1009) (Distribution System)

PWSs Required To Monitor	MCL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	Report Freq	It is a violation if:
CWSs & NTNCWSs that treat with chlorine dioxide (Exclude consecutive systems unless they treat with chlorine dioxide.)	1.0 mg/L	3-sample set (all 3 on same day) (Must be tested by certified lab)	Mo (only when chlorine dioxide treatment is in use)	D	All samples are "D" samples, but the monitoring plan must indicate the following: 1 sample near first customer. 1 sample at average residence location. 1 sample at maximum residence location.	Increased monitoring: Any time a daily E sample result > MCL (1.0 mg/L), a set is required the next day.[3] (Note: This set can be used to meet the monthly "set" requirement.) Reduced to: 1 set per Q if: [4] • All chlorite samples (both E & D samples) ≤MCL value (1.0 mg/L) for 1 year. Resume to 1 set per month if: • Any qrtrly D sample exceeds MCL value (1.0 mg/L); or • Any daily E sample exceeds MCL value (1.0 mg/L) (requiring an additional "set" to be taken the next day).	All "D" Chlorite results on SDWA-1 form. Entry point and distribution system sample results may be reported on the same form.	Monthly Or Quarterly, if on reduced monitoring. If any sample >MCL value while on reduced monitoring, must resume monthly reporting immediately.	**MCL (02)** Average of any 3-sample "D" sample set >MCL. (The state will average each 3-sample set monthly.) **M/R (27)** Major: <90% of all samples (E & D) taken or reported. Minor: 90-99% of all samples (E & D) taken or reported.

[1] The state will not track "E" samples by specific entry point, only that the correct number of samples was taken per month
[2] If chlorite samples exceed the MCL value in the selling system, the state may require the purchasing system to conduct chlorite monitoring.
[3] The state will look for the additional 3-sample "D" set whenever an elevated "E" result is reported; and the samples must be taken the next day, even if chlorine dioxide treatment isn't being used the next day.
[4] The state will enforce reduced (quarterly) monitoring or resumed monthly monitoring when the stipulated conditions are met. Eligibility for reduced (quarterly) monitoring is evaluated annually.

Bromate (1011) (Entry Point)

PWSs Required To Monitor	MCL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	Report Freq	It is a violation if:
CWSs & NTNCWSs that treat with ozone (Exclude consecutive systems unless they treat with ozone.)	0.010 mg/L	1 (Must be tested by certified lab)	Mo	E[1]	Each EP treated with ozone. (Purchased water entry points are excluded) [2]	Reduced to: 1 per EP per Q if: Until March 31, 2009: • RAA of monthly source bromide < 0.05 mg/L for 1 year. Resume to: 1 per EP per month if: • RAA of monthly source bromide, computed quarterly, ≥ 0.05 mg/L Beginning April 1, 2009: • RAA of monthly bromate ≤ 0.0025 mg/L Resume to: 1 per EP per month if: • RAA of monthly bromate > 0.0025 mg/L	All EP Bromate detail result information on SDWA-1 form	Q Within 10 days after the end of the quarter, but results may be reported each month during the quarter.	**MCL (02)** RAA, computed qrtrly, of monthly averages of all samples >MCL. **M/R (27)** Major: <100% of samples taken or reported. Minor: NA

Bromide (1004) (Raw Source Water) – Optional monitoring to determine eligibility for reduced monitoring (Effective until March 31, 2009)

PWSs Required To Monitor	MCL	# Samples	Frequency	Sample Type	Sample Location Specifics	Altered Monitoring	Report	Report Freq	It is a violation if:
CWSs & NTNCWSs that conduct bromate monitoring, and that wish to reduce bromate monitoring. If on reduced bromate monitoring, bromide monitoring is required.	None	1 (Must be tested by certified lab)	Mo	R	Each source treated with ozone.	Not required if PWS does not wish to reduce bromate monitoring. Monthly monitoring of sources treated with ozone is necessary if PWS wishes to reduce bromate monitoring to quarterly. Monthly monitoring of sources treated with ozone is required if PWS is on reduced bromate monitoring, because if RAA of monthly bromide results, computed quarterly, is ≥0.05 mg/L, routine bromate monitoring must resume.	All monthly source water Bromide detail result information on SDWA-1 form.	Q (Only if monitoring is conducted) Within 10 days after the end of each quarter, but results may be reported each month during the quarter.	**MCL (02)** None. Used as a trigger for reduced or resumed routine bromate monitoring. Trigger = 0.05 mg/L. **M/R (27)** Only when on reduced bromate monitoring. Major: <100% of samples taken or reported. Minor: NA

[1] The state will not track "E" samples by specific entry point, only that the correct number of samples was taken per month
[2] If bromate samples exceed the MCL value in the selling system, the state may require the purchasing system to conduct bromate monitoring at the interconnection.

Disinfection Byproduct Precursors [Total Organic Carbon (TOC) - 2920] (Raw Source Water and Plant)

PWSs Required To Monitor	Treatment Technique	# Samples	Freq	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Reporting Frequency	It is a violation if:
Surface water CWSs & NTNCWSs that have conventional filtration must conduct TOC monitoring at the filtration plant and at the raw water source. (Not required at consecutive systems.) Monthly source water TOC monitoring is optional for other SW systems (i.e. systems without conventional treatment) that wish to reduce TTHM/HAA5 monitoring. (See the altered monitoring column of the TTHM /HAA5 tables)	See the Step 1 table (3-by-3 matrix) for removal percentage (determined by the alkalinity and TOC present in the source water)	1 set (Comprised of 1 raw water sample and 1 plant sample taken at the same time) (Must be tested by certified lab)	Mo	R & P	Mandatory SW systems with conventional filtration must sample: • Each SW source; • Each filter plant (post sedimentation). Optional Other SW systems (serving ≥500 people and wanting to meet 4.0 mg/L of TOC criteria for reduced TTHM & HAA5 monitoring) may sample each surface water raw water source. (see TTHM/HAA5 table.) PWSs who only use purchased surface water may use the wholesaler TOC results to qualify for reduced monitoring.	TOC monitoring at a conventional filtration plant may be reduced to Q if the post-sedimentation RAA TOC (Plant sample) for the plant is: a) < 2.0 mg/L for 2 consecutive years; or b) < 1.0 mg/L for 1 year. Thus, reduced TOC monitoring is plant specific. Resume to monthly monitoring if: • TOC RAA for the conventional filtration plant is ≥ 2.0 mg/L. For other SW systems, TOC monitoring is optional. SW systems serving ≥500 people and wishing to reduce TTHM & HAA5 monitoring must demonstrate that the annual average of monthly source water TOC level is ≤4.0 mg/L. Once on reduced TTHM & HAA5 monitoring, no additional TOC monitoring is necessary for these systems.	Conventional filter systems: All monthly "R" & "P" TOC results on SDWA-1 form. Other SW systems (optional to reduce TTHM & HAA5 monitoring): All optional monthly "R" TOC results on SDWA-1 form.	Q Within 10 days after the end of each quarter, but results may be reported each month during the quarter.	**Treatment Technique (46)** The TOC removal performance ratio for any conventional treatment plant is <1.00 based on the RAA of performance ratios, computed quarterly; and none of the alternative compliance criteria (ACC) are achieved. (See ACC listed at the end of this job aid.) **M/R (27)** Associated with conventional filtration systems only. Major: <90% of all samples (R & P) taken or reported. Also for failure to take "R" and "P" TOC samples and alkalinity samples at same time. Minor: 90-99% of all samples (R & P) taken or reported.

Step 1 Required Percent Removal of TOC by Enhanced Coagulation and Enhanced Softening (3 x 3 Matrix) [1]

Source-water TOC (mg/L)	Source-water alkalinity (mg/L as $CaC0_3$)		
	0-60	>-60-120	>120 [2]
>2.0-4.0	35.0 %	25.0 %	15.0 %
>4.0-8.0	45.0 %	35.0 %	25.0 %
>8.0	50.0 %	40.0 %	30.0 %

[1] Enhanced coagulation is the treatment technique for removal of DBP precursors. Systems practicing precipitative softening must perform enhanced softening as the treatment technique for removal of DBP precursors.

[2] Systems practicing enhanced softening must meet the TOC removal requirements in this column.

Disinfection Byproduct Precursors [Alkalinity] (1927) (Raw Source Water)

PWSs Required To Monitor	# Samples	Freq	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Reporting Frequency	It is a violation if:
Surface water CWSs & NTNCWSs with conventional filtration (Not required at consecutive systems.)	1	Mo	R	Same locations and times as source water TOC.	May reduce to Q for a plant if the post-sedimentation TOC RAA is: a) <2.0 mg/L for 2 consecutive years; or b) <1.0 mg/l for 1 year. Resume to monthly monitoring if TOC RAA is ≥2.0 mg/L.	All "R" alkalinity results on SDWA-1 form	Q Within 10 days after the end of each quarter, but results may be reported each month during the quarter.	**Treatment Technique (46)** See TOC table above. **M/R (27)** See TOC table above.

SUVA (Specific Ultraviolet Absorption at 254 nm) (2923) (Raw Source Water or Plant)

Optional monitoring to meet alternative compliance criteria using SUVA

PWSs Required To Monitor	# Samples	Freq	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Reporting Frequency	It is a violation if:
Surface water CWSs & NTNCWSs with conventional filtration and wishing to meet alternative compliance criteria (ACC) using SUVA. (See ACC listed at the end of this job aid.) (Not required at consecutive systems.)	1 (Must be tested by certified lab)	Mo	R or P [1] (Plant sample must be prior to addition of an oxidant)	Same locations as source water or plant TOC.	NA	All "R" and / or "P" SUVA results on SDWA-1 form	Q (Only if monitoring is conducted) Within 10 days after the end of each quarter, but results may be reported each month during the quarter.	**Treatment Technique (46)** See TOC table above. **M/R (27)** See TOC table above.

[1] Since almost all plants provide water at the entry point that contains an oxidant, plant finished water SUVA should be measured in jar test simulations.

Magnesium Hardness (as $CaC0_3$) (1918) (Raw Source Water and Plant)

Optional monitoring to meet alternative compliance criteria when practicing enhanced softening

PWSs Required To Monitor	# Samples	Freq	Sample Type	Sample Location Specifics	Altered Monitoring	Report	State Reporting Frequency	It is a violation if:
Surface water CWSs & NTNCWSs with conventional filtration and enhanced softening and wishing to meet alternative compliance criteria (ACC) by reducing magnesium hardness. (See ACC listed at the end of this job aid.) (Not required at consecutive systems.)	1	Mo	R and P (Plant sample must be prior to addition of an oxidant)	Same locations as source water and plant TOC.	NA	All "R" and "P" magnesium hardness results (as $CaC0_3$) on SDWA-1 form	Q (Only if monitoring is conducted) Within 10 days after the end of each quarter, but results may be reported each month during the quarter.	**Treatment Technique (46)** See TOC table above. **M/R (27)** See TOC table above.

Alternative Compliance Criteria (ACC) for Enhanced Coagulation and Enhanced Softening Systems

SW CWSs & NTNCWSs that have conventional filtration may use any of the following alternative compliance criteria to comply with the treatment technique for control of DBP precursors:

(1) If the source water TOC is less than 2.0 mg/L (based on a running annual average).

OR

(2) If the treated water TOC is less than 2.0 mg/L (based on a running annual average).

OR

(3) If the following three running annual averages are met: source water TOC is less than 4.0 mg/L, the source alkalinity is greater than 60 mg/L (as $CaC0_3$), and the distribution system TTHM levels are 0.040 mg/L or less AND HAA5 levels are 0.030 mg/L or less. If the system meets these TOC and alkalinity levels but *not* the TTHM and HAA5 levels, they may choose to do the following:

- Make a clear and irrevocable financial commitment to use technologies that limit TTHM to 0.040 mg/L or less and HAA5 0.030 mg/L or less.
- Make this financial commitment on or before the applicable compliance date.
- Ensure the technologies are operational no later June 30, 2005.

OR

(4) If the TTHM levels are 0.040 mg/L or less AND HAA5 levels are 0.030 mg/L or less (as running annual averages) and the system uses only chlorine for primary and residual disinfection.

OR

(5) If the source water SUVA values are 2.0 L/mg-m or less (as a running annual average).

OR

(6) If the finished water SUVA values are 2.0 L/mg-m or less (as a running annual average).

SW CWSs & NTNCWSs that have conventional filtration and that practice enhanced softening [1] may use the any of the following alternative compliance criteria to comply with the treatment technique for control of DBP precursors:

(1) Softening that results in lowering the treated water alkalinity to less than 60 mg/L (as $CaC0_3$), measured monthly and calculated quarterly as a running annual average.

OR

(2) Softening that results in removing at least 10 mg/L of magnesium hardness (as $CaC0_3$), measured monthly and calculated quarterly as an annual running average.

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

Bottled, Vended, Retail, and Bulk System (BVRB) DBPR M/R Requirements by Type of Disinfectant Treatment Used

● = Required to monitor and report

Blank = Not required to monitor and report

Disinfectant / DBPR Parameter	Chlorine	Chloramines	Chlorine Dioxide	Ozone
TTHM / HAA5	●	●	●	● [1]
Residual Chlorine	●			
Residual Chloramines		●		
Chlorine Dioxide			●	
Chlorite			●	
Bromate				●

[1] Applies only to vended, retail, and bulk systems. Bottled water systems using only ozone are not required to monitor for TTHM / HAA5.

Note 1: The following BVRB systems are exempt from all DBPR monitoring and reporting requirements:

1. Vended systems permitted by rule (PBR). The conditions for PBR are:
   - Source is a CWS.
   - Vending machines are NAMA approved.
   - All machines are located within the same DEP Region.
2. BVRB systems using no chemical disinfectant or oxidant (e.g., using only ultraviolet light (UV)).

Note 2: Clarification of requirements for BVRBs that purchase finished (chlorinated) water from another public water system:

- The buying BVRB only has to monitor for TTHM/HAA5.
- If the buying BVRB treats with chlorine dioxide, they must also monitor for chlorine dioxide and chlorite.
- If the buying BVRB treats with ozone, they must also monitor for bromate.