

HTRW Center of Expertise Environmental Regulatory Fact Sheet 02-02

Civil Works Fact Sheet on the New Standard for Arsenic In Drinking Water

Introduction

Under the Safe Drinking Water Act (SDWA), which regulates public water systems, the allowable level of arsenic is dropping from 50 micrograms/liter to 10 micrograms/liter, and the applicability of the new standards is expanded. Affected systems will need to take action to ensure compliance with the new standard. Unlike the old arsenic maximum contaminant level (MCL) which only applied to community water systems (CWSs), the new standard will also apply to non-transient non-community water systems (NTNCWSs) as well. Affected systems will need time to arrange for monitoring of source water; to evaluate whether water will meet the new MCL; to possibly plan for, fund, design, and construct treatment systems where needed; and/or to seek alternate sources of drinking water. The purpose of this fact sheet is to summarize the new standards, the types of systems affected, the compliance dates, the approved analytical methods, the associated changes to consumer confidence reporting, and the treatment technologies capable of attaining the new arsenic standard.

Key Definitions

- A public water system is defined as "a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year." This means that if drinking water is provided from a well or surface water source to more than just a few people, it is likely to be classified as a public water system.
- A community water system is defined as a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.
- A non-transient non-community water system is defined as a public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year.
- A transient non-community water system (TNCWS) is defined as a non-community water system that does not regularly serve at least 25 of the same persons over 6 months per year.

Background

There has been much regulatory activity regarding arsenic in recent years. Here is a brief summary of actions leading to the revised standard for arsenic:

- The longstanding maximum contaminant level (MCL) for arsenic in drinking water, 50 micrograms per liter, applied only to community water systems (40 CFR 141.11). As defined above, these systems serve year-round residents. This standard continues to apply to CWSs until January 23, 2006.
- On January 22, 2001, 66 Federal Register (FR) 6975, EPA published a final rule revising the arsenic MCL to 10 micrograms per liter (40 CFR 141.62), and which expands the scope of the standard to also apply to NTNCWSs as well as to CWSs. This standard applies on January 23, 2006.
- Shortly after publishing the new arsenic standard, a change in Administration occurred and the arsenic standard was revisited under the new Administration. As a result, the effective date of the January 22, 2001 final rule was delayed on multiple occasions. (March 23, 2001, 66 FR 16134; April 23, 2001, 66 FR 20580; May 22, 2001, 66 FR 28342)
- On July 19, 2001 (66 FR 37617) a proposed rule appeared in the Federal Register requesting comments on a range of arsenic levels from 3 to 20 micrograms/liter.
- On October 31, 2001, via a press release, EPA announced the decision to retain the 10 microgram/liter MCL as originally specified in the January 22, 2001 final rule. This announcement was not published formally in the Federal Register, so those unaware of the press release may not realize that EPA has completed action on this rule and that the requirements of the January 22, 2001 final rule continue to apply.
- States with primacy for the SDWA are required to adopt new arsenic standards within 2 years, well before the January 23, 2006 Federal compliance date. States may also choose to be more stringent than the Federal Requirements.

Applicability

Until January 23, 2006, the "old" MCL of 50 micrograms/liter continues to apply to community water systems. Then on January 23, 2006 the MCL is not only lowered to 10 micrograms/liter for CWSs, but also becomes applicable to NTNCWS. **TNCWSs remain unaffected.**

CWSs and NTNCWSs will be required to monitor for compliance unless specifically excluded. Generally, public water system are required to monitor water unless all 4 of the following conditions are met per 40 CFR 141.3:

- The system consist only of distribution and storage facilities (and does not have any collection and treatment facilities);
- obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply;
- does not sell water to any person; and
- is not a carrier which conveys passengers in interstate commerce.

Monitoring for Compliance (40 CFR 141.23)

Because CWS are currently required to monitor for arsenic, there should be data available to assess whether these systems are likely meet the new standard or whether they will need additional treatment for arsenic. NTNCWSs, however, were not previously required to monitor for arsenic, so data may be unavailable. Therefore it is recommended that these systems pursue sampling as soon as possible to ensure adequate planning time to meet the new standard.

EPA has determined the following methods are capable of detecting arsenic at the 10 micrograms/liter level. Samples are generally collected at the point of entry to the distribution system unless the State allows an alternative collection point.

Methodology	Reference Method
Inductively Coupled Plasma Mass Spectroscopy (ICP-MS)	200.8 (EPA)
Stabilized Temperature Platform Graphite Furnace Atomic Absorption (STP-GFAA)	200.9 (EPA)
Graphite Furnace Atomic Absorption (GFAA)	3113B (SM) D-2972-93C (ADSTM)
Gaseous Hydride Atomic Absorption (GHAA)	3114B (SM) D-2972-93B (ASTM)

Changes to the Consumer Confidence Report (CCR) (40 CFR 141.154)

CWS operators should be aware of a **July 1, 2002** compliance date regarding Consumer Confidence Reporting. Systems detecting arsenic above 5 micrograms per liter and up to 10 micrograms/liter must either include the following statement or an alternative statement developed in consultation with the primary agency:

"While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems."

