



# The Arsenic Rule:

## Background and Rule Provisions

- This presentation provides background information on arsenic and addresses the basic provisions of the Arsenic Rule.
- The Final Arsenic Rule was published in the Federal Register on January 22, 2001 (66 FR 6976).
- The Rule:
  - Is applicable to community water systems (CWSs) and non-transient non-community water systems (NTNCWSs);
  - Updates the current maximum contaminant level (MCL) for arsenic; and,
  - Clarifies compliance and new source contaminant monitoring requirements.
- *Throughout this presentation, the terms “State” or “States” are used to refer to all types of primacy agencies including U.S. territories, Indian Tribes, and EPA Regions.*

# Sinister Uses for Arsenic



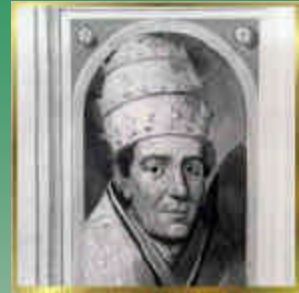
- Victorian ladies of fashion used arsenic for cosmetic purposes, as well as for killing husbands.
- In the 15th and 16th century, the Borgias used arsenic as their favorite poison for political assassinations.
- In WWII, arsenic used as a war gas
  - Contact with the skin produced huge blisters

- The negative effects of arsenic have been known throughout history.
- The word arsenic is derived from the Greek word arsenikon, meaning potent. As early as 2000 BC, the word was synonymous with poison.
- Arsenic has been considered "the perfect poison" since it is odorless and nearly tasteless with a sugar-like appearance, will cause a slow and painful death, and is hard to detect in the body.
- The corrupt and worldly Pope Alexander VI, formerly Rodrigo Borgia, used arsenic as a political tool.
  - Pope Alexander (Borgia) did not hesitate to appoint cardinals for a hefty fee and later have them poisoned, expropriating their property and making appointments afresh. His favoured poison was cantarella, a concoction laced with arsenic.



Arsenic poisoning is thought to be responsible for the deaths of some well known historical figures such as:

- Claudius
- Pope Pius III and Clemente XIV
- Charles Francis Hall
- Napoleon



- Claudius was Emperor of Rome from 41-54 AD. As some accounts tell, his wife Agrippina and her son Nero poisoned Claudius to make way for Nero's ascension as Emperor.
- Pope Pius III was successor to Alexander VI (Rodrigo Borgia). He lasted in office only 26 days. Though he was old and infirm at the time of his accession, conspiracy theorists have often claimed he was poisoned during this politically tumultuous era.
- Clement XIV suppressed the Jesuit Order and granted the order of dissolution which allowed the States to seize goods and properties from the Jesuits. There is some anecdotal evidence that Pope Clemente XIV died from arsenic poisoning.
- Charles Francis Hall was an American Explorer in the Arctic. He set out on an expedition (with the backing of Congress) to reach the North Pole in 1871. Though the expedition initially went well, Hall fell suddenly ill and died several months into the voyage.
  - An autopsy performed in the 1960s revealed high levels of arsenic in his system, and it is thought he was either poisoned by a member of his expedition, or used arsenic for medicinal purposes (Arsenious acid was a common medicine aboard ships at that time) and accidentally poisoned himself.
- Napoleon: See next slide.

# Was Napoleon Poisoned?



June 1, 2001  
CNN.com/world

- A toxicological study of Napoleon's hair showed "major exposure, and I stress 'major', to arsenic."
- Natural upper limit of arsenic concentration in hair is one nanogram per milligram of hair.
  - In one of the samples tested, the concentration was 38 nanograms.

- www.cnn.com posted a story on June 1, 2001 reporting that new evidence had been found concerning the cause of Napoleon's death.
  - A toxicological study of 5 samples of Napoleon's hair, preserved since his death in 1821, showed "major exposure to arsenic."
  - The natural upper limit of arsenic concentration in hair is one nanogram per milligram of hair.
  - In one of Napoleon's hair samples, the concentration was 38 nanograms.
- The controversy regarding the cause of Napoleon's death however remains alive, since there is some doubt that the hair samples were authentic.

# Altruistic Uses for Arsenic



- Used in agriculture as ingredients in
  - Insecticides
  - Rat poisons
  - Herbicides and wood preservatives
- Used as pigments in paints, wallpaper, ceramics
- Early syphilis treatment
- Fowler's Solution
  - Solution of one-percent potassium arsenite
  - Used in the treatment of psoriasis

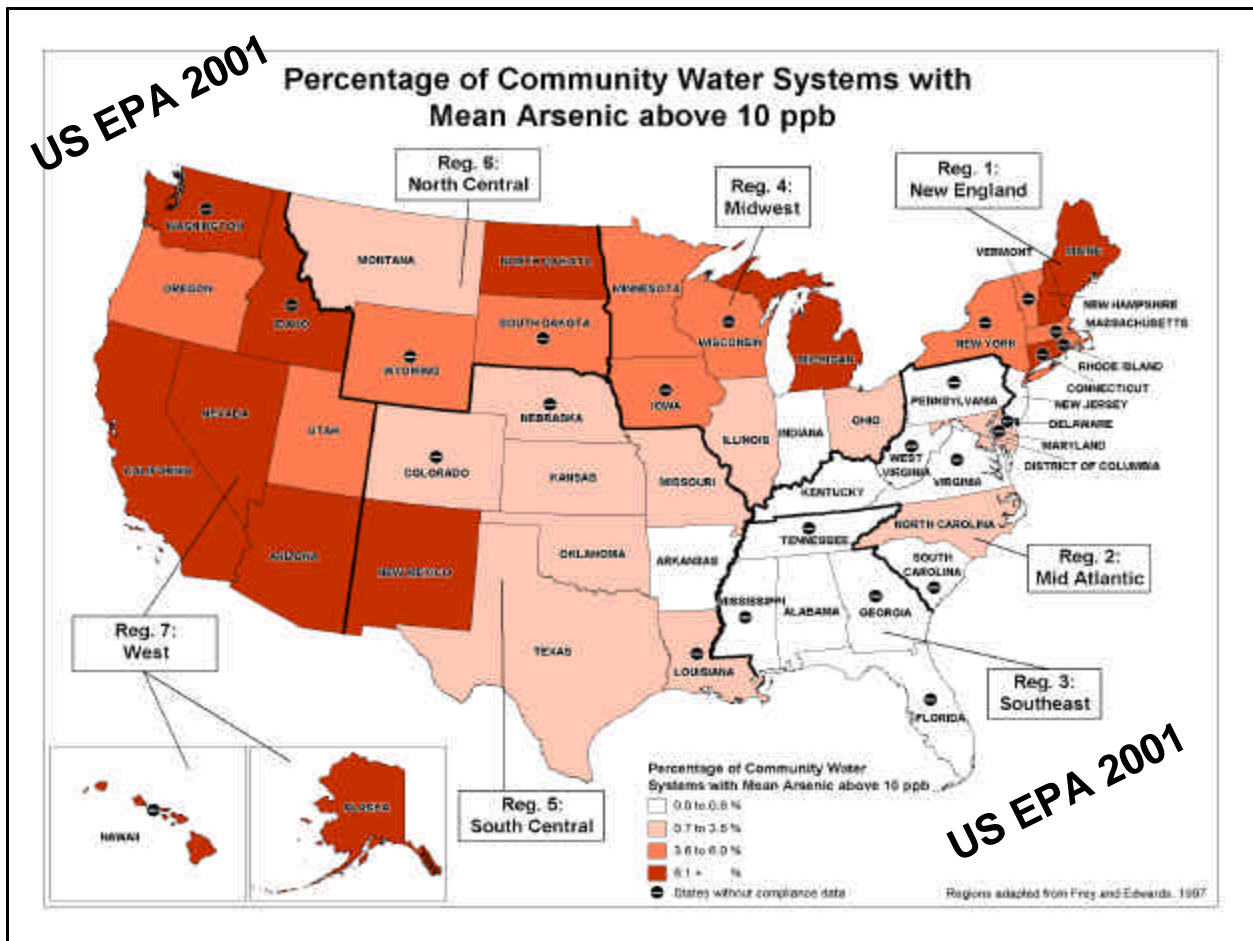
- Arsenic compounds have been used in agriculture as ingredients in insecticides, rat poisons, herbicides, and wood preservatives.
- Arsenic has also been used as a pigment in paints, wallpaper, and ceramics.
- Paul Ehrlich discovered that an organic compound of arsenic (which he named Salvarsan), would bind to sulfur groups on microbes. Salvarsan became the first drug that was safe enough to give to humans and effective against the spirochete bacteria that causes syphilis.
  - Salvarsan was immediately replaced upon the discovery of penicillin.
- As late as the 1960's dermatology textbooks were still recommending a one-percent potassium arsenite solution. Called Fowler's Solution, doctors used it as both a general tonic and for the treatment of psoriasis.
- For additional information on the history of arsenic uses see *Arsenic: A Murderous History* at <http://www.dartmouth.edu/~toxmetal/TXSHas.htm>

# Arsenic Occurrence



- Naturally occurring element
- Found throughout the United States
- Weathers from rocks and soils
- Primarily found in ground waters
- Also associated with wood preserving, mining, agriculture, pulp and paper production, burning of fossil fuels

- Arsenic is found in the environment in rocks, soil, water, air, and in biota. Natural concentrations of arsenic in soil typically range from 0.1 to 40 mg/kg. Higher concentrations are found in some igneous and sedimentary rocks, particularly in iron and manganese ores. Other natural sources of arsenic include volcanism and forest fires. Through erosion, dissolution, and weathering, arsenic can be released to ground water or surface water.
- Arsenic is also released from a variety of human activities. Almost 8 million pounds of arsenic and arsenic containing compounds were released into the environment in 1997.
  - Arsenic is found in the preservative chromated copper arsenate (CCA) used to preserve wood. 90% of all arsenic consumed in the U.S. is used in the production of CCA.
  - Arsenic can be a by-product of mining and smelting, and is of particular concern in old waste disposal sites (e.g., mine tailings).
  - In agriculture, organic arsenic is a constituent of organic herbicides and is a constituent of feed additives for poultry and swine.
  - Other industries and processes which use or release arsenic:
    - Manufacturing of metals and alloys;
    - Petroleum refining;
    - Pharmaceutical, glass, and cement manufacturing;
    - Production of lead-acid batteries;
    - Production of a particular semiconductor used in computers and other electronic applications;
    - Burning of fuels and wastes; and,
    - Pulp and paper production.



- This map shows the percentage of CWSs in the US expected to have arsenic concentrations in their source water above the revised arsenic MCL of 0.010 mg/L.
  - The darker shades show a higher percentage of systems with levels of arsenic in their source water.
    - Over 6% of CWSs in many western states, Michigan, and some New England states have mean arsenic concentrations