

The EPA Administrator, Gina McCarthy signed the following proposed rule on November 30, 2015, and EPA is submitting it for publication in the Federal Register (FR). While we have taken steps to ensure the accuracy of this Internet version of the rule, it is not the official version of the rule for purposes of public comment. Please refer to the official version in a forthcoming FR publication, which will appear on the Government Printing Office's FDsys website (<http://fdsys.gpo.gov/fdsys/search/home.action>) and on Regulations.gov (<http://www.regulations.gov>) in Docket No. EPA-HQ-OW-2015-0218. Once the official version of this document is published in the FR, this version will be removed from the Internet and replaced with a link to the official version.

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6560-50-P

## **ENVIRONMENTAL PROTECTION AGENCY**

### **40 CFR Part 141**

**[EPA-HQ-OW-2015-0218; FRL-9935-74-OW]**

### **RIN 2040-AF10**

## **Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 4) for Public Water Systems and Announcement of a Public Meeting**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Proposed rule and notice of public meeting.

**SUMMARY:** The U.S. Environmental Protection Agency (EPA) is proposing a Safe Drinking Water Act (SDWA) rule that requires public water systems to collect occurrence data for contaminants that may be present in tap water but are not yet subject to EPA's drinking water standards set under SDWA. This rule, revised every five years as required by SDWA, benefits public health by providing EPA and other interested parties with scientifically valid data on the national occurrence of selected contaminants in drinking water, such as cyanotoxins associated with harmful algal blooms. This data set is one of the primary sources of information on occurrence, levels of exposure and population exposure the Agency uses to develop regulatory decisions for emerging contaminants in the public drinking water supply. This proposal identifies eleven analytical methods to support water system monitoring for a total of 30 chemical contaminants/groups, consisting of ten cyanotoxins/groups; two metals; eight pesticides plus one pesticide manufacturing byproduct (hereinafter collectively referred to as "pesticides"); three brominated haloacetic acid groups of disinfection byproducts; three alcohols; and three

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semivolatile organic chemicals. EPA is also announcing a public webinar to discuss this proposal of the fourth Unregulated Contaminant Monitoring Rule.

**DATES:** Comments must be received on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Under the Paperwork Reduction Act (PRA), comments on the information collection provisions are best assured of consideration if the Office of Management and Budget (OMB) receives a copy of your comments on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The public webinar will be held on January 13, 2016, from 1:00 p.m. to 4:30 p.m., eastern time. Persons wishing to participate in the webinar must register by January 10, 2016, as described in section II.M.

**ADDRESSES:** Submit your comments, identified by Docket ID No. **EPA-HQ-OW-2015-0218**, at <http://www.regulations.gov>. Follow the online instructions for submitting comments. Once submitted, comments cannot be edited or removed from Regulations.gov. The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (i.e. on the web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit <http://www2.epa.gov/dockets/commenting-epa-dockets>.

**FOR FURTHER INFORMATION CONTACT:** Brenda D. Parris, Standards and Risk

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Management Division (SRMD), Office of Ground Water and Drinking Water (OGWDW) (MS 140), Environmental Protection Agency, 26 West Martin Luther King Drive, Cincinnati, OH 45268; telephone number: (513) 569-7961; or email address: [parris.brenda@epa.gov](mailto:parris.brenda@epa.gov); or Melissa Simic, SRMD, OGWDW (MS 140), Environmental Protection Agency, 26 West Martin Luther King Drive, Cincinnati, Ohio 45268; telephone number: (513) 569-7864; or email address: [simic.melissa@epa.gov](mailto:simic.melissa@epa.gov). For general information, contact the Safe Drinking Water Hotline.

Callers within the United States can reach the Hotline at (800) 426-4791. The Hotline is open Monday through Friday, excluding federal holidays, from 10:00 a.m. to 4:00 p.m., eastern time.

The Safe Drinking Water Hotline can also be found on the Internet at:

<http://water.epa.gov/drink/hotline/>.

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µg/L	Microgram per liter
ADDA	(2 <i>S</i> , 3 <i>S</i> , 8 <i>S</i> , 9 <i>S</i> , 4 <i>E</i> , 6 <i>E</i> )-3-amino-9-methoxy-2,6,8-trimethyl-10-phenyl-4, 6-decadienoic acid
ASDWA	Association of State Drinking Water Administrators
ASTM	ASTM International
CAS	Chemical Abstract Service
CBI	Confidential Business Information
CCC	Continuing Calibration Check
CCL	Contaminant Candidate List
CFR	Code of Federal Regulations
CLDA	Chlorine Dioxide Applied After SR Sample Location
CLDB	Chlorine Dioxide Applied Before SR Sample Location
CWS	Community Water System
DBPR	Disinfectants and Disinfection Byproducts Rule
DSMRT	Distribution System Maximum Residence Time
ELISA	Enzyme-linked Immunosorbent Assay
EPA	United States Environmental Protection Agency

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EPTDS	Entry Point to the Distribution System
FR	Federal Register
GC	Gas Chromatography
GC/ECD	Gas Chromatography/Electron Capture Detection
GC/MS	Gas Chromatography/Mass Spectrometry
GW	Ground Water
GWUDI	Ground Water Under the Direct Influence of Surface Water
HAAs	Haloacetic Acids
HAA5	Dibromoacetic Acid, Dichloroacetic Acid, Monobromoacetic Acid, Monochloroacetic Acid, Trichloroacetic Acid
HAA6Br	Bromochloroacetic Acid, Bromodichloroacetic Acid, Dibromoacetic Acid, Dibromochloroacetic Acid, Monobromoacetic Acid, Tribromoacetic Acid
HAA9	Bromochloroacetic Acid, Bromodichloroacetic Acid, Chlorodibromoacetic Acid, Dibromoacetic Acid, Dichloroacetic Acid, Monobromoacetic Acid, Monochloroacetic Acid, Tribromoacetic Acid, Trichloroacetic Acid
HPXA	Hydrogen Peroxide Applied After Source Water Sample Location
HPXB	Hydrogen Peroxide Applied Before Source Water Sample Location
IC-MS/MS	Ion Chromatography/Tandem Mass Spectrometry
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
ICR	Information Collection Request

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IDC	Initial Demonstration of Capability
IS	Internal Standard
LFB	Laboratory Fortified Blank
LRB	Laboratory Reagent Blank
LCMRL	Lowest Concentration Minimum Reporting Level
LC/ECI-MS/MS	Liquid Chromatography/Electrospray Ionization/Tandem Mass Spectrometry
LC/MS/MS	Liquid Chromatography/Tandem Mass Spectrometry
LT2	Long Term 2 Enhanced Surface Water Treatment Rule
M	Million
MRL	Minimum Reporting Level
NAICS	North American Industry Classification System
NCOD	National Drinking Water Contaminant Occurrence Database
NPDWRs	National Primary Drinking Water Regulations
NTNCWS	Non-transient Non-community Water System
OGWDW	Office of Ground Water and Drinking Water
OMB	Office of Management and Budget
PA	Partnership Agreement
PEMA	Permanganate Applied After Source Water Sample Location
PEMB	Permanganate Applied Before Source Water Sample Location
PRA	Paperwork Reduction Act
PT	Proficiency Testing
PWS	Public Water System

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QCS	Quality Control Sample
QH	Quality HAA Sample
RFA	Regulatory Flexibility Act
SDWA	Safe Drinking Water Act
SDWARS	Safe Drinking Water Accession and Review System
SDWIS/Fed	Federal Safe Drinking Water Information System
SM	Standard Methods
SMP	State Monitoring Plan
SOP	Standard Operating Procedure
SPE	Solid Phase Extraction
SR	Source Water
SRF	Drinking Water State Revolving Fund
SRMD	Standards and Risk Management Division
SUR	Surrogate Standard
SVOCs	Semivolatile Organic Chemicals
SW	Surface Water
TNCWS	Transient Non-community Water System
TOC	Total Organic Carbon
UCMR	Unregulated Contaminant Monitoring Rule
UMRA	Unfunded Mandates Reform Act of 1995
USEPA	United States Environmental Protection Agency

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## **I. General Information**

### *A. Does this action apply to me?*

Public water systems (PWSs) would be regulated by this proposed, fourth Unregulated Contaminant Monitoring Rule (UCMR 4). PWSs are systems that provide water for human consumption through pipes, or other constructed conveyances, to at least 15 service connections or that regularly serve an average of at least 25 individuals daily at least 60 days out of the year. Under this proposal, all large community and non-transient non-community water systems (NTNCWSs) serving more than 10,000 people would be required to monitor. A community water system (CWS) means a PWS that has at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. A NTNCWS means a PWS that is not a CWS and that regularly serves at least 25 of the same people over six months per year. A nationally representative sample of CWSs and NTNCWSs serving 10,000 or fewer people would also be required to monitor (see “Statistical Design and Sample Selection for the Unregulated Contaminant Monitoring Regulation” (USEPA, 2001b) for a description of the statistical approach for the nationally representative sample). As is generally the case for UCMR monitoring, transient non-community water systems (TNCWSs) (i.e., non-community water systems that do not regularly serve at least 25 of the same people over six months per year) would not be required to monitor under UCMR 4. States, territories and tribes, with primary enforcement responsibility (primacy) to administer the regulatory program for PWSs under SDWA, can participate in the implementation of UCMR 4 through Partnership Agreements (PAs) (see discussion of PAs in section II.K). Primacy agencies with PAs can choose to be involved in various aspects of the UCMR 4 monitoring for PWSs they oversee; however, the

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PWS remains responsible for compliance. Potentially regulated categories and entities are identified in the following table.

Category	Examples of potentially regulated entities	NAICS <sup>a</sup>
State, local, & tribal governments	States, local and tribal governments that analyze water samples on behalf of PWSs required to conduct such analysis; states, local and tribal governments that directly operate CWSs and NTNCWSs required to monitor.	924110
Industry	Private operators of CWSs and NTNCWSs required to monitor.	221310
Municipalities	Municipal operators of CWSs and NTNCWSs required to monitor.	924110

<sup>a</sup> NAICS = North American Industry Classification System

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table summarizes the types of entities that EPA is aware could potentially be regulated by this action. If you are uncertain whether your entity is regulated by this action after carefully examining the definition of PWS found in §§141.2 and 141.3, and the applicability criteria found in §141.40(a)(1) and (2) of Title 40 in the Code of Federal Regulations (CFR), please consult the contacts listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

*B. What action is the Agency taking and why?*

EPA is proposing a rule to require PWSs to analyze drinking water samples for unregulated contaminants that do not have health based standards set under SDWA and to report their results to EPA. This will be the fourth national monitoring effort under the UCMR program (see section II.D). The monitoring provides data to inform future regulatory actions to protect public health.

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The public will benefit from information about whether or not unregulated contaminants are present in their drinking water. If contaminants are not found, consumer confidence in their drinking water will improve. If contaminants are found, illnesses may be avoided when subsequent actions, such as regulations, reduce or eliminate those contaminants.

*C. What is the Agency's authority for taking this action?*

As part of its responsibilities under SDWA, EPA implements section 1445(a)(2), Monitoring Program for Unregulated Contaminants. This section, as amended in 1996, requires that once every five years, beginning in August 1999, EPA issue a list of no more than 30 unregulated contaminants to be monitored by PWSs. SDWA requires that EPA enter the monitoring data into the Agency's publically available National Contaminant Occurrence Database (NCOD). EPA's UCMR program must ensure that systems serving a population larger than 10,000 people, as well as a nationally representative sample of PWSs serving 10,000 or fewer people, are required to monitor. EPA must vary the frequency and schedule for monitoring based on the number of persons served, the source of supply and the contaminants likely to be found. EPA is using this authority as the basis for monitoring 29 of the 30 contaminants/groups proposed under this rule.

Section 1445(a)(1)(A) of SDWA, as amended in 1996, requires that every person who is subject to any SDWA requirement establish and maintain such records, make such reports, conduct such monitoring and provide such information as the Administrator may reasonably require by regulation to assist the Administrator in establishing SDWA regulations. Pursuant to this provision, EPA can also require the monitoring of contaminants already subject to EPA's drinking water standards. EPA is using this authority as the basis for monitoring one of the chemical groups (Haloacetic Acids 5 (HAA5)) proposed under this rule. Sample collection and

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analysis for HAA5 can be done concurrent with the unregulated HAA monitoring described in section II.F (resulting in no substantive additional burden) and would allow EPA to better understand co-occurrence between regulated and unregulated disinfection byproducts.

Hereinafter, all 30 proposed contaminants/groups are collectively referred to as “contaminants.”

*D. What is the estimated cost of this proposed action?*

EPA estimates the total average national cost of this proposed action will be \$25.3 million per year from 2017-2021. EPA has documented the assumptions and data sources used in the preparation of this estimate in the Information Collection Request (ICR) (USEPA, 2015a). EPA proposes using eleven analytical methods (eight EPA-developed analytical methods, one state-developed methodology and two alternate equivalent consensus organization-developed methods) to analyze samples for 30 UCMR 4 chemical contaminants. EPA's estimate of the analytical cost for the UCMR 4 contaminants and related indicators is \$2,562 per sample set. EPA calculated these costs by summing the laboratory unit cost of each method. Exhibit 1 presents a breakdown of EPA estimated annual average national costs. Estimated PWS (i.e., large and very large) and EPA costs reflect the analytical cost (i.e., non-labor) for all UCMR 4 methods. EPA pays for the analytical costs for all systems serving a population of 10,000 or fewer people. Laboratory analysis and sample shipping account for approximately 80% of the total national cost for UCMR 4 implementation. EPA estimated laboratory unit costs based on consultations with multiple commercial drinking water laboratories and, in the case of new methods, a review of the costs of analytical methods similar to those proposed in this action. The cost of the laboratory methods includes shipping as part of the cost for the analysis.

EPA expects that states would incur labor costs associated with voluntary assistance with

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UCMR 4 implementation. EPA estimated state costs using the relevant assumptions from the State Resource Model that was developed by the Association of State Drinking Water Administrators (ASDWA) (ASDWA, 2013) to help states forecast resource needs. Model estimates were adjusted to account for actual levels of state participation under UCMR 3. State participation is voluntary; thus, the level of effort is expected to vary among states and would depend on their individual agreements with EPA.

EPA assumes that one-third of the systems would monitor during each of the three monitoring years from January 2018 through December 2020. The total estimated annual costs (labor and non-labor) would be incurred as follows:

**Exhibit 1: Estimated Average Annual Costs of UCMR 4**

<b>Respondent</b>	<b>Avg. Annual Cost All Respondents (2017-2021)<sup>1</sup></b>
Small Systems (25-10,000), including labor <sup>2</sup> only (non-labor costs <sup>3</sup> paid for by EPA)	\$0.16 m
Large Systems (10,001-100,000), including labor and non-labor costs	\$15.7 m
Very Large Systems (100,001 and greater), including labor and non-labor costs	\$4.3 m
States, including labor costs related to implementation coordination	\$0.50 m
EPA, including labor for implementation, non-labor for small system testing	\$4.7 m
<b>AVERAGE ANNUAL NATIONAL TOTAL</b>	<b>\$25.3 m</b>

<sup>1</sup> Totals may not equal the sum of components due to rounding.

<sup>2</sup> Labor costs pertain to systems, states and EPA. Costs include activities such as reading the rule, notifying systems selected to participate, sample collection, data review, reporting and record keeping.

<sup>3</sup> Non-labor costs would be incurred primarily by EPA and by very large and large PWSs. They include the cost of shipping samples to laboratories for testing and the cost of the laboratory analyses.

Additional details regarding EPA's cost assumptions and estimates can be found in the "DRAFT Information Collection Request for the Unregulated Contaminant Monitoring Rule (UCMR 4)" (USEPA, 2015a) ICR Number 2192.07, which presents estimated cost and burden for the 2017-2019 period, consistent with the 3-year time frame for ICRs. Estimates of costs over the entire 5-year UCMR 4 sequence of 2017-2021 are attached as an appendix to the ICR.

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Copies of the ICR and its appendix may be obtained from the EPA public docket for this proposed rule, under Docket ID No. EPA-HQ-OW-2015-0218.

## **II. Background**

### *A. How Has EPA Implemented the Unregulated Contaminant Monitoring Program?*

EPA published the list of contaminants for the first UCMR (UCMR 1) in the Federal Register (FR) on September 17, 1999 (64 FR 50556, (USEPA, 1999)), the second UCMR (UCMR 2) on January 4, 2007 (72 FR 368, (USEPA, 2007)) and the third UCMR (UCMR 3) on May 2, 2012 (77 FR 26072, (USEPA, 2012c)). EPA established a three-tiered approach for monitoring contaminants under the UCMR program that takes into account the availability of analytical methods, the source of water supply and the contaminants likely to be found. Assessment Monitoring for “List 1” contaminants typically relies on analytical methods, techniques or technologies that are in common use by drinking water laboratories. Screening Survey monitoring for “List 2” contaminants typically relies on newer analytical methods that are not as commonly used, such that laboratory capacity to perform List 2 analyses may be limited. Finally, Pre-Screen Testing for “List 3” contaminants is often associated with analytical methods that are very recently developed and/or are particularly complex. In addition to method complexity and laboratory capacity, EPA considers sampling frequency and/or the relevant universe of PWSs when deciding which of the three tiers is appropriate for a contaminant.

EPA designed the Assessment Monitoring sampling approach (USEPA, 2001b) to ensure that sample results would yield a high level of confidence and a low margin of error. The design for a nationally representative sample of small systems called for the sample to be stratified by water source type (ground water (GW) or surface water (SW)), service size category and state (where each state is allocated a minimum of two systems in its state monitoring plan (SMP)).

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This action proposes 30 contaminants for List 1, Assessment Monitoring from 2018-2020, with pre-monitoring activity in 2017 and post-monitoring activity in 2021. EPA developed this proposal after considering input from an EPA-state workgroup as well as other stakeholders.

*B. How are the Contaminant Candidate List (CCL), the UCMR program, the Regulatory Determination process and the NCOD interrelated?*

Under the 1996 amendments to SDWA, Congress established a stepwise, risk-based approach for determining which contaminants would become subject to drinking water standards. Under the first step, EPA is required to publish, every five years, a list of contaminants that are not yet regulated but which are known or anticipated to occur in PWSs; this is the Contaminant Candidate List (CCL). Under the second step, EPA must require, every five years, monitoring of up to 30 unregulated contaminants to determine their occurrence in drinking water systems; this is the UCMR program. Under the third step, EPA is required to determine, every five years, whether or not at least five contaminants from the CCL warrant regulation, based in part on the UCMR occurrence information; this is known as a Regulatory Determination where the following questions are evaluated:

- (1) Which contaminants may have an adverse effect on human health?
- (2) Which contaminants are known to occur or are likely to occur in drinking water with a frequency and at levels of public health concern?
- (3) Does regulation of such contaminants present a meaningful opportunity for risk reduction? Finally, SDWA requires EPA to issue national primary drinking water regulations (NPDWRs) for contaminants the Agency determines should be regulated.

The CCL process identifies contaminants that may require regulation, while the UCMR

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program helps provide the data necessary for the Regulatory Determination process outlined above. The data collected through the UCMR program are stored in the NCOD to facilitate analysis and review of contaminant occurrence, and support the Administrator's determination on whether regulation of a contaminant is in the public health interest, as required under SDWA section 1412(b)(1). UCMR results can be viewed by the public at: <http://www2.epa.gov/dwucmr>.

*C. What notable changes are being proposed for UCMR 4?*

This proposed action refines the existing UCMR, as reflected in the Code of Federal Regulations, to address the contaminants proposed for UCMR 4 monitoring and to reflect lessons learned through prior experience implementing UCMRs. EPA's proposed approach and rationale for changes are described in the following sections. Key aspects of the UCMR program that would remain the same, and are outside the scope of today's proposal, include direct implementation of the rule by EPA; the number and types of systems included in Assessment Monitoring for the majority of the proposed contaminants; and EPA funding for the small system testing. Proposed changes include the list of UCMR 4 contaminants, the analytical methods, monitoring time frame, sampling locations, the revised data elements outlined in Exhibit 2 and conforming and editorial changes, such as those necessary to remove requirements solely related to UCMR 3. A track-changes version of the rule language comparing UCMR 3 to the proposed changes for UCMR 4 is included in the public docket (Docket ID No. EPA-HQ-OW 2015-0218) for this proposed rule (USEPA, 2015h).

**Exhibit 2: Notable Changes Proposed for UCMR 4**

CFR Rule Section		Description of Rule Change	Corresponding Preamble Section
Number	Title/Description		
(3) §141.40(a)	Analytes to be monitored and related specifications	Revises Table 1 to include a new list of contaminants and associated analytical methods.	II.D

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§§141.35(a) and 141.40(a)	Applicability	<p>Revises the Federal Safe Drinking Water Information System (SDWIS/Fed) applicability date (i.e., the date used to determine which systems are subject to monitoring) to December 31, 2015.</p> <p>Revises the monitoring dates to January 2018 through December 2020.</p>	<p>II.E</p> <p>II.F</p>
(4) §141.40(a)	Sampling design requirements – Frequency	<p>Updates Table 2 to change the sample collection time frame to March – November, and excludes December – February. Additionally, updates the frequency such that, with the exception of cyanotoxins, monitoring would occur every two months (bi-monthly) for SW or ground water under the direct influence of surface water (GWUDI) systems and every six months for GW systems.</p> <p>Updates Table 2 to include monitoring requirements for cyanotoxins for PWSs with SW and GWUDI sources at a frequency of twice a month for four consecutive months (for a total of eight cyanotoxin sampling events).</p>	II.F
(4) §141.40(a)	Sampling design requirements - Location	<p>Specifies revised sampling locations for Assessment Monitoring, including HAA5 Stage 2 compliance and/or distribution system maximum residence time (DSMRT) locations for the brominated haloacetic acids (HAAs), and source water intake locations for total organic carbon (TOC), total microcystins (i.e. the sum of congeners as measured by ADDA-ELISA), pH and temperature.</p>	II.F
§141.35(e)	Reporting requirements - Data elements	<p>Updates, revises, adds and removes data elements to account for the contaminants being proposed, and requires the reporting of quality control data by all laboratories.</p>	II.G.1
(4)(ii)(F) §141.40(a)	Small systems sampling requirements - Duplicate samples	<p>Removes the requirement for small system duplicate quality control samples, although EPA may in the future select a subset of systems to collect duplicate samples if the Agency becomes aware of a need to include this type of quality control.</p>	II.G.2

*D. How did EPA prioritize candidate contaminants and what contaminants are proposed for UCMR 4?*

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In establishing the proposed list of contaminants for UCMR 4, EPA started with a priority set of contaminants from the draft fourth Contaminant Candidate List (CCL 4), which includes 100 chemicals or chemical groups and 12 microbes (80 FR 6076, February 4, 2015 (USEPA, 2015b)). The evaluation and selection process that led to the draft CCL 4 carried forward the final list of CCL 3 contaminants (except for those with regulatory determinations), requested and evaluated contaminant nominations from the public and evaluated any new data from previous negative regulatory determinations for potential inclusion on CCL 4 (77 FR 27057, May 8, 2012 (USEPA, 2012b)).

EPA selected the proposed UCMR 4 contaminants using a stepwise prioritization process. The first step included identifying contaminants that: (1) were not monitored under UCMR 2 or UCMR 3; (2) are anticipated to have significant occurrence nationally; and (3) are expected to have a completed, validated drinking water method in time for rule proposal. This resulted in a set of 45 draft CCL 4 contaminants and another set of related non-CCL analytes with potential health effects of concern that can be measured concurrently using the analytical methods for the CCL contaminants. Including related non-CCL analytes creates a more cost-effective design and reduces the likelihood of needing to include them in a subsequent UCMR.

The next step was to select contaminants associated with one or more of the following considerations: an available health assessment to facilitate regulatory determinations; high public concern; critical health endpoints (e.g., likely or suggestive carcinogen); active use (e.g., pesticides); and an occurrence data gap. This step identified 31 CCL contaminants, and 18 related non-CCL analytes that can be measured using the analytical methods for the CCL contaminants.

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During the final step, EPA considered workgroup and stakeholder input; looked at cost-effectiveness of the method/contaminant groups; considered implementation factors (e.g., laboratory capacity); and further evaluated health, occurrence, and persistence/mobility data to identify a proposed list of 30 UCMR 4 contaminants.

Further information on this prioritization process, as well as contaminant-specific information (source, use, production, release, persistence, mobility, health effects and occurrence), that EPA used to select the proposed analyte list, is contained in "UCMR 4 Candidate Contaminants – Information Compendium" (USEPA, 2015i). Copies of the Compendium may be obtained from the EPA public docket for this proposed rule, under Docket ID No. EPA-HQ-OW-2015-0218.

EPA invites comment on the proposed UCMR 4 contaminants and their associated analytical methods identified in Exhibit 3, as well as any other priority contaminants commenters wish to recommend. In particular, the Agency welcomes comments on the following contaminants that were considered by the workgroup, but not included in the proposed list because they were deemed a lower UCMR 4 priority than the contaminants identified in Exhibit 3: *Legionella pneumophila* and *Mycobacterium avium* (both are part of the draft CCL 4); ammonia (considered as an indicator of distribution system nitrification potential); and the pesticides vinclozolin, hexazinone and disulfoton (additional analytes in EPA Method 525.3). More specific information on why these contaminants were not included on the proposed list can be found in the Information Compendium (USEPA, 2015i) cited above. In your comments, please identify the following: any new contaminant(s) that you think the Agency should include in UCMR 4 monitoring; any contaminant(s) in Exhibit 3 that you think represent a lower priority

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than your new recommendation(s) or that should otherwise be removed from the list; the recommended analytical method(s) for any new contaminant(s) that you propose; and other relevant details (e.g., reporting level, sampling location and sampling frequency). Comments that provide supporting data or rationale are especially helpful to the Agency.

**Exhibit 3: 30 Proposed UCMR 4 Analytes**

<b>List 1 Analytes</b>	
<b>One Cyanotoxin Group using ELISA<sup>1</sup>:</b>	
total microcystins	
<b>Seven Cyanotoxins using EPA Method 544 (SPE LC/MS/MS)<sup>2</sup>:</b>	
microcystin-LA	microcystin-RR
microcystin-LF	microcystin-YR
microcystin-LR	nodularin
microcystin-LY	
<b>Two Cyanotoxins using EPA Method 545 (LC/ECI-MS/MS)<sup>3</sup>:</b>	
anatoxin-a	Cylindrospermopsin
<b>Two Metals using EPA Method 200.8 (ICP-MS)<sup>4</sup> or alternate SM<sup>5</sup> or ASTM<sup>6</sup>:</b>	
germanium	manganese
<b>Nine Pesticides using EPA Method 525.3 (SPE GC/MS)<sup>7</sup>:</b>	
alpha-hexachlorocyclohexane	profenofos
chlorpyrifos	tebuconazole
dimethipin	total permethrin (cis- & trans-)
ethoprop	tribufos
oxyfluorfen	
<b>Three Brominated HAA Groups using EPA Method 552.3 (GC/ECD) or 557 (IC/ECI-MS/MS)<sup>8,9,10</sup>:</b>	
HAA5	HAA9
HAA6Br	
<b>Three Alcohols using EPA Method 541 (GC/MS)<sup>11</sup>:</b>	
1-butanol	2-propen-1-ol
2-methoxyethanol	
<b>Three Semivolatile Organic Chemicals (SVOCs) using EPA Method 530 (GC/MS)<sup>12</sup>:</b>	
butylated hydroxyanisole	quinolone
o-toluidine	

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<sup>1</sup> ELISA Standard Operating Procedure (SOP) (Ohio EPA, 2015). EPA anticipates having an EPA ELISA method available by the publication of the final rule and anticipates that this method will be similar to the Ohio EPA methodology. Monitoring includes measuring for pH using one of the following methods: EPA Method 150.1 and 150.2 (USEPA, 1983a and 1983b), ASTM D1293-12 (ASTM, 2012a), SM 4500-H+ B (SM, 2005c), SM 4500-H+ B-00 (SM Online, 2000a). Monitoring also includes measuring for water temperature using one of the following methods: SM 2550 (SM, 2005a) or SM 2550-10 (SM Online, 2010).

<sup>2</sup> EPA Method 544 (Solid Phase Extraction (SPE) Liquid chromatography/tandem mass spectrometry (LC/MS/MS)) (USEPA, 2015f). This method would only be used if analyses by ELISA (for “total microcystins”) yielded results above reporting limits.

<sup>3</sup> EPA Method 545 (Liquid chromatography/electrospray ionization/tandem mass spectrometry (LC/ESI-MS/MS)) (USEPA, 2015g).

<sup>4</sup> EPA Method 200.8 (Inductively coupled plasma mass spectrometry (ICP-MS)) (USEPA, 1994).

<sup>5</sup> Standard Methods (SM) 3125 (SM, 2005b) or SM 3125-09 (SM Online, 2009).

<sup>6</sup> ASTM International (ASTM) D5673-10 (ASTM, 2010).

<sup>7</sup> EPA Method 525.3 (SPE Gas chromatography/mass spectrometry (GC/MS)) (USEPA, 2012a).

<sup>8</sup> EPA Method 552.3 (GC/Electron capture detection (ECD)) (USEPA, 2003) and EPA Method 557 (Ion chromatography-electrospray ionization-tandem mass spectrometry (IC-ESI-MS/MS)) (USEPA, 2009b). HAA5 includes: dibromoacetic acid, dichloroacetic acid, monobromoacetic acid, monochloroacetic acid, trichloroacetic acid. HAA6Br includes: bromochloroacetic acid, bromodichloroacetic acid, dibromoacetic acid, dibromochloroacetic acid, monobromoacetic acid, tribromoacetic acid. HAA9 includes: bromochloroacetic acid, bromodichloroacetic acid, chlorodibromoacetic acid, dibromoacetic acid, dichloroacetic acid, monobromoacetic acid, monochloroacetic acid, tribromoacetic acid, trichloroacetic acid.

<sup>9</sup> Regulated HAAs (HAA5) are included in the proposed monitoring program to gain a better understanding of co-occurrence with currently unregulated disinfection byproducts.

<sup>10</sup> Brominated HAA monitoring also includes sampling for indicators TOC and bromide using methods approved for compliance monitoring. TOC methods include: SM 5310B, SM 5310C, SM 5310D (SM, 2005d, 2005e, 2005f), or SM 5310B-00, SM 5310C-00, SM 5310D-00 (SM Online, 2000b, 2000c, 2000d), EPA Method 415.3 (Rev. 1.1 or 1.2) (USEPA, 2005, 2009a). Bromide methods include: EPA Methods 300.0 (Rev. 2.1), 300.1 (Rev. 1.0), 317.0 (Rev. 2.0), 326.0 (Rev. 1.0) (USEPA, 1993, 1997, 2001a, 2002) or ASTM D 6581-12 (ASTM, 2012b).

<sup>11</sup> EPA Method 541 (GC/MS) (USEPA, 2015e).

<sup>12</sup> EPA Method 530 (GC/MS) (USEPA, 2015d).

#### *E. What is the proposed applicability date?*

EPA proposes (in §141.40(a)) a new applicability date of December 31, 2015. That is, the determination of whether a PWS is required to monitor under UCMR 4 is based on the type of system (e.g., CWS, NTNCWS, etc.) and its retail population served, as indicated by the SDWIS/Fed inventory on December 31, 2015. If a PWS believes its retail population served in SDWIS/Fed is inaccurate, the system should contact its state to verify its population as of the applicability date and request a correction if necessary. The 5-year UCMR 4 program would take place from January 2017 through December 2021.

#### *F. What are the proposed UCMR 4 sampling design and timeline of activities?*

The proposed rule identifies sampling and analysis for List 1 contaminants within the 2018 to 2020 time frame. Preparations prior to 2018 are expected to include coordination of

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laboratory approval, selection of representative small systems, development of SMPs and establishment of monitoring schedules. EPA anticipates that there is enough laboratory capacity to meet the needs of Assessment Monitoring. Exhibit 4 illustrates the major activities that we expect will take place in preparation for and during the implementation of UCMR 4.

**Exhibit 4: Proposed Timeline of UCMR 4 Activities**

2017	2018	2019	2020	2021
<p><i>After proposed rule publication:</i> EPA laboratory approval program begins</p> <p><i>After final rule publication:</i> EPA/state primacy authorities (1) develop SMPs (including the nationally representative sample); and (2) inform PWSs/ establish monitoring plans</p>	<p style="text-align: center;">← Assessment Monitoring →</p> <p style="text-align: center;">List 1 Contaminants</p> <p style="text-align: center;"><i>All large systems serving more than 10,000 people; 800 small systems serving 10,000 or fewer people for cyanotoxins; 800 small systems serving 10,000 or fewer people for the 20 additional chemicals.</i></p>			<p style="text-align: center;">Complete reporting and analysis of data</p>

To minimize the impact of the rule on small systems (those serving 10,000 or fewer people), EPA pays for the sample kit preparation, sample shipping fees and analysis costs for these systems. In addition, no small system would be required to monitor for both cyanotoxins and the 20 additional UCMR chemicals. Consistent with prior UCMRs, large systems (those serving more than 10,000 people) pay for all costs associated with their monitoring. A summary of the estimated number of systems subject to monitoring is shown in Exhibit 5.

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**Exhibit 5: Systems to Participate in UCMR 4 Monitoring**

System Size (# of people served)	National Sample Assessment Monitoring		Total # of Systems per Size Category
	10 List 1 Cyanotoxins	20 Additional List 1 Chemicals	
<i>Small Systems</i> <sup>1</sup>			
25 – 10,000	800 randomly selected SW or GWUDI systems	800 randomly selected SW, GWUDI and GW systems	1,600
<i>Large Systems</i> <sup>2</sup>			
10,001 and over	All SW or GWUDI systems (1,987)	All SW, GWUDI and GW systems (4,292)	4,292
<b>TOTAL</b>	<b>2,787</b>	<b>5,092</b>	<b>5,892</b>

<sup>1</sup>Total for small systems is additive because these systems would only be selected for one component of UCMR 4 sampling (10 cyanotoxins or 20 additional chemicals). EPA would pay for all analytical costs associated with monitoring at small systems.

<sup>2</sup>Large system counts are approximate. The number of large systems is not additive. All SW and GWUDI systems would monitor for cyanotoxins; those same systems would also monitor for the 20 additional List 1 chemicals, as would the large GW systems.

1. Sampling frequency, timing

The number of samples for SW, GWUDI and GW systems would generally be consistent with those during prior UCMR cycles, with the exceptions noted for the monitoring of cyanotoxins. Water systems would be required to collect samples during the monitoring time frame of March through November (excluding December, January and February). With the exception of cyanotoxin monitoring, sampling would take place every two months for SW and GWUDI systems (a total of four sampling events), and at 6-month intervals for GW systems (a total of two sampling events). For cyanotoxin monitoring, SW and GWUDI systems would collect samples twice a month for four consecutive months (total of eight sampling events). GW systems would be excluded from cyanotoxin monitoring.

The Assessment Monitoring sampling time frame would take place during the compressed period of March through November to better reflect the times of year when

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contaminants are more likely to occur in drinking water. Populations of cyanobacteria generally peak when water temperature is highest (Graham et al., 2008). Seasonality of pesticide occurrence in surface waters has been well documented, and generally relates to the timing of pesticide applications in the watershed, rainfall or irrigation patterns and watershed size (USGS, 2014; Ryberg and Gilliom, 2015). Based on this information, EPA anticipates that sampling in the December through February time period would not accurately reflect occurrence for some of the contaminants, particularly cyanotoxins and pesticides. Industry and laboratory stakeholders have also observed that the traditional UCMR approach has the potential to underestimate exposure for some contaminants because of seasonal occurrence (Roberson and Eaton, 2014). Therefore, EPA is proposing that no sampling take place during those winter months, except for resampling purposes. EPA welcomes comments on this approach.

Large system schedules (year and months of monitoring) would initially be determined by EPA in conjunction with the states (as described in section II.K) and these PWSs would have an opportunity to modify this schedule for planning purposes or other reasons (e.g., to conduct monitoring during the months the system or the state believes are most vulnerable, spread costs over multiple years, a sampling location will be closed during the scheduled month of monitoring, etc.). PWSs would not be permitted to reschedule monitoring specifically to avoid sample collection during a suspected vulnerable period. EPA proposes to schedule and coordinate small system monitoring by working closely with partnering states. SMPs provide an opportunity for states to review and revise the initial sampling schedules that EPA proposes (see discussion of SMPs in section II.K).

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## 2. Sampling locations

Sample collection for the UCMR 4 contaminants would take place at the entry point to the distribution system (EPTDS), with the following exceptions/additions. Sampling for “total microcystins” (i.e., the sum of congeners as measured by ADDA-ELISA) would also take place at the source water intake (concurrent with the collection of cyanotoxin samples at the EPTDS) unless the PWS purchases 100 percent of their water. “Consecutive systems” would only sample for cyanotoxins at their EPTDS. Measurements for temperature and pH would take place at the source water intake (concurrent with total microcystin sampling). HAA sampling would take place in the distribution system. Sampling for TOC and bromide would take place at a single source water intake (concurrent with HAA sampling in the distribution system). The indicator data, along with the disinfectant type and water treatment information, would aid in the understanding of brominated HAA and cyanotoxin occurrence and treatment efficacy.

For purposes of total microcystin sampling, temperature and pH measurement, and TOC and bromide sampling, EPA defines source water under UCMR as untreated water entering the water treatment plant (i.e., at a location prior to any treatment). Systems that are subject to the Long Term 2 Enhanced Surface Water Treatment Rule (LT2) would use their source water sampling site(s) that have been identified under that rule (71 FR 654, January 5, 2006 (USEPA, 2006a)). Systems subject to the Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR) would use their TOC source water sampling site(s) (63 FR 69390, December 16, 1998 (USEPA, 1998c)). TOC source water sampling site(s) were set under Stage 1 DBPR and remain unchanged under Stage 2 DBPR. If a system has two different source water sampling locations for LT2 and Stage 1 DBPR, the system would be permitted to select the sample point that best represents the definition of source water sample location(s) for UCMR.

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EPA proposes that PWSs monitor for HAAs only in the distribution system. If the system's treatment plant/water source is subject to sampling requirements under §141.622 (monitoring requirements for Stage 2 DBPR), the water systems must collect samples for the HAAs at the sampling locations identified under that rule (71 FR 388, January 4, 2006 (USEPA, 2006b)). If a treatment plant/water source is not subject to Stage 2 DBPR monitoring, then the water system must collect HAA distribution system samples at a location that represents the DSMRT. UCMR 4 HAA samples and HAA5 Stage 2 DBPR compliance monitoring samples may be collected by the PWS at the same time. However, in such cases, PWSs would be required to arrange for UCMR 4 HAA samples to be analyzed by a UCMR 4 approved laboratory using EPA Method 552.3 or 557 (compliance methods used for analysis of Stage 2 DBPR samples).

### 3. Phased sample analysis for microcystins

EPA is proposing a phased sample analysis approach for microcystins to reduce analytical costs (i.e., PWSs must collect all required samples for each sampling event but not all samples may need to be analyzed). Two samples would be collected for ADDA ELISA (one source water intake sample and one EPTDS), and one sample would be collected for EPA Method 544 at the EPTDS. Initially, source water intake samples (collected by “non-consecutive” SW and GWUDI PWSs) would be analyzed for total microcystins as defined by an ADDA specific ELISA methodology. ADDA ELISA is a widely used screening assay that allows for the aggregate detection of numerous microcystin congeners; it does not allow for measurement of the individual congeners (USEPA, 2015c; Fischer et al., 2001; McElhiney and Lawton, 2005; Zeck et al., 2001). If the source water intake ELISA result is less than 0.3 micrograms per liter ( $\mu\text{g/L}$ ) (i.e., the reporting limit for total microcystins), then the other collected samples (from the EPTDS) would not be analyzed for that sample event and only the

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source water result would be reported to EPA. If the ELISA result from the source water intake is greater than or equal to 0.3 µg/L, the result would be reported to EPA and the sample from the EPTDS would then also be analyzed for total microcystins by ELISA. ELISA analysis of the EPTDS sample would be the first step for consecutive systems. If the EPTDS ELISA result is less than 0.3 µg/L, then no additional analyses would be required for that particular sample event and the result would be reported to EPA. If the EPTDS ELISA result is greater than or equal to 0.3 µg/L, then that result would be reported to EPA and the other microcystin sample collected at the EPTDS would be analyzed using EPA Method 544 to identify and quantify six particular microcystin congeners and a related toxin, nodularin. Method 544 uses liquid chromatography with tandem mass spectrometry (LC/MS/MS) to quantify and speciate microcystin congeners at low concentrations. Using Method 544 to analyze EPTDS samples that tested positive for microcystins by ELISA is expected to help EPA and the states to establish the degree to which particular congener occurrence compares with total microcystin occurrence as measured by ADDA ELISA (USEPA, 2015c).

This phased sample analysis approach for microcystins has the potential to achieve significant cost savings. A similar approach is not practical for cylindrospermopsin and anatoxin-a samples. Therefore, EPA proposes that cylindrospermopsin and anatoxin-a sampling be conducted simultaneously with the microcystins, twice a month for four consecutive months only at the EPTDS, and that the samples be analyzed using EPA Method 545.

#### 4. Representative sampling

As during past UCMRs and as described in §141.35(c)(3), the proposed rule would allow large GW systems that have multiple EPTDSs, with prior approval, to sample at representative sampling locations rather than at each EPTDS. Representative sampling plans approved under

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prior UCMRs will be recognized as valid for UCMR 4 and these systems must submit a copy of documentation from their state or EPA that approves their alternative sampling plan. Any new GW representative monitoring plans must be submitted to be reviewed by the state or EPA within 120 days from publication of the final rule. Once approved, these representative EPTDS locations, along with previously approved EPTDS locations from prior UCMRs, must be loaded into the Safe Drinking Water Accession and Review System (SDWARS) by December 31, 2017.

## 5. Summary

With the exception of the increased sample frequency, phased sample analysis for microcystins, revised sampling locations and the compressed monitoring schedule, the approach to UCMR 4 Assessment Monitoring remains consistent with that established for UCMR 3.

EPA invites comments regarding the cyanotoxin monitoring approach and the usefulness of collecting temperature and pH data (concurrently with the ELISA sample) at the source water intake, as well as designating source water type (e.g., lakes/reservoirs or flowing streams), as potential indicators of cyanotoxin occurrence. EPA also invites comments on the appropriateness of other potential cyanotoxin indicators, recognizing that the cost of any additional indicator monitoring would need to be weighed with consideration given to the likelihood of any other parameters serving as effective indicators.

Finally, EPA recognizes the trade-off between PWS burden and occurrence-data representativeness, and has attempted to strike a reasonable balance in selecting the affected PWSs and establishing the monitoring frequency. The Agency welcomes comment on this particular point, including input regarding the appropriateness of collecting occurrence data from fewer PWSs. This could include employing the Screening Survey approach used in UCMR 3 or an alternative design. EPA requests that commenters suggesting alternatives describe how their

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proposed approach would be nationally representative of the frequency and level of contaminant occurrence.

*G. What are reporting requirements for UCMR 4?*

1. Data elements

EPA proposes the following changes to the reporting requirements listed in Table 1 of §141.35(e) to account for the UCMR 4 contaminants being proposed and the associated indicators. Additionally, EPA proposes to collect quality control information related to sample analysis. This information would further ensure that methods are followed as written, and would provide continuous quality assurance of data reported. EPA collected this information for small systems in previous UCMRs and found that doing so helps ensure that laboratories consistently follow the methods.

- Add Public Water System Name. New data element to be assigned once by the PWS.
- Add Public Water System Facility Name. New data element to be assigned once by the PWS for every facility identification code.
- Add Public Water System Facility Type. New data element to be assigned once by the PWS for every facility.
- Update Sampling Point Identification Code. Added “source water” as an example of applicable sampling locations.
- Add Sampling Point Name. New data element to be assigned once by the PWS for every sampling point identification code.

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- Update Sample Point Type Code. Add source water (SR) to account for brominated HAA indicators and microcystin monitoring at the intake to the treatment plant.
- Update Disinfectant Type. Adding the following primary disinfectant/oxidation practices: permanganate applied before SR sample location (PEMB) and after (PEMA), hydrogen peroxide applied before SR sample location (HPXB) and after (HPXA), and chlorine dioxide applied before SR sample location (CLDB) and after (CLDA).
- Add Treatment Information. New data element to capture treatment associated with the water being sampled.
- Add Disinfectant Residual Type. New data element to capture disinfectant residual type information associated with the water being sampled.
- Add Extraction Batch Identification Code. New data element to allow evaluation of quality control elements associated with extraction of samples in methods where extraction is required.
- Add Extraction Date. New data element identifying the date of sample extraction.
- Add Analysis Batch Identification Code. New data element to allow evaluation of quality control elements associated with analyzing samples.
- Add Analysis Date. New data element identifying the start date of sample analysis.

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- Update Sample Analysis Type. The following elements are proposed as quality assurance measures:
  - Continuing calibration check (CCC), an element that verifies the accuracy of method calibration;
  - Internal standard (IS), an element that measures the relative response of contaminants;
  - Laboratory fortified blank (LFB), an element that verifies method performance in the absence of a sample matrix;
  - Laboratory reagent blank (LRB), an element that verifies the absence of interferences in the reagents and equipment;
  - Quality control sample (QCS), an element that verifies the accuracy of the calibration standards;
  - Quality HAA (QH), HAA sample collected and submitted for quality control; and,
  - Surrogate standard (SUR), an element that assesses method performance for each extraction.
- Update Analytical Result – Value. Update to “Analytical Result – Measured Value.” The measured value is the analytical result for the contaminant.
- Add Additional Value. This element is used for quality control samples and is the amount of contaminant added to a QCS.

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- Update Sample Event Code. Revise sample event codes to uniquely identify sampling events with specific codes for cyanotoxin and additional chemical monitoring.

## 2. Duplicate samples

Currently, §141.40(a)(4)(ii)(F), requires EPA to randomly select a small percentage of small water systems to collect duplicate water samples for quality control purposes. Based on experience from previous UCMRs, this requirement did not provide significant useful information and EPA proposes to remove the requirement for the collection of duplicate samples from UCMR 4.

### *H. What are Minimum Reporting Levels (MRLs) and how were they determined?*

The analyte minimum reporting level (MRL) is a quantitation level designed to be an estimate of the reporting level that is achievable, with 95% confidence, by a capable analyst/laboratory at least 75% of the time, using the prescribed method. Demonstration of the ability to reliably make quality measurements at or below the MRL is intended to ensure that high quality results are being reported by participating laboratories. MRLs are generally established as low as is reasonable (and are typically lower than the current health reference levels and health advisories), so that the occurrence data reported to EPA will support sound decision making, including those cases where new information might lead to lower health reference levels. EPA established the proposed MRL for each analyte/method by obtaining data from several laboratories performing “lowest concentration minimum reporting level” (LCMRL) studies. For further information on the LCMRL and MRL process, see "Technical Basis for the Lowest Concentration Minimum Reporting Level (LCMRL) Calculator" (USEPA, 2010), available on the Internet at (<http://www2.epa.gov/dwanalyticalmethods/approved-drinking->

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[water-analytical-methods](#)). EPA will consider raising MRLs if the Agency becomes aware of evidence that a proposed MRL is unattainable or impractical.

*I. How do laboratories become approved to conduct UCMR 4 analyses?*

The proposed rule would require EPA approval for all laboratories conducting analyses for UCMR 4. EPA anticipates following the traditional Agency approach to approving UCMR laboratories, which would require laboratories seeking approval to: (1) provide EPA with data that demonstrate a successful completion of an initial demonstration of capability (IDC) as outlined in each method; (2) verify successful performance at or below the MRLs as specified in this action; (3) provide information about laboratory operating procedures; and (4) successfully participate in an EPA proficiency testing (PT) program for the analytes of interest. Audits of laboratories may be conducted by EPA prior to and/or following approval. The "UCMR 4 Laboratory Approval Requirements and Information Document" (USEPA, 2015j) will provide guidance on the EPA laboratory approval program and the specific method acceptance criteria.

EPA may supply analytical reference standards for select analytes to participating/approved laboratories when reliable standards are not readily available through commercial sources.

The structure of the proposed UCMR 4 laboratory approval program is the same as that employed in previous UCMRs, and would provide an assessment of the ability of laboratories to perform analyses using the methods listed in §141.40(a)(3), Table 1. The UCMR 4 laboratory approval process is designed to assess whether laboratories possess the required equipment and can meet laboratory-performance and data-reporting criteria described in this action. Laboratory participation in the UCMR laboratory approval program is voluntary. However, as in previous UCMRs and as proposed for UCMR 4, EPA would require PWSs to exclusively use laboratories

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that have been approved under the program. EPA expects to post a list of approved UCMR 4 laboratories to: <http://www2.epa.gov/dwucmr>. Laboratories are encouraged to apply for UCMR 4 approval as early as possible, as EPA anticipates that large PWSs scheduled for monitoring in the first year will be making arrangements for sample analyses soon after the final rule is published. The anticipated steps and requirements for the laboratory approval process are listed in the following paragraphs, steps 1 through 6.

1. Request to participate

Laboratories interested in the UCMR 4 laboratory approval program would first email EPA at: [UCMR\\_Sampling\\_Coordinator@epa.gov](mailto:UCMR_Sampling_Coordinator@epa.gov) to request registration materials. EPA expects to accept such requests beginning **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. EPA anticipates that the final opportunity for a laboratory to complete and submit the necessary registration information will be 60 days after final rule publication.

2. Registration

Laboratory applicants provide registration information that includes: laboratory name, mailing address, shipping address, contact name, phone number, email address and a list of the UCMR 4 methods for which the laboratory is seeking approval. This registration step provides EPA with the necessary contact information, and ensures that each laboratory receives a customized application package.

3. Application package

Laboratories that wish to participate complete and return a customized application package that includes the following: IDC data, including precision, accuracy and results of MRL studies; information regarding analytical equipment and other materials; proof of current

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drinking water laboratory certification (for select compliance monitoring methods); and example chromatograms for each method under review.

As a condition of receiving and maintaining approval, the laboratory is expected to confirm that it will post UCMR 4 monitoring results and quality control data that meet method criteria (on behalf of its PWS clients) to EPA's UCMR electronic data reporting system, SDWARS.

#### 4. EPA's review of application package

EPA will review the application packages and, if necessary, request follow-up information. Laboratories that successfully complete the application process become eligible to participate in the UCMR 4 PT program.

#### 5. Proficiency testing

A PT sample is a synthetic sample containing a concentration of an analyte or mixture of analytes that is known to EPA, but unknown to the laboratory. To be approved, a laboratory is expected to meet specific acceptance criteria for the analysis of a UCMR 4 PT sample(s) for each analyte in each method, for which the laboratory is seeking approval. EPA intends to offer up to four opportunities for a laboratory to successfully analyze UCMR 4 PT samples. Up to three of these studies will be conducted prior to the publication of the final rule, and at least one study will be conducted after publication of the final rule. This allows laboratories to complete their portion of the laboratory approval process prior to publication of the final rule and receive their approval immediately following the publication of the final rule. A laboratory is expected to pass one of the PT studies for each analytical method for which it is requesting approval, and will not be required to pass a PT study for a method it already passed in a previous UCMR 4 PT study.

EPA does not expect to conduct additional PT studies after the start of system monitoring;

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however, laboratory audits will likely be ongoing throughout UCMR 4 implementation. Initial laboratory approval is expected to be contingent on successful completion of a PT study.

Continued laboratory approval is contingent on successful completion of the audit process and satisfactorily meeting all the other stated conditions.

#### 6. Written EPA approval

After successfully completing the preceding steps 1 through 5, EPA expects to send each laboratory a letter listing the methods for which approval is pending (i.e., pending promulgation of the final rule if the PT studies have been conducted prior to that time), or for which approval is granted (if after promulgation of the final rule). Laboratories receiving pending approval are expected to be granted approval without further action following promulgation of the final rule if no changes have been made to the rule that impact the laboratory approval program. EPA expects to contact the laboratory if changes are made between the proposed and final rules that warrant additional action by the laboratory.

##### *J. What documents are being incorporated by reference?*

The following methods are being incorporated by reference into this section for UCMR 4 monitoring. All approved material except for the Standard Method Online, is available for inspection electronically at <http://www.regulations.gov> (Docket ID No. OW-2015-0218), or from the sources listed for each method. EPA has worked to make these methods and documents reasonably available to interested parties. The versions of the EPA and non-EPA methods that may be used to support monitoring under this rule are as follows:

#### 1. Methods from the U.S. Environmental Protection Agency

The following methods are from the U.S. Environmental Protection Agency, Water Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Avenue, NW, Washington, DC

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20004.

(i) EPA Method 150.1 “pH Electrometric, in Methods for Chemical Analysis of Water and Wastes,” 1983, EPA/600/4-79/020. Available on the Internet at <http://www.nemi.gov>. This is an EPA method for measuring pH in water samples using a meter with a glass electrode and reference electrode or a combination electrode. The proposal includes measurement of pH as a potential indicator for cyanotoxins.

(ii) EPA Method 150.2 “pH, Continuous Monitoring (Electrometric), in Methods for Chemical Analysis of Water and Wastes,” 1983, EPA/600/4-79/020. Available on the Internet at <http://www.nemi.gov>. This is an EPA method for measuring pH of in-line water samples using a continuous flow meter with a glass electrode and reference electrode or a combination electrode.

(iii) EPA Method 200.8 “Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma - Mass Spectrometry,” Revision 5.4, 1994. Available on the Internet at <https://www.nemi.gov>. This is an EPA method for the analysis of elements in water by ICP-MS and is proposed to measure germanium and manganese.

(iv) EPA Method 300.0 “Determination of Inorganic Anions by Ion Chromatography Samples,” Revision 2.1, 1993. Available on the Internet at <http://www.nemi.gov>. This is an EPA method for the analysis of inorganic anions in water samples using ion chromatography (IC) with conductivity detection. The proposal includes measurement of bromide as a potential indicator for HAAs.

(v) EPA Method 300.1 “Determination of Inorganic Anions in Drinking Water by Ion Chromatography,” Revision 1.0, 1997. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>. This is an EPA method for the analysis of inorganic anions in water samples using IC with conductivity

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detection.

(vi) EPA Method 317.0 “Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography with the Addition of a Postcolumn Reagent for Trace Bromate Analysis,” Revision 2.0, 2001, EPA 815-B-01-001. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>. This is an EPA method for the analysis of inorganic anions in water samples using IC with conductivity detection.

(vii) EPA Method 326.0 “Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography Incorporating the Addition of a Suppressor Acidified Postcolumn Reagent for Trace Bromate Analysis,” Revision 1.0, 2002, EPA 815-R-03-007. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>. This is an EPA method for the analysis of inorganic anions in water samples using IC with conductivity detection.

(viii) EPA Method 415.3 “Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water,” Revision 1.1, 2005, EPA/600/R-05/055. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>. This is an EPA method for the analysis of TOC in water samples using a conductivity detector or a nondispersive infrared detector.

(ix) EPA Method 415.3 “Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water,” Revision 1.2, 2009, EPA/600/R-09/122. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>. This is an EPA method for the analysis of TOC in water samples using a

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conductivity detector or a nondispersive infrared detector.

(x) EPA Method 525.3 “Determination of Semivolatile Organic Chemicals in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS),” Version 1.0, February 2012, EPA/600/R-12/010. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>. This is an EPA method for the analysis of semivolatile organic chemicals in drinking water using SPE and GC/MS and is proposed to measure nine pesticides (alpha-hexachlorocyclohexane, chlorpyrifos, dimethipin, ethoprop, oxyfluorfen, profenofos, tebuconazole, total cis- and trans- permethrin, and tribufos).

(xi) EPA Method 530 “Determination of Select Semivolatile Organic Chemicals in Drinking Water by Solid Phase Extraction and Gas Chromatography/Mass Spectrometry (GC/MS),” Version 1.0, January 2015, EPA/600/R-14/442. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>. This is an EPA method for the analysis of semivolatile organic chemicals in drinking water using SPE and GC/MS and is proposed to measure butylated hydroxyanisole, o-toluidine, and quinoline.

(xii) EPA Method 541 “Determination of 1-Butanol, 1,4-Dioxane, 2-Methoxyethanol and 2-Propen-1-ol in Drinking Water by Solid Phase Extraction and Gas Chromatography/Mass Spectrometry,” November 2015, EPA 815-R-15-011. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>. This is an EPA method for the analysis of selected alcohols and 1,4-dioxane in drinking water using SPE and GC/MS and is proposed to measure 1-butanol, 2-methoxyethanol and 2-propen-1-ol.

(xiii) EPA Method 544 “Determination of Microcystins and Nodularin in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry

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(LC/MS/MS),” Version 1.0, February 2015, EPA/600/R-14/474. Available on the Internet at

<http://www2.epa.gov/water-research/epa-drinking-water-research-methods>. This is an EPA method for the analysis of selected cyanotoxins in drinking water using SPE and LC-MS/MS with electrospray ionization (ESI) and is proposed to measure six microcystins (microcystin-LA, microcystin-LF, microcystin-LR, microcystin-LY, microcystin-RR, and microcystin-YR) and nodularin.

(xiv) EPA Method 545 “Determination of Cylindrospermopsin and Anatoxin-a in Drinking Water by Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS),” April 2015, EPA 815-R-15-009. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>. This is an EPA method for the analysis of selected cyanotoxins in drinking water using LC-MS/MS with electrospray ionization (ESI) and is proposed to measure cylindrospermopsin and anatoxin-a.

(xv) EPA Method 552.3 “Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-Liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection,” Revision 1.0, July 2003, EPA 815-B-03-002. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>. This is an EPA method for the analysis of haloacetic acids and dalapon in drinking water using liquid-liquid microextraction, derivatization, and GC with electron capture detection (ECD) and is proposed to measure three HAA groups (HAA5, HAA6Br and HAA9).

(xvi) EPA Method 557 “Determination of Haloacetic Acids, Bromate, and Dalapon in Drinking Water by Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS),” Version 1.0, September 2009, EPA 815-B-09-012. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>. This

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is an EPA method for the analysis of haloacetic acids, bromate, and dalapon in drinking water using IC-MS/MS with electrospray ionization (ESI) and is proposed to measure three HAA groups (HAA5, HAA6Br and HAA9).

## 2. Methods from “ASTM International”

The following methods are from “ASTM International”, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

(i) ASTM D1293-12 “Standard Test Methods for pH of Water.” Available for purchase on the Internet at <http://www.astm.org/Standards/D1293.htm>. This is an ASTM method for measuring pH in water samples using a meter and associated electrodes.

(ii) ASTM D5673-10 “Standard Test Method for Elements in Water by Inductively Coupled Plasma-Mass Spectrometry,” approved August 1, 2010. Available for purchase on the Internet at <http://www.astm.org/Standards/D5673.htm>. This is an ASTM method for the analysis of elements in water by ICP-MS and is proposed to measure germanium and manganese.

(iii) ASTM D6581-12 “Standard Test Methods for Bromate, Bromide, Chlorate, and Chlorite in Drinking Water by Suppressed Ion Chromatography.” Available for purchase on the Internet at <http://www.astm.org/Standards/D6581.htm>. This is an ASTM method for the analysis of inorganic anions in water samples using IC with conductivity detection. The proposal includes measurement of bromide as a potential indicator for HAAs.

## 3. Methods from “Standard Methods for the Examination of Water & Wastewater”

The following methods are from “Standard Methods for the Examination of Water & Wastewater”, 21<sup>st</sup> edition (2005), American Public Health Association, 800 I Street, NW, Washington, DC 20001-3710.

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(i) SM 2550 “Temperature.” This is a Standard Method for temperature measurements using a thermometer (mercury). The proposal includes measurement of temperature as a potential indicator for cyanotoxins.

(ii) SM 3125 “Metals by Inductively Coupled Plasma/Mass Spectrometry.” This is a Standard Method for the analysis of metals and metalloids in water by ICP-MS and is proposed for the analysis of germanium and manganese.

(iii) SM 4500-H+ B “pH Value in Water by Potentiometry Using a Standard Hydrogen Electrode.” This is a Standard Method for measuring pH of water samples using a meter, standard hydrogen electrode, and reference electrode.

(iv) SM 5310B “The Determination of Total Organic Carbon by High-Temperature Combustion Method.” This is a Standard Method for the analysis of TOC in water samples using a conductivity detector or a nondispersive infrared detector.

(v) SM 5310C “Total organic carbon by Persulfate-UV or Heated-Persulfate Oxidation Method.” This is a Standard Method for the analysis of TOC in water samples using conductivity detector or a nondispersive infrared detector.

(vi) SM 5310D “Total organic carbon by Wet-Oxidation Method.” This is a Standard Method for the analysis of TOC in water samples using a conductivity detector or a nondispersive infrared detector.

#### 4. Methods from “Standard Methods Online”

The following methods are from “Standard Methods Online,” available for purchase on the Internet at <http://www.standardmethods.org>.

(i) SM 2550-10 “Temperature.” This is a Standard Method for temperature measurements using a thermometer (fluid filled or electronic).

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(ii) SM 3125-09 “Metals by Inductively Coupled Plasma/Mass Spectrometry (Editorial revisions, 2011).” This is a Standard Method for the analysis of metals and metalloids in water by ICP-MS and is proposed to measure germanium and manganese.

(iii) SM 4500-H+ B-00 “pH Value in Water by Potentiometry Using a Standard Hydrogen Electrode.” This is a Standard Method for measuring pH in water samples using a meter, standard hydrogen electrode, and reference electrode.

(iv) SM 5310B-00 “The Determination of Total Organic Carbon by High-Temperature Combustion Method.” This is a Standard Method for the analysis of TOC in water samples using a conductivity detector or a nondispersive infrared detector.

(v) SM 5310C-00 “Total organic carbon by Persulfate-UV or Heated-Persulfate Oxidation Method.” This is a Standard Method for the analysis of TOC in water samples using a conductivity detector or a nondispersive infrared detector.

(vi) SM 5310D-00 “Total organic carbon by Wet-Oxidation Method.” This is a Standard Method for the analysis of TOC in water samples using a conductivity detector or a nondispersive infrared detector.

#### 5. Method from “Ohio EPA”

The following methodology is from Ohio EPA, Columbus, OH.

(i) ELISA SOP “Ohio EPA Total (Extracellular and Intracellular) Microcystins - ADDA by ELISA Analytical Methodology,” Version 2.0. January 2015, available on the Internet at [http://www.epa.ohio.gov/Portals/28/documents/habs/HAB\\_Analytical\\_Methodology.pdf](http://www.epa.ohio.gov/Portals/28/documents/habs/HAB_Analytical_Methodology.pdf). This is an Ohio EPA method for the analysis of cyanotoxins (microcystins and nodularin) in drinking water using an ELISA technique. The proposal includes measurement of “total microcystins” using this technique.

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*K. What is the states' role in the UCMR program?*

UCMR is a direct implementation rule (i.e., EPA has primary responsibility for its implementation) and state participation is voluntary. Under previous UCMRs, specific activities that individual states, tribes and territories agreed to carry out or assist with were identified and established exclusively through Partnership Agreements (PAs). Through PAs, states, tribes and territories can help EPA implement the UCMR program and help ensure that the UCMR data are of the highest quality possible to best support Agency decision making. Under UCMR 4, EPA expects to continue to use the PA process to determine and document the following: the process for review and revision of the SMPs; replacing and updating system information; review and approval of proposed ground water representative monitoring plans; notification and instructions for systems; and compliance assistance. EPA recognizes that states/primacy agencies often have the best information about PWSs in their state and encourages states to partner.

SMPs include tabular listings of the systems that EPA selected and the proposed schedule for their monitoring. Initial SMPs also typically include instructions to states for revising and/or correcting system information in the SMPs, including modifying the sampling schedules for small systems. EPA expects to incorporate revisions from states, resolve any outstanding questions and return the final SMPs to each state.

*L. What stakeholder meetings have been held in preparation for UCMR 4?*

EPA incorporates stakeholder involvement into each UCMR cycle. Specific to the development of UCMR 4, EPA held two public stakeholder meetings and is announcing a third in this proposal (see sections II.L and II.M). EPA held a meeting focused on drinking water methods for CCL contaminants on May 15, 2013, in Cincinnati, Ohio. Participants included representatives of state agencies, laboratories, PWSs, environmental organizations and drinking

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water associations. Meeting topics included an overview of the regulatory process (CCL, UCMR and Regulatory Determination) and drinking water methods under development, primarily for CCL contaminants (see USEPA, 2013 for presentation materials). EPA held a second stakeholder meeting on June 25, 2014, in Washington, DC. Attendees representing state agencies, tribes, laboratories, PWSs, environmental organizations and drinking water associations participated in the meeting via webinar and in person. Meeting topics included a status update on UCMR 3; UCMR 4 potential sampling design changes relative to UCMR 3; UCMR 4 candidate analytes and rationale; and the laboratory approval process (see USEPA, 2014 for meeting materials).

*M. How do I participate in the upcoming stakeholder meeting?*

EPA will hold the third public stakeholder meeting (via webinar) on January 13, 2016. Topics will include the proposed UCMR 4 monitoring requirements, analyte selection and rationale, analytical methods, the laboratory approval process and ground water representative monitoring plans.

1. Webinar participation

Those who wish to participate in the public webinar must register in advance no later than 5:00 p.m., eastern time on January 10, 2016, <https://attendee.gotowebinar.com/register/7326881974233959170>. To ensure adequate time for public statements, individuals or organizations interested in making a statement should identify their interest when they register. We ask that only one person present on behalf of a group or organization, and that the presentation be limited to ten minutes. Any additional statements from attendees will be taken during the webinar if time permits; alternatively, official comments can be submitted to the docket. The number of webinar connections available for the meeting is

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limited and will be available on a first-come, first-served basis. Further details about registration and participation in the webinar can be found on EPA's Unregulated Contaminant Monitoring Program Meetings and Materials Web page at <http://www2.epa.gov/dwucmr/unregulated-contaminant-monitoring-rule-ucmr-meetings-and-materials>.

## 2. Webinar materials

Meeting materials are expected to be sent by email to all registered attendees prior to the public webinar. EPA will post the materials on the Agency's website for persons who are unable to attend the webinar. Please note, these materials could be posted after the webinar.

### *N. How did EPA consider Children's Environmental Health?*

Executive Order 13045 does not apply to UCMR 4, however, EPA's Policy on Evaluating Health Risks to Children is applicable (See III.G. Executive Order 13045). By monitoring for unregulated contaminants that may pose health risks via drinking water, UCMR furthers the protection of public health for all citizens, including children. EPA considered children's health risks during the proposed rule development process for UCMR 4, including the decision-making process for prioritizing candidate contaminants, and included a representative from EPA's Office of Children's Health Protection as a participant on the UCMR 4 workgroup.

The objective of UCMR 4 is to collect nationally representative drinking water data on a set of unregulated contaminants. Wherever feasible, EPA collects occurrence data for contaminants at levels below current "reference concentrations" (e.g., health advisories and health reference levels). By setting reporting levels as low as we reasonably can, the Agency positions itself to better address updated risk information in the future, including that associated with unique risks to children. EPA requests comments regarding any further steps that may be taken to evaluate and address health risks to children within the scope of UCMR 4.

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*O. How did EPA address Environmental Justice?*

EPA did not identify any disproportionately high or adverse human health or environmental effects on minority, low-income or indigenous populations in the process of developing the proposed rule for UCMR 4 (See III.J. Executive Order 12898). By seeking to identify unregulated contaminants that may pose health risks via drinking water from all PWSs, UCMR furthers the protection of public health for all citizens. EPA recognizes that unregulated contaminants in drinking water are of interest to all populations and structured the rulemaking process and implementation of the proposed UCMR 4 rule to allow for meaningful involvement and transparency. EPA organized public meetings/webinars to share information regarding the development of UCMR 4; coordinated with tribal governments; and convened a workgroup with representatives from the EPA Regions, EPA Program Offices, EPA's Office of Research and Development and several states.

EPA proposes to continue to collect U.S. Postal Service Zip Codes for each PWS's service area, as collected under UCMR 3, to support an assessment of whether or not minority, low-income and/or indigenous-population communities are uniquely impacted by particular drinking water contaminants. EPA solicits comment on additional actions the Agency could take to further address environmental justice within the UCMR program. EPA welcomes, for example, comments regarding sampling and/or modeling approaches, and the feasibility and utility of applying these approaches to determine disproportionate impacts.

**III. Statutory and Executive Order Reviews**

- A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review*

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This action is not a significant regulatory action and was therefore not submitted to OMB.

*B. Paperwork Reduction Act (PRA)*

The information collection activities in this proposed rule have been submitted for approval to OMB under the PRA. The ICR document that the EPA prepared has been assigned EPA ICR number 2192.07. You can find a copy of the ICR in the docket for this rule, and it is briefly summarized here.

The information that EPA proposes to collect under this rule fulfills the statutory requirements of section 1445(a)(2) of SDWA, as amended in 1996. The data will describe the source of the water, location and test results for samples taken from PWSs. The information collected will support Agency decisions as to whether or not to regulate particular contaminants under SDWA. Reporting is mandatory. The data are not subject to confidentiality protection.

The annual burden and cost estimates described in this section are based on the implementation assumptions described in section II.F. Respondents to UCMR 4 include 1,600 small PWSs (800 for cyanotoxin monitoring and a different set of 800 for monitoring the additional 20 chemicals), the ~4,292 large PWSs and the 56 states and primacy agencies (~5,948 total respondents). The frequency of response varies across respondents and years. System costs (particularly laboratory analytical costs) vary depending on the number of sampling locations. For cost estimates, EPA assumed that systems would conduct sampling evenly across March 2018 through November 2020, excluding December, January or February of each year, except for resampling purposes (i.e., one-third of the systems in each year of monitoring). Because the applicable ICR period is 2017-2019, one year of monitoring activity (i.e., 2020) is not captured in the ICR estimates; this will be addressed in a subsequent ICR renewal for UCMR 4.

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Small PWSs that are selected for UCMR 4 monitoring would sample an average of 6.7 times per PWS (i.e., number of responses per PWS) across the 3-year ICR period. The average burden per response for small PWSs is estimated to be 2.8 hours. Large PWSs (those serving 10,001 to 100,000 people) and very large PWSs (those serving more than 100,000 people) would sample and report an average of 11.4 and 14.1 times per PWS, respectively, across the 3-year ICR period. The average burden per response for large and very large PWSs is estimated at 6.1 and 9.9 hours, respectively. States are assumed to have an annual average burden of 366.5 hours related to coordination with EPA and PWSs. In aggregate, during the ICR period, the average response (e.g., responses from PWSs and states) is associated with a burden of 6.9 hours, with a labor plus non-labor cost of \$1,705 per response.

The annual average per-respondent burden hours and costs for the ICR period are: small PWSs – 6.2 hours, or \$171, for labor; large PWSs – 23.3 hours, or \$682, for labor, and \$6,047 for analytical costs; very large PWSs – 46.5 hours, or \$1,248, for labor, and \$16,298 for analytical costs; and states – 244.3 hours, or \$11,598, for labor. Annual average burden and cost per respondent (including both systems and states) is estimated to be 23.4 hours, with a labor plus non-labor cost of \$3,470 per respondent. Burden is defined at 5 CFR 1320.3(b).

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's rules in 40 CFR are listed in 40 CFR part 9.

To comment on the Agency's need for this information, accuracy of the burden estimates or to provide suggested methods for minimizing respondent burden, reference the public docket for this rule, which includes the ICR. Submit any comments related to the ICR to EPA and OMB. See the **ADDRESSES** section at the beginning of this notice for where to submit

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comments to EPA and OMB. OMB is required to make a decision concerning the ICR between 30 and 60 days after **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER.]** Comments should be sent to OMB by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER.]** for the comment to be appropriately considered. The final rule will contain responses to any OMB or public comments on the information collection requirements contained in this proposal.

*C. Regulatory Flexibility Act (RFA)*

For purposes of assessing the impacts of this proposed rule on small entities, EPA considered small entities to be PWSs serving 10,000 or fewer people, because this is the system size specified in SDWA as requiring special consideration with respect to small system flexibility. As required by the RFA, EPA proposed using this alternative definition in the FR, (63 FR 7606, February 13, 1998 (USEPA, 1998b)), requested public comment, consulted with the Small Business Administration and finalized the alternative definition in the Consumer Confidence Reports rulemaking, (63 FR 44512, August 19, 1998 (USEPA, 1998a)). As stated in that Final Rule, the alternative definition would be applied to future drinking water rules, including this rule.

The evaluation of the overall impact on small systems, summarized in the preceding discussion, is further described as follows. EPA analyzed the impacts for privately-owned and publicly-owned water systems separately, due to the different economic characteristics of these ownership types, such as different rate structures and profit goals. However, for both publicly- and privately-owned systems, EPA used the "revenue test," which compares annual system costs attributed to the rule to the system's annual revenues. EPA used median revenue data from the 2006 CWS Survey for public and private water systems. The revenue figures were updated to

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2014 dollars, and to account for 3 percent inflation. EPA assumes that the distribution of the sample of participating small systems will reflect the proportions of publicly- and privately-owned systems in the national inventory. The estimated distribution of the representative sample, categorized by ownership type, source water and system size, is presented in Exhibit 6.

**Exhibit 6: Number of Publicly- and Privately-Owned Small Systems Subject to UCMR 4**

<b>System Size (# of people served)</b>	<b>Publicly- Owned</b>	<b>Privately- Owned</b>	<b>Total<sup>1</sup></b>
<i>Ground Water</i>			
500 and under	21	64	85
501 to 3,300	161	62	223
3,301 to 10,000	179	41	220
<i>Subtotal GW</i>	<i>361</i>	<i>167</i>	<i>528</i>
<i>Surface Water (and GWUDI)</i>			
500 and under	18	21	39
501 to 3,300	241	86	327
3,301 to 10,000	548	158	706
<i>Subtotal SW</i>	<i>807</i>	<i>265</i>	<i>1,072</i>
<i>Total of Small Water Systems</i>	<i>1,168</i>	<i>432</i>	<i>1,600</i>

<sup>1</sup> PWS counts were adjusted to display as whole numbers in each size category.

The basis for the proposed UCMR 4 RFA certification is as follows: for the 1,600 small water systems that would be affected, the average annual cost for complying with this rule represents no more than 0.8% of system revenues (the highest estimated percentage is for GW systems serving 500 or fewer people, at 0.8% of its median revenue). Exhibit 7 presents the yearly cost to small systems and to EPA for the small system sampling program, along with an illustration of system participation for each year of UCMR 4.

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**Exhibit 7: Implementation of UCMR 4 at Small Systems**

Cost Description	2017	2018	2019	2020	2021	Total <sup>1</sup>
<i>Costs to EPA for Small System Program (Assessment Monitoring)</i>						
	\$0	\$5,9 71,948	\$5,9 71,948	\$5,9 71,948	\$0	\$17,9 15,845
<i>Costs to Small Systems (Assessment Monitoring)</i>						
	\$0	\$273 ,210	\$273 ,210	\$273 ,210	\$0	\$819, 631
<i>Total Costs to EPA and Small Systems for UCMR 4</i>						
	\$0	\$6,2 45,159	\$6,2 45,159	\$6,2 45,159	\$0	\$18,7 35,476
<i>System Monitoring Activity Timeline<sup>2</sup></i>						
<i>Assessment Monitoring: Cyanotoxins</i>		1/3 PWSs Sample	1/3 PWSs Sample	1/3 PWSs Sample		800
<i>Assessment Monitoring: 20 Additional Chemicals</i>		1/3 PWSs Sample	1/3 PWSs Sample	1/3 PWSs Sample		800

<sup>1</sup> Totals may not equal the sum of components due to rounding.

<sup>2</sup> Total number of systems is 1,600. No small system conducts Assessment Monitoring for both cyanotoxins and the 20 additional chemicals.

PWS costs are attributed to the labor required for reading about UCMR 4 requirements, monitoring, reporting and record keeping. The estimated average annual burden across the 5-year UCMR 4 implementation period of 2017-2021 is 2.8 hours at \$103 per small system. Average annual cost, in all cases, is less than 0.8% of system revenues. By assuming all costs for laboratory analyses, shipping and quality control for small entities, EPA incurs the entirety of the non-labor costs associated with UCMR 4 small system monitoring, or 96% of total small system testing costs. Exhibit 8 and Exhibit 9 present the estimated economic impacts in the form of a revenue test for publicly- and privately-owned systems.

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**Exhibit 8: UCMR 4 Relative Cost Analysis for Small Publicly-Owned Systems (2017-2021)**

System Size (# of people served)	Annual Number of Systems Impacted <sup>1</sup>	Average Annual Hours per System (2017-2021)	Average Annual Cost per System (2017-2021)	Revenue Test <sup>2</sup>
<b>Ground Water Systems</b>				
500 and under	4	1.6	\$59	0.16%
501 to 3,300	32	1.7	\$63	0.04%
3,301 to 10,000	36	1.9	\$67	0.01%
<b>Surface Water (and GWUDI) Systems</b>				
500 and under	4	3.3	\$118	0.17%
501 to 3,300	48	3.3	\$118	0.04%
3,301 to 10,000	109	3.4	\$123	0.01%

<sup>1</sup> PWS counts were adjusted to display as whole numbers in each size category.

<sup>2</sup> The Revenue Test was used to evaluate the economic impact of an information collection on small government entities (e.g., publicly-owned systems); costs are presented as a percentage of median annual revenue in each size category.

**Exhibit 9: UCMR 4 Relative Cost Analysis for Small Privately-Owned Systems (2017-2021)**

System Size (# of people served)	Annual Number of Systems Impacted <sup>1</sup>	Average Annual Hours per System (2017-2021)	Average Annual Cost per System (2017-2021)	Revenue Test <sup>2</sup>
<b>Ground Water Systems</b>				
500 and under	13	1.6	\$59	0.81%
501 to 3,300	12	1.7	\$63	0.05%
3,301 to 10,000	8	1.9	\$67	0.01%
<b>Surface Water (and GWUDI) Systems</b>				

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500 and under	4	3.3	\$118	0.29%
501 to 3,300	17	3.3	\$118	0.04%
3,301 to 10,000	32	3.4	\$123	0.01%

<sup>1</sup>PWS counts were adjusted to display as whole numbers in each size category.

<sup>2</sup>The Revenue Test was used to evaluate the economic impact of an information collection on small government entities (e.g., privately-owned systems); costs are presented as a percentage of median annual revenue in each size category.

The Agency has determined that 1,600 small PWSs (for Assessment Monitoring), or approximately 4.2% of all small systems, would experience an impact of no more than 0.8% of revenues; the remainder of small systems would not be impacted.

Although this proposed rule will not have a significant economic impact on a substantial number of small entities, EPA has attempted to reduce this impact by assuming all costs for analyses of the samples and for shipping the samples from small systems to laboratories contracted by EPA to analyze UCMR 4 samples (the cost of shipping is now included in the cost of each analytical method). EPA has set aside \$2.0 million each year from the Drinking Water State Revolving Fund (SRF) with its authority to use SRF monies for the purposes of implementing this provision of SDWA. Thus, the costs to these small systems will be limited to the labor associated with collecting a sample and preparing it for shipping.

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. In making this determination, the impact of concern is any significant adverse economic impact on small entities. Although EPA has concluded that this action will have no significant net regulatory burden for directly regulated small entities, the Agency continues to be interested in the potential impacts of the proposed rule on small entities and welcomes comments on issues related to such impacts.

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*D. Unfunded Mandates Reform Act (UMRA)*

This action does not contain an annual unfunded mandate of \$100 million or more as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments.

*E. Executive Order 13132: Federalism*

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

Consistent with EPA policy to promote communications between EPA and state and local governments, EPA specifically solicits comment on the proposed rule from state and local officials.

*F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments*

This action will neither impose substantial direct compliance costs on federally recognized tribal governments, nor preempt tribal law. As described previously, this proposed rule requires monitoring by all large PWSs. Information in the SDWIS/Fed water system inventory indicates there are approximately 17 large tribal PWSs (ranging in size from 10,001 to 40,000 customers). EPA estimates the average annual cost to each of these large PWSs, over the 5-year rule period, to be \$4,037. This cost is based on a labor component (associated with the collection of samples), and a non-labor component (associated with shipping and laboratory fees), and represents less than 1.2% of average revenue/sales for large PWSs. UCMR also requires monitoring by a nationally representative sample of small PWSs. EPA estimates that less than 2% of small tribal systems will be selected as a nationally representative sample for Assessment Monitoring. EPA estimates the average annual cost to small tribal systems over the

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5-year rule period to be \$103. Such cost is based on the labor associated with collecting a sample and preparing it for shipping and represents less than 0.8% of average revenue/sales for small PWSs. All other small-PWS expenses (associated with shipping and laboratory fees) are paid by EPA.

EPA consulted with tribal officials under the EPA Policy on Consultation and Coordination with Indian Tribes early in the process of developing this proposed rule to permit them to have meaningful and timely input into its development. A summary of that consultation is provided in the electronic docket listed in the **ADDRESSES** section at the beginning of this notice. EPA specifically solicits additional comment on this proposed rule from tribal officials.

*G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks*

This action is not subject to Executive Order 13045 because it is not economically significant as defined in Executive Order 12866, and because EPA does not think the environmental health or safety risks addressed by this action present a disproportionate risk to children. This action's health and risk assessments are addressed in section II.N of the preamble.

*H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution or Use*

This action is not subject to Executive Order 13211, because it is not a significant regulatory action under Executive Order 12866.

*I. National Technology Transfer and Advancement Act and 1 CFR part 51*

This action involves technical standards. EPA proposes to use methods developed by the Agency, three major voluntary consensus method organizations and the Ohio EPA to support UCMR 4 monitoring. The voluntary consensus method organizations are Standard Methods,

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Association of Analytical Communities International and ASTM International. EPA identified acceptable consensus method organization standards for the analysis of manganese and germanium. Additionally, EPA identified an Ohio EPA method for the analysis of total microcystins using ADDA by ELISA. EPA therefore proposes using a collection of analytical methods published by these parties for the UCMR 4 analytes. In addition, there are several consensus standards that are approved for compliance monitoring that will be available for use in the analysis of TOC and bromide, and for the measurement of temperature and pH. A summary of each method along with how the method specifically applies to UCMR 4 can be found in section II.J of the preamble.

All of these standards are reasonably available for public use. The Agency methods are free for download on EPA's website. The methods in the Standard Method 21<sup>st</sup> edition are consensus standards, available for purchase from the publisher, and are commonly used by the drinking water community. The methods in the Standard Method Online are consensus standards, available for purchase from the publisher's website, and are commonly used by the drinking water community. The methods from ASTM International are consensus standards, are free for download from the publisher's website, and are commonly used by the drinking water community. The Ohio EPA method is free for download on their website and is increasingly being used by the drinking water community.

EPA welcomes comments on this aspect of the proposed rulemaking; the Agency specifically invites the public to identify potentially-applicable voluntary consensus standards and explain why such standards should be used in this rule.

*J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*

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The EPA believes the human health or environmental risk addressed by this action will not have potential disproportionately high and adverse human health or environmental effects on minority, low-income or indigenous populations. The results of this evaluation are contained in section II.O of this preamble and an additional supporting document has been placed in the docket.

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**List of Subjects in 40 CFR Part 141**

Environmental protection, Chemicals, Indian-lands, Intergovernmental relations, Radiation protection, Reporting and recordkeeping requirements, Water supply.

Dated:

Gina McCarthy,  
Administrator.

For the reasons set forth in the preamble, EPA proposes to amend 40 CFR part 141 as follows:

**PART 141 - NATIONAL PRIMARY DRINKING WATER REGULATIONS**

1. The authority citation for part 141 continues to read as follows:

**Authority:** 42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, 300j-9, and 300j-11.

**Subpart D—Reporting and Recordkeeping**

2. In §141.35:

- a. Revise the third sentence in paragraph (b)(1).
- b. Revise the second and third sentences in paragraph (b)(2).

- c. Remove “October 1, 2012,” and add in its place “December 31, 2017,” in paragraph (c)(1).
- d. Revise the second and third sentences in paragraph (c)(2).
- e. Revise the last sentence in paragraph (c)(3)(i).
- f. Revise the fifth sentence in paragraph (c)(3)(ii).
- g. Remove “October 1, 2012,” and add in its place “[**WITHIN 120 DAYS FROM PUBLICATION OF THE FINAL RULE**],” in paragraph (c)(4).
- h. Revise paragraphs (c)(5)(i), (c)(6) introductory text, (d)(2), and (e).

The revisions and additions read as follows:

**§141.35 Reporting for unregulated contaminant monitoring results.**

\* \* \* \* \*

(b) \* \* \*

(1) \* \* \* Information that must be submitted using EPA’s electronic data reporting system must be submitted through: <http://www2.epa.gov/dwucmr>. \* \* \*

(2) \* \* \* If you have received a letter from EPA or your State concerning your required monitoring and your system does not meet the applicability criteria for UCMR established in §141.40(a)(1) or (2), or if a change occurs at your system that may affect your requirements under UCMR as defined in §141.40(a)(3) through (5), you must mail or email a letter to EPA, as specified in paragraph (b)(1) of this section. The letter must be from your PWS Official and must include your PWS Identification (PWSID) Code along with an explanation as to why the UCMR requirements are not applicable to your PWS, or have changed for your PWS, along with the appropriate contact information.\* \* \*

(c) \* \* \*

(2) \* \* \* You must provide your sampling location(s) and associate each source water location with its entry point location(s) by December 31, 2017, using EPA's electronic data reporting system. You must submit, verify or update the following information for each sampling location, or for each approved representative sampling location (as specified in paragraph (c)(3) of this section regarding representative sampling locations): PWSID Code; PWS Name; PWS Facility Identification Code; PWS Facility Name; PWS Facility Type; Water Source Type; Sampling Point Identification Code; Sampling Point Name; and Sampling Point Type Code; (as defined in Table 1 of paragraph (e) of this section). \* \* \*

(3) \* \* \*

(i) \* \* \* You must submit a copy of the existing alternate EPTDS sampling plan or your representative well proposal, as appropriate, [**DATE 120 DAYS AFTER PUBLICATION OF THE FINAL RULE**], as specified in paragraph (b)(1) of this section.

(ii) \* \* \* You must submit the following information for each proposed representative sampling location: PWSID Code; PWS Name; PWS Facility Identification Code; PWS Facility Name; PWS Facility Type; Sampling Point Identification Code; and Sampling Point Name (as defined in Table 1, paragraph (e) of this section). \* \* \*

\* \* \* \* \*

(5) \* \* \*

(i) *General rescheduling notification requirements.* Large systems may change their monitoring schedules up to December 31, 2017, using EPA's electronic data

reporting system, as specified in paragraph (b)(1) of this section. After this date has passed, if your PWS cannot sample according to your assigned sampling schedule (e.g., because of budget constraints, or if a sampling location will be closed during the scheduled month of monitoring), you must mail or email a letter to EPA, as specified in paragraph (b)(1) of this section, prior to the scheduled sampling date. You must include an explanation of why the samples cannot be taken according to the assigned schedule, and you must provide the alternative schedule you are requesting. You must not reschedule monitoring specifically to avoid sample collection during a suspected vulnerable period. You are subject to your assigned UCMR sampling schedule or the schedule that you revised on or before December 31, 2017, unless and until you receive a letter from EPA specifying a new schedule.

\* \* \* \* \*

(6) *Reporting monitoring results.* For UCMR samples, you must report all data elements specified in Table 1 of paragraph (e) of this section, using EPA's electronic data reporting system. You also must report any changes, relative to what is currently posted, made to data elements 1 through 9 to EPA, in writing, explaining the nature and purpose of the proposed change, as specified in paragraph (b)(1) of this section.

\* \* \* \* \*

(d) \* \* \*

(2) *Reporting sampling information.* You must provide your sampling location(s) and associate each source water location with its entry point location(s) by December 31, 2017, using EPA's electronic data reporting system, as specified in paragraph (b)(1) of this section. If this information changes, you must report updates, including new sources

and sampling locations that are put in use before or during the PWS' UCMR sampling period, to EPA's electronic data reporting system within 30 days of the change, as specified in paragraph (b)(1) of this section. You must record all data elements listed in Table 1 of paragraph (e) of this section on each sample form and sample bottle, as appropriate, provided to you by the UCMR Sampling Coordinator. You must send this information as specified in the instructions of your sampling kit, which will include the due date and return address. You must report any changes made in data elements 1 through 9 by mailing or emailing an explanation of the nature and purpose of the proposed change to EPA, as specified in paragraph (b)(1) of this section.

(e) *Data elements.* Table 1 defines the data elements that must be provided for UCMR monitoring.

**TABLE 1—UNREGULATED CONTAMINANT MONITORING REPORTING REQUIREMENTS**

Data element	Definition
1. Public Water System Identification (PWSID) Code	The code used to identify each PWS. The code begins with the standard 2-character postal State abbreviation or Region code; the remaining 7 numbers are unique to each PWS in the State. The same identification code must be used to represent the PWS identification for all current and future UCMR monitoring.
2. Public Water System Name	Unique name, assigned once by the PWS.
3. Public Water System Facility Identification Code	An identification code established by the State or, at the State's discretion, by the PWS, following the format of a 5-digit number unique within each PWS for each applicable facility (i.e., for each source of water, treatment plant, distribution system, or any other facility associated with water treatment or delivery). The same identification code must be used to represent the facility for all current and future UCMR monitoring.
4. Public Water System Facility Name	Unique name, assigned once by the PWS, for every facility ID (e.g., Treatment Plant).
5. Public Water System Facility Type	That code that identifies that type of facility as either: <b>CC</b> = consecutive connection <b>DS</b> = distribution system <b>IN</b> = source water intake <b>SS</b> = sampling station <b>TP</b> = treatment plant <b>OT</b> = other
6. Water Source Type	The type of source water that supplies a water system facility. Systems must

Data element	Definition
	<p>report one of the following codes for each sampling location:</p> <p><b>SW</b> = surface water (to be reported for water facilities that are served all or in part by a surface water source at any time during the twelve-month period).</p> <p><b>GW</b> = ground water (to be reported for water facilities that are served entirely by a ground water source).</p> <p><b>GU</b> = ground water under the direct influence of surface water (to be reported for water facilities that are served all or in part by ground water under the direct influence of surface water at any time during the twelve-month sampling period), and are not served at all by surface water during this period.</p>
7. Sampling Point Identification Code	<p>An identification code established by the State, or at the State's discretion, by the PWS, that uniquely identifies each sampling point. Each sampling code must be unique within each applicable facility, for each applicable sampling location (<i>i.e.</i>, entry point to the distribution system, source water intake or distribution system sample at maximum residence time). The same identification code must be used to represent the sampling location for all current and future UCMR monitoring.</p>
8. Sampling Point Name	<p>Unique sample point name, assigned once by the PWS, for every sample point ID (e.g., Entry Point).</p>
9. Sampling Point Type Code	<p>A code that identifies the location of the sampling point as either:</p> <p><b>SR</b> = source water taken from plant intake; untreated water entering the water treatment plant (<i>i.e.</i>, a location prior to any treatment).</p> <p><b>EP</b> = entry point to the distribution system.</p> <p><b>MR</b> = distribution system sample at maximum residence time.</p>
10. Disinfectant Type	<p>All of the primary disinfectants/oxidants that have been added in the treatment plant to the water being sampled. To be reported by systems for each sampling point.</p> <p><b>PEMB</b> = Permanganate (applied before SR sample location)</p> <p><b>PEMA</b> = Permanganate (applied after SR sample location)</p> <p><b>HPXB</b> = Hydrogen peroxide (applied before SR sample location)</p> <p><b>HPXA</b> = Hydrogen peroxide (applied after SR sample location)</p> <p><b>CLGA</b> = Gaseous chlorine</p> <p><b>CLOF</b> = Offsite Generated Hypochlorite (stored as a liquid form)</p> <p><b>CLON</b> = Onsite Generated Hypochlorite</p> <p><b>CAGC</b> = Chloramine (formed from gaseous chlorine)</p> <p><b>CAOF</b> = Chloramine (formed from offsite hypochlorite)</p> <p><b>CAON</b> = Chloramine (formed from onsite hypochlorite)</p> <p><b>CLDB</b> = Chlorine dioxide (applied before SR sample location)</p> <p><b>CLDA</b> = Chlorine dioxide (applied after SR sample location)</p> <p><b>OZON</b> = Ozone</p> <p><b>ULVL</b> = Ultraviolet light</p> <p><b>OTHD</b> = All other types of disinfectant/oxidant</p> <p><b>NODU</b> = No disinfectant/oxidant used</p>
11. Treatment Information	<p>Treatment information associated with the water being sampled.</p> <p><b>CON</b> = Conventional (non-softening)</p> <p><b>SCO</b> = Softening conventional</p> <p><b>RBF</b> = River bank filtration</p> <p><b>PSD</b> = Pre-sedimentation</p> <p><b>INF</b> = In-line filtration</p> <p><b>DFL</b> = Direct filtration</p> <p><b>PCF</b> = Precoat filtration</p> <p><b>SSF</b> = Slow sand filtration</p> <p><b>BIO</b> = Biological filtration</p> <p><b>REC</b> = Reactor clarification (e.g. solids contact clarification, slurry)</p>

Data element	Definition
	<p>recirculation clarification, Aciflo®)</p> <p><b>SBC</b> = Sludge blanket clarification (e.g. Pulsator®, Super Pulsator®, contact adsorption clarifiers, floc-blanket clarifiers)</p> <p><b>ADC</b> = Adsorption clarification (contact adsorption clarification)</p> <p><b>UTR</b> = Unfiltered treatment</p> <p><b>PAC</b> = Application of powder activated carbon</p> <p><b>GAC</b> = Granular activated carbon (not part of filters in CON, SCO, INF, DFL, or SSF)</p> <p><b>AIR</b> = Air stripping (packed towers, diffused gas contactors)</p> <p><b>POB</b> = Pre-oxidation/disinfection with chlorine (applied before SR sample location)</p> <p><b>POA</b> = Pre-oxidation/disinfection with chlorine (applied after SR sample location)</p> <p><b>MFL</b> = Membrane filtration</p> <p><b>IEX</b> = Ionic exchange</p> <p><b>UVT</b> = Ultraviolet light</p> <p><b>AOX</b> = Advanced oxidation (ultraviolet light with hydrogen peroxide and/or ozone)</p> <p><b>DAF</b> = Dissolved air floatation</p> <p><b>CWL</b> = Clear well/finished water storage without aeration</p> <p><b>CWA</b> = Clear well/finished water storage with aeration</p> <p><b>ADS</b> = Aeration in distribution system (localized treatment)</p> <p><b>OTH</b> = All other types of treatment</p> <p><b>NTU</b> = No treatment used</p>
12. Disinfectant Residual Type	<p>Secondary disinfectant type added in the distribution system for each finished water sample.</p> <p><b>CL2</b> = Chlorine (i.e., originating from addition of free chlorine only)</p> <p><b>CLM</b> = Chloramines (originating from with addition of chlorine and ammonia or pre-formed chloramines)</p> <p><b>CAC</b> = Chlorine and chloramines (if being mixed from chlorinated and chloraminated water)</p> <p><b>NOD</b> = No disinfectant residual</p>
13. Sample Collection Date	The date the sample is collected, reported as 4-digit year, 2-digit month, and 2-digit day (YYYY/MM/DD).
14. Sample Identification Code	An alphanumeric value up to 30 characters assigned by the laboratory to uniquely identify containers, or groups of containers, containing water samples collected at the same sampling location for the same sampling date.
15. Contaminant	The unregulated contaminant for which the sample is being analyzed.
16. Analytical Method Code	The identification code of the analytical method used.
17. Extraction Batch Identification Code	Laboratory assigned extraction batch ID. Must be unique for each extraction batch within the laboratory for each method. For CCC samples report the Analysis Batch Identification Code as the value for this field. For methods without an extraction batch, leave this field null.
18. Extraction Date	Date for the start of the extraction batch (YYYY/MM/DD). For methods without an extraction batch, leave this field null.
19. Analysis Batch Identification Code	Laboratory assigned analysis batch ID. Must be unique for each analysis batch within the laboratory for each method.
20. Analysis Date	Date for the start of the analysis batch (YYYY/MM/DD).

Data element	Definition
21. Sample Analysis Type	<p>The type of sample collected and/or prepared, as well as the fortification level. Permitted values include:</p> <p><b>CF</b> = concentration fortified; the concentration of a known contaminant added to a field sample reported with sample analysis types LFSM, LFSMD, LFB, CCC and QCS.</p> <p><b>CCC</b> = continuing calibration check; a calibration standard containing the contaminant, the internal standard, and surrogate analyzed to verify the existing calibration for those contaminants.</p> <p><b>FS</b> = field sample; sample collected and submitted for analysis under this rule.</p> <p><b>IS</b> = internal standard; a standard that measures the relative response of contaminants.</p> <p><b>LFB</b> = laboratory fortified blank; an aliquot of reagent water fortified with known quantities of the contaminants and all preservation compounds.</p> <p><b>LRB</b> = laboratory reagent blank; an aliquot of reagent water treated exactly as a field sample, including the addition of preservatives, internal standards, and surrogates to determine if interferences are present in the laboratory, reagents, or other equipment.</p> <p><b>LFSM</b> = laboratory fortified sample matrix; a UCMR field sample with a known amount of the contaminant of interest and all preservation compounds added.</p> <p><b>LFSMD</b> = laboratory fortified sample matrix duplicate; duplicate of the laboratory fortified sample matrix.</p> <p><b>QCS</b> = quality control sample; a sample prepared with a source external to the one used for initial calibration and CCC. The QCS is used to check calibration standard integrity.</p> <p><b>QH</b> = quality HAA; HAA sample collected and submitted for quality control purposes.</p> <p><b>SUR</b> = surrogate standard; a standard that assesses method performance for each extraction.</p>
22. Analytical Results—Sign	<p>A value indicating whether the sample analysis result was:</p> <p>(&lt;) “less than” means the contaminant was not detected, or was detected at a level below the Minimum Reporting Level.</p> <p>(=) “equal to” means the contaminant was detected at the level reported in “Analytical Result— Measured Value.”</p>
23. Analytical Result— Measured Value	<p>The actual numeric value of the analytical results for: field samples; laboratory fortified matrix samples; laboratory fortified sample matrix duplicates; and concentration fortified.</p>
24. Additional Value	<p>Represents the true value or the fortified concentration for spiked samples for QC Sample Analysis Types (CCC, EQC, LFB, LFSM and LFSMD). For Sample Analysis Type FS and LRB and for IS and surrogate QC Contaminants, leave this field null.</p>
25. Laboratory Identification Code	<p>The code, assigned by EPA, used to identify each laboratory. The code begins with the standard two-character State postal abbreviation; the remaining five numbers are unique to each laboratory in the State.</p>
26. Sample Event Code	<p>A code assigned by the PWS for each sample event. This will associate samples with the PWS monitoring plan to allow EPA to track compliance and completeness. Systems must assign the following codes:</p> <p><b>SEC1, SEC2, SEC3, SEC4, SEC5, SEC6, SEC7 and SEC8</b> - represent samples collected to meet UCMR Assessment Monitoring requirements for cyanotoxins; where “SEC1” represents the first sampling period, “SEC2” the second period and so forth, for all eight sampling events.</p> <p><b>SEA1, SEA2, SEA3 and SEA4</b> - represent samples collected to meet UCMR</p>

Data element	Definition
	Assessment Monitoring requirements for the additional chemicals; where “SEA1” and “SEA2” represent the first and second sampling period for all water types; and “SEA3” and “SEA4” represent the third and fourth sampling period for SW and GU sources only.

**Subpart E–Special Regulations, Including Monitoring Regulations and Prohibition on Lead Use**

3. In §141.40:

a. Remove “December 31, 2010” and add in its place “December 31, 2015” in the introductory text in paragraph (a).

b. Revise paragraphs (a)(1), (a)(2)(i)(A), (a)(2)(ii)(A), (a)(2)(ii)(C), (a)(3), (a)(4)(i)(B), (a)(4)(i)(C), (a)(4)(ii), (a)(5)(v), the second sentence in paragraph (a)(5)(vi), and (c).

c. Remove “October 1, 2012.” and add in its place “December 31, 2017.” in paragraph (a)(4)(i).

d. Remove and reserve paragraph (a)(4)(ii)(F).

e. Add paragraph (a)(4)(iii).

f. Remove “August 1, 2012.” and add in its place “**[DATE 60 DAYS AFTER PUBLICATION OF THE FINAL RULE]**, and necessary application material **[DATE 120 DAYS AFTER PUBLICATION OF THE FINAL RULE]**.” in paragraph (a)(5)(ii).

The revisions and additions read as follows:

**§141.40 Monitoring requirements for unregulated contaminants.**

\* \* \* \* \*

(1) *Applicability to transient non-community systems.* If you own or operate a transient non-community water system, you are not subject to monitoring requirements in this section.

(2) \* \* \*

(i) \* \* \*

(A) *Assessment monitoring.* You must monitor for the contaminants on List 1, per Table 1, UCMR Contaminant List, in paragraph (a)(3) of this section. If you serve a retail population of more than 10,000 people, you are required to perform this monitoring regardless of whether you have been notified by the State or EPA.

\* \* \* \* \*

(ii) \* \* \*

(A) *Assessment monitoring.* You must monitor for the contaminants on List 1: Assessment Monitoring Cyanotoxin Chemical Contaminants, or List 1: Assessment Monitoring Additional Chemical Contaminants, per Table 1, in paragraph (a)(3) of this section, if you are notified by your State or EPA that you are part of the State Monitoring Plan for Assessment Monitoring.

\* \* \* \* \*

(C) *Pre-screen testing.* You must monitor for the unregulated contaminants on List 3 of Table 1, in paragraph (a)(3) of this section, if you are notified by your State or EPA that you are part of the State Monitoring Plan for Pre-Screen Testing.

(3) *Analytes to be monitored.* Lists 1, 2, and 3 contaminants are provided in the following table:

**TABLE 1—UCMR CONTAMINANT LIST**

1- Contaminant	2-CAS Registry Number	3- Analytical Methods <sup>a</sup>	4- Minimum Reporting Level <sup>b</sup>	5- Sampling Location <sup>c</sup>	6-Period During Which Monitoring to be Completed
<b>List 1: Assessment Monitoring Cyanotoxin Chemical Contaminants<sup>e</sup></b>					
total microcystin	N/A	ELISA	0.3 µg/L	EPTDS and SR	3/1/2018 –11/30/2020
anatoxin-a	6428 5-06-9	545 EPA	0.03 µg/L	EPTDS	3/1/2018 –11/30/2020
cylindrospermopsin	1435 45-90-8	545 EPA	0.09 µg/L	EPTDS	3/1/2018 –11/30/2020
microcystin-LA	9618 0-79-9	544 EPA	0.008 µg/L	EPTDS	3/1/2018 –11/30/2020
microcystin-LF	1540 37-70-4	544 EPA	0.006 µg/L	EPTDS	3/1/2018 –11/30/2020
microcystin-LR	1010 43-37-2	544 EPA	0.02 µg/L	EPTDS	3/1/2018 –11/30/2020
microcystin-LY	1233 04-10-9	544 EPA	0.009 µg/L	EPTDS	3/1/2018 –11/30/2020
microcystin-RR	1117 55-37-4	544 EPA	0.006 µg/L	EPTDS	3/1/2018 –11/30/2020
microcystin-YR	1010 64-48-6	544 EPA	0.02 µg/L	EPTDS	3/1/2018 –11/30/2020
nodularin	1183 99-22-7	544 EPA	0.005 µg/L	EPTDS	3/1/2018 –11/30/2020
<b>List 1: Assessment Monitoring Additional Chemical Contaminants</b>					
<b>Metals</b>					
germanium	7440- 56-4	200.8, EPA AST M D5673-10, SM 3125	0.3 µg/L	EPTDS	3/1/2018 –11/30/2020
manganese	7439- 96-5	200.8, EPA AST M D5673-10, SM 3125	0.4 µg/L	EPTDS	3/1/2018 –11/30/2020

1- Contaminant	2-CAS Registry Number	3- Analytical Methods <sup>a</sup>	4- Minimum Reporting Level <sup>b</sup>	5- Sampling Location <sup>c</sup>	6-Period During Which Monitoring to be Completed
<b>Pesticides and a Pesticide Manufacturing Byproduct</b>					
alpha-hexachlorocyclohexane	319-84-6	EPA 525.3	0.01 µg/L	EPTDS	3/1/2018 –11/30/2020
chlorpyrifos	2921-88-2	EPA 525.3	0.03 µg/L	EPTDS	3/1/2018 –11/30/2020
dimethipin	5529 0-64-7	EPA 525.3	0.2 µg/L	EPTDS	3/1/2018 –11/30/2020
ethoprop	1319 4-48-4	EPA 525.3	0.03 µg/L	EPTDS	3/1/2018 –11/30/2020
oxyfluorfen	4287 4-03-3	EPA 525.3	0.05 µg/L	EPTDS	3/1/2018 –11/30/2020
profenofos	4119 8-08-7	EPA 525.3	0.3 µg/L	EPTDS	3/1/2018 –11/30/2020
tebuconazole	1075 34-96-3	EPA 525.3	0.2 µg/L	EPTDS	3/1/2018 –11/30/2020
total permethrin (cis- & trans-)	5264 5-53-1	EPA 525.3	0.04 µg/L	EPTDS	3/1/2018 –11/30/2020
tribufos	78-48-8	EPA 525.3	0.07 µg/L	EPTDS	3/1/2018 –11/30/2020
<b>Brominated Haloacetic Acid (HAA) Groups<sup>d</sup></b>					
HAA5	N/A	EPA 552.3 or EPA 557	N/A	Stage 2 DBPR and/or DSMRT	3/1/2018 –11/30/2020
HAA6Br	N/A	EPA 552.3 or EPA 557	N/A	Stage 2 DBPR and/or DSMRT	3/1/2018 –11/30/2020
HAA9	N/A	EPA 552.3 or EPA 557	N/A	Stage 2 DBPR and/or DSMRT	3/1/2018 –11/30/2020

1-Contaminant	2-CAS Registry Number	3-Analytical Methods <sup>a</sup>	4-Minimum Reporting Level <sup>b</sup>	5-Sampling Location <sup>c</sup>	6-Period During Which Monitoring to be Completed
<b>Alcohols</b>					
1-butanol	71-36-3	EPA 541	2.0 µg/L	EPTDS	3/1/2018 –11/30/2020
2-methoxyethanol	109-86-4	EPA 541	0.4 µg/L	EPTDS	3/1/2018 –11/30/2020
2-propen-1-ol	107-18-6	EPA 541	0.5 µg/L	EPTDS	3/1/2018 –11/30/2020
<b>Other Semivolatile Chemicals</b>					
butylated hydroxanisole	25013-16-5	EPA 530	0.03 µg/L	EPTDS	3/1/2018 –11/30/2020
o-toluidine	95-53-4	EPA 530	0.00 7 µg/L	EPTDS	3/1/2018 –11/30/2020
quinoline	91-22-5	EPA 530	0.02 µg/L	EPTDS	3/1/2018 –11/30/2020
<b>List 2: Screening Survey</b>					
Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
<b>List 3: Pre-Screen Testing</b>					
Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

Column headings are:

1—Contaminant: The name of the contaminant to be analyzed.

2—CAS (Chemical Abstract Service) Registry Number or Identification Number: A unique number identifying the chemical contaminants.

3—Analytical Methods: Method numbers identifying the methods that must be used to test the contaminants.

4—Minimum Reporting Level (MRL): The value and unit of measure at or above which the concentration of the contaminant must be measured using the approved analytical methods. If EPA determines, after the first six months of monitoring that the specified MRLs result in excessive resampling, EPA will establish alternate MRLs and will notify affected PWSs and laboratories of the new MRLs. N/A is defined as non-applicable.

5—Sampling Location: The locations within a PWS at which samples must be collected.

6—Period During Which Monitoring to be Completed: The time period during which the sampling and testing will occur for the indicated contaminant.

<sup>a</sup> The analytical procedures shall be performed in accordance with the documents associated with each method, see paragraph (c) of this section.

<sup>b</sup> The MRL is the minimum concentration of each analyte that must be reported to EPA.