Also beginning July 1, 2002, systems classified as CWSs which detect arsenic above 10 micrograms/liter and up to 50 micrograms/liter, must include the following statement in the CCR:

"Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer."

Summary of General Treatment Technologies

EPA has determined the following treatment technologies as capable of attaining the 10 microgram/liter MCL, however all are not necessarily suitable for small systems:

Technology	Maximum Removal Efficiency¹	Constraints/Comments	Waste Disposal Issues
Ion Exchange	95 %	Water must contain ≤ 50 mg/L sulfate.	Brine from regeneration of resin may be hazardous waste (HW)
Activated Alumina	95 %	pH sensitive. pH = 6 optimal. Works at up to pH of 8, but less efficient. Small systems can use to treat at point of use.	Not cost effective to regenerate alumina. Alumina not expected to be HW.
Reverse Osmosis	> 95%	20-25% of the water is lost during the treatment process. Not considered cost effective for treatment of arsenic alone. Small systems can use to treat at point of use.	Anion exchange brines expected to be non-hazardous waste.
Coagulation/Filtration (Not for systems with less than 500 service connections)	96%	pH sensitive. May need to lower pH or use more coagulant to achieve higher removal rates. pH level ≤ 7 is preferred.	Waste not expected to be HW
Modified Lime Softening (Not for systems with less than 500 service connections)	90%	Optimal pH > 10.5.	Waste not expected to be HW
Electrodialysis	85%	Fully automated system so requires little operator attention. No chemicals need to be added. 20-30% of water is lost during the treatment process.	Not specified
Oxidation/Filtration (20:1 iron:arsenic)	80%	Water needs to have iron present	Not specified

¹Removal efficiency is based on arsenic V and pre-oxidation may be required to convert arsenic III to arsenic V.

Small System Compliance

EPA has evaluated the affordability of treatment with respect to small public water systems. Small systems are grouped into three categories - those serving less than or equal to 500 persons; those serving 501 to 3,300 persons; and those serving 3,301 to 10,000 persons.

The Table below indicates technologies EPA considers affordable for small systems. Central treatment is not the only option available. Small systems may also choose to attain compliance through point of use (POU) devices. POU devices are particularly viable options when only a relatively small portion of water is used for drinking and/or cooking purposes, such as may be the case for many NTNCWSs. POU options for treating arsenic include reverse osmosis, activated alumina, and ion exchange processes. POU systems can generally be easily installed, operated and maintained, but require additional monitoring to ensure significant breakthrough of the contaminant does not occur.

Small System Compliance Technologies for Arsenic ²

Small system compliance technology	Affordable for listed small system categories
Activated alumina (centralized)	All size categories
Activated Alumina (point of use) ⁴	All size categories.
Coagulation/Filtration ⁵	Affordable for systems serving > 500 to 10,000. Not affordable for systems serving < 500.
Coagulation-assisted Microfiltration	Affordable for systems serving > 500 to 10,000. Not affordable for systems serving < 500.
Electrodialysis reversal ⁶	Affordable for systems serving > 500 to 10,000. Not affordable for systems serving < 500.
Enhanced coagulation/filtration	All size categories.
Enhanced lime softening (pH>10.5)	All size categories.
Ion exchange	All size categories.
Lime Softening ⁵	Affordable for systems serving > 500 to 10,000. Not affordable for systems serving < 500.
Oxidation/filtration ⁷	All size categories.
Reverse osmosis (centralized) ⁶	Affordable for systems serving > 500 to 10,000. Not affordable for systems serving < 500.
Reverse osmosis (point of use) ⁴	All size categories.

¹ - Reserved

² - Pre-oxidation may be required

³ - Reserved

⁴ - When POU or point of entry (POE) devices are used for compliance, programs to ensure proper long-term operation, maintenance, and monitoring must be provided by the water system to ensure adequate performance.

⁵ - Unlikely to be installed solely for arsenic removal. May require pH adjustments to optimal range if high removals are needed.

⁶ - Technologies reject a large volume of water - may not be appropriate for areas where water quantity may be an issue.

⁷ - To obtain high removals, iron to arsenic ratio must be at least 20:1

Conclusion

EPA has established more stringent requirements for arsenic in drinking water. States with primacy for administering the SDWA program are required to adopt these standards, but may choose to be even more stringent. Public water systems need to be aware of the new requirements and should be checking their individual state requirements. CWSs and NTNCWSs need to start work now toward compliance with the new Federal standards. Though the transition from the old MCL of 50 micrograms/liter to the new MCL of 10 micrograms/liter does not occur until January 23, 2006, much lead time may be required to assess water quality and to plan for, fund, and implement treatment to meet the new standard. New consumer confidence reporting requirements will apply as early as July 1, 2002 for systems classified as community water systems.

The full text of the final arsenic rule can be obtained via the Federal Register Table of Contents located at: http://www.access.gpo.gov/su_docs/fedreg/a010122c.html under the heading Environmental Protection Agency, Final Rules.

Related questions can be directed to Beverly VanCleaf at the HTRW CX at (402) 697-2559 or to EPA's Safe Drinking Water Act Hotline at 800-426-4791.