<sup>c</sup> Sampling must occur at entry points to the distribution system (EPTDSs), after treatment is applied, that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to the use of representative ground water EPTDSs. Sampling for brominated HAA groups must be conducted at the Stage 2 Disinfectants and Disinfection Byproduct Rule (DBPR) sampling locations (40 CFR 141.622). If these locations are not defined, the PWS is required to collect samples at locations that best represent the distribution system maximum residence time (DSMRT). DSMRT is defined as an active point (i.e., a location that currently provides water to customers) in the distribution system where the water has been in the system the longest relative to the EPTDS. Sampling must occur at source water (SR) intake locations defined by EPA under the UCMR as untreated water entering the water treatment plant (i.e., a location prior to any treatment). Systems subject to the Long Term 2 Enhanced Surface Water Treatment Rule (LT2) should use their source water sampling site(s) from 40 CFR 141.703. Systems subject to the Stage 1 DBPR should use their TOC source water sampling site(s) from 40 CFR 141.132. TOC source water sampling site(s) were set under Stage 1 DBPR and remain unchanged under Stage 2 DBPR. If a system has two different sampling locations for LT2 and Stage 1 DBPR, the system should select the sample point the best represents the definition of source water sample location(s) for UCMR. For each EPTDS there should be one source water sample point associated with that EPTDS. It is possible that different EPTDSs share the same source water. PWSs that purchase 100 percent of their water; “consecutive systems” are not required to collect source water samples.

<sup>d</sup> TOC and bromide must be collected at the same time as HAA samples. These indicator samples must be collected at a single source water intake (as defined in footnote c, above) using methods already approved for compliance monitoring. TOC methods include: SM 5310 B, SM 5310 C, SM 5310 D (21st edition), or SM 5310 B-00, SM 5310 C-00, SM 5310 D-00 (SM Online), EPA Method 415.3 (Rev. 1.1 or 1.2). Bromide methods include: EPA Methods 300.0 (Rev. 2.1), 300.1 (Rev. 1.0), 317.0 (Rev. 2.0), 326.0 (Rev. 1.0) or ASTM D 6581-12. The MRLs for the individual HAAs are discussed in paragraph (a)(5)(v) of this section.

<sup>e</sup> Temperature and pH must be measured at the same time as cyanotoxin samples at the source water intake as described in footnote c, above. pH methods include: EPA Method 150.1 and 150.2, ASTM D1293-12, SM 4500-H+ B (21st edition) or SM 4500-H+ B-00 (SM Online). Temperature methods include: SM 2550 (21st edition), or SM 2550-10 (SM Online).

(4) \* \* \*

(i) \* \* \*

(B) *Frequency.* You must collect the samples within the time frame and according to the frequency specified by contaminant type and water source type for each sampling location, as specified in Table 2, in this paragraph. For the second or subsequent round of sampling, if a sample location is non-operational for more than one month before and one month after the scheduled sampling month (i.e., it is not possible for you to sample within the window specified in Table 2, in this paragraph), you must notify EPA as specified in §141.35(c)(5) to reschedule

your sampling.

**TABLE 2—MONITORING FREQUENCY BY CONTAMINANT AND WATER SOURCE TYPES**

Contaminant type	Water source type	Time frame <sup>1</sup>	Frequency <sup>2</sup>
List 1 Cyanotoxins Chemicals	Surface water or Ground water under the direct influence of surface water (GWUDI)	March – November	You must monitor twice a month for four consecutive months (total of eight sampling events). Sample events must occur two week apart.
List 1 Contaminants – Additional Chemicals	Surface water or GWUDI	March – November	You must monitor four times during your 12-month monitoring period. Sample events must occur two months apart. (Example: If your first sampling event is in March, the second monitoring must occur during May, the third during July, and the fourth during September).
	Ground water	March – November	You must monitor two times during your 12-month monitoring period. Sample events must occur six months apart. (Example: If your first monitoring is in March, the second monitoring must occur during September. If your first monitoring is in November, the second monitoring must occur in May).

<sup>1</sup> No sampling will take place during the months of December, January or February, except for resampling purposes.

<sup>2</sup> Systems must assign a sample event code for each contaminant listed in Table 1. Sample event codes must be assigned by the PWS for each sample event. For more information on sample event codes see §141.35(e) Table 1.

(C) *Location.* You must collect samples for each List 1 Assessment Monitoring contaminant, and, if applicable, for each List 2 Screening Survey, or List 3 Pre-Screen Testing contaminant, as specified in Table 1, in paragraph (a)(3) of this section. Samples must be collected at each sample point that is specified in column 5 and footnote c of Table 1, in paragraph (a)(3) of this section. PWSs conducting List 1 monitoring for the

brominated HAA groups must collect TOC and bromide samples as specified in footnote d of Table 1, in paragraph (a)(3) of this section. PWSs conducting List 1 monitoring for cyanotoxins must measure temperature and pH as specified in footnote e of Table 1, in paragraph (a)(3) of this section. If you are a ground water system with multiple EPTDSs, and you request and receive approval from EPA or the State for sampling at representative EPTDS(s), as specified in §141.35(c)(3), you must collect your samples from the approved representative sampling location(s).

\* \* \* \* \*

(ii) *Small systems.* If you serve 10,000 or fewer people and are notified that you are part of the State Monitoring Plan for Assessment Monitoring, Screening Survey or Pre-Screen monitoring, you must comply with the requirements specified in paragraphs (a)(4)(ii)(A) through (H) of this section. If EPA or the State informs you that they will be collecting your UCMR samples, you must assist them in identifying the appropriate sampling locations and in collecting the samples.

\* \* \* \* \*

(F) [Reserved]

\* \* \* \* \*

(iii) *Phased sample analysis for microcystins.* You must collect the three required samples (one at the source water intake and two at the EPTDS) for each sampling event, but not all samples may need to be analyzed. PWSs that purchase 100 percent of their water; “consecutive systems” only sample at their EPTDS. If the ELISA result from the source water intake is less than 0.3 µg/L, report that result and do not analyze the additional EPTDS samples for that sample event. If the ELISA result from the source

water intake is greater than or equal to 0.3 µg/L, report that value and analyze the EPTDS ELISA sample. If the EPTDS ELISA result is less than 0.3 µg/L, report that result and do not analyze the additional EPTDS samples for that sample event. If the EPTDS ELISA result is greater than or equal to 0.3 µg/L, report the value and analyze the other microcystin samples collected at the EPTDS using EPA Method 544.

\* \* \* \* \*

(5) \* \* \*

(v) *Method defined quality control.* You must ensure that your laboratory analyzes Laboratory Fortified Blanks and conducts Laboratory Performance Checks, as appropriate to the method's requirements, for those methods listed in Table 1, column 3, in paragraph (a)(3) of this section. Each method specifies acceptance criteria for these QC checks. The following HAA results must be reported using EPA's electronic data reporting system for quality control purposes.

**TABLE 4 – HAA QC RESULTS**

1- Contaminant	2- CAS Registry Number	3- Analytical Methods <sup>a</sup>	4- Minimum Reporting Level <sup>b</sup>	5- HAA6Br Group	6- HAA9 Group	7- HAA5 Group
Brominated Haloacetic Acid (HAA) Groups						
Bromochloroacetic acid (BCAA)	55 89-96-8	EPA 552.3 or EPA 557	0.3 µg/L	H AA6Br	H AA9	
Bromodichloroacetic acid (BDCAA)	71 133-14-7	EPA 552.3 or EPA 557	0.5 µg/L			
Chlorodibromoacetic acid (CDBAA)	52 78-95-5	EPA 552.3 or EPA 557	0.3 µg/L			
Tribromoacetic acid (TBAA)	75 -96-7	EPA 552.3 or EPA 557	2.0 µg/L			

Monobromoacetic acid (MBAA)	79 -08-3	EPA 552.3 or EPA 557	0.3 µg/L		HA A5
Dibromoacetic acid (DBAA)	63 1-64-1	EPA 552.3 or EPA 557	0.3 µg/L		
Dichloroacetic acid (DCAA)	79 -43-6	EPA 552.3 or EPA 557	0.2 µg/L		
Monochloroacetic acid (MCAA)	79 -11-8	EPA 552.3 or EPA 557	2.0 µg/L		
Trichloroacetic acid (TCAA)	76 -03-9	EPA 552.3 or EPA 557	0.5 µg/L		

Column headings are:

1—Contaminant: The name of the contaminant to be analyzed.

2—CAS (Chemical Abstract Service) Registry Number or Identification Number: A unique number identifying the chemical contaminants.

3—Analytical Methods: Method numbers identifying the methods that must be used to test the contaminants.

4—Minimum Reporting Level (MRL): The value and unit of measure at or above which the concentration of the contaminant must be measured using the approved analytical methods. If EPA determines, after the first six months of monitoring that the specified MRLs result in excessive resampling, EPA will establish alternate MRLs and will notify affected PWSs and laboratories of the new MRLs.

5-7 – HAA groups identified in paragraph (a)(3) of this section to be monitored as UCMR contaminants.

<sup>a</sup> The analytical procedures shall be performed in accordance with the documents associated with each method, see paragraph (c) of this section, and must meet all quality control requirements outlined paragraph (a)(5) of this section.

<sup>b</sup> The MRL is the minimum concentration of each analyte that must be reported to EPA.

(vi) \* \* \* You must require your laboratory to submit these data electronically to the State and EPA using EPA’s electronic data reporting system, accessible at <http://www2.epa.gov/dwucmr>, within 120 days from the sample collection date. \* \* \*

\* \* \* \* \*

(c) *Incorporation by reference.* These standards are incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection either electronically at <http://www.regulations.gov>, in hard copy at the Water Docket, EPA/DC, and from the sources as follows. The Public Reading Room (EPA West, Room 3334, 1301 Constitution Ave. NW., Washington, DC) is open from 8:30 a.m. to 4:30 p.m.,

Monday through Friday, excluding legal holidays. The telephone number for this Public Reading Room is (202) 566-1744, and the telephone number for the Water Docket is (202) 566-2426. The material is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030 or go to <http://www.archives.gov/federal-register/cfr/about.html>.

(1) The following methods are from the U.S. Environmental Protection Agency, Water Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave. NW., Washington, DC 20004.

(i) EPA Method 150.1 “pH Electrometric, in Methods for Chemical Analysis of Water and Wastes,” 1983, EPA/600/4-79/020. Available on the Internet at <http://www.nemi.gov>.

(ii) EPA Method 150.2 “pH, Continuous Monitoring (Electrometric), in Methods for Chemical Analysis of Water and Wastes,” 1983, EPA/600/4-79/020. Available on the Internet at <http://www.nemi.gov>.

(iii) EPA Method 200.8 “Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma - Mass Spectrometry,” Revision 5.4, 1994. Available on the Internet at <https://www.nemi.gov>.

(iv) EPA Method 300.0 “Determination of Inorganic Anions by Ion Chromatography Samples,” Revision 2.1, 1993. Available on the Internet at <http://www.nemi.gov>.

(v) EPA Method 300.1 “Determination of Inorganic Anions in Drinking Water by Ion Chromatography,” Revision 1.0, 1997. Available on the Internet at

<http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>.

(vi) EPA Method 317.0 “Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography with the Addition of a

Postcolumn Reagent for Trace Bromate Analysis,” Revision 2.0, 2001, EPA 815-B-01-001. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>.

(vii) EPA Method 326.0 “Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography Incorporating the Addition of a

Suppressor Acidified Postcolumn Reagent for Trace Bromate Analysis,” Revision 1.0, 2002, EPA 815-R-03-007. Available on the Internet at

<http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>.

(viii) EPA Method 415.3 “Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water,” Revision 1.1, 2005,

EPA/600/R-05/055. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>.

(ix) EPA Method 415.3 “Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water,” Revision 1.2, 2009,

EPA/600/R-09/122. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>.

(x) EPA Method 525.3 “Determination of Semivolatile Organic Chemicals in Drinking Water by Solid Phase Extraction and Capillary Column Gas

Chromatography/Mass Spectrometry (GC/MS),” Version 1.0, February 2012, EPA/600/R-12/010. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>.

(xi) EPA Method 530 “Determination of Select Semivolatile Organic Chemicals in Drinking Water by Solid Phase Extraction and Gas Chromatography/Mass Spectrometry (GC/MS),” Version 1.0, January 2015, EPA/600/R-14/442. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>.

(xii) EPA Method 541 “Determination of 1-Butanol, 1,4-Dioxane, 2-Methoxyethanol and 2-Propen-1-ol in Drinking Water by Solid Phase Extraction and Gas Chromatography/Mass Spectrometry,” November 2015, EPA 815-R-15-011. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>.

(xiii) EPA Method 544 “Determination of Microcystins and Nodularin in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS),” Version 1.0, February 2015, EPA 600-R-14/474. Available on the Internet at <http://www2.epa.gov/water-research/epa-drinking-water-research-methods>.

(xiv) EPA Method 545 “Determination of Cylindrospermopsin and Anatoxin-a in Drinking Water by Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS),” April 2015, EPA 815-R-15-009. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>.

(xv) EPA Method 552.3 “Determination of Haloacetic Acids and Dalapon in

Drinking Water by Liquid-Liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection,” Revision 1.0, July 2003, EPA 815-B-03-002. Available on the Internet at

<http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>.

(xvi) EPA Method 557 “Determination of Haloacetic Acids, Bromate, and Dalapon in Drinking Water by Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS),” Version 1.0, September 2009, EPA 815-B-09-012. Available on the Internet at <http://www2.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>.

(2) The following methods are from “ASTM International,” 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

(i) ASTM D1293-12 “Standard Test Methods for pH of Water.” Available for purchase on the Internet at <http://www.astm.org/Standards/D1293.htm>.

(ii) ASTM D5673-10 “Standard Test Method for Elements in Water by Inductively Coupled Plasma-Mass Spectrometry,” approved August 1, 2010. Available for purchase on the Internet at <http://www.astm.org/Standards/D5673.htm>.

(iii) ASTM D6581-12 “Standard Test Methods for Bromate, Bromide, Chlorate, and Chlorite in Drinking Water by Suppressed Ion Chromatography.” Available for purchase on the Internet at <http://www.astm.org/Standards/D6581.htm>.

(3) The following methods are from “Standard Methods for the Examination of Water & Wastewater,” 21st edition (2005), American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

(i) SM 2550. “Temperature.”

(ii) SM 3125 “Metals by Inductively Coupled Plasma/Mass Spectrometry.”

(iii) SM 4500-H+ B “pH Value in Water by Potentiometry Using a Standard Hydrogen Electrode.”

(iv) SM 5310B “The Determination of Total Organic Carbon by High-Temperature Combustion Method.”

(v) SM 5310C “Total Organic Carbon by Persulfate-UV or Heated-Persulfate Oxidation Method.”

(vi) SM 5310D “Total Organic Carbon by Wet-Oxidation Method.”

(4) The following methods are from “Standard Methods Online.” Available for purchase on the Internet at <http://www.standardmethods.org>.

(i) SM 2550-10 “Temperature.”

(ii) SM 3125-09 “Metals by Inductively Coupled Plasma/Mass Spectrometry (Editorial revisions, 2011).”

(iii) SM 4500-H+ B-00 “pH Value in Water by Potentiometry Using a Standard Hydrogen Electrode.”

(iv) SM 5310B-00 “The Determination of Total Organic Carbon by High-Temperature Combustion Method.”

(v) SM 5310C-00 “Total Organic Carbon by Persulfate-UV or Heated-Persulfate Oxidation Method.”

(vi) SM 5310D-00 “Total Organic Carbon by Wet-Oxidation Method.”

(5) The following methodology is from Ohio EPA, Columbus, OH.

(i) ELISA SOP. “Ohio EPA Total (Extracellular and Intracellular) Microcystins - ADDA by ELISA Analytical Methodology,” Version 2.0, January 2015. Available on the

Internet at

[http://www.epa.ohio.gov/Portals/28/documents/habs/HAB\\_Analytical\\_Methodology.pdf](http://www.epa.ohio.gov/Portals/28/documents/habs/HAB_Analytical_Methodology.pdf).

(ii) [Reserved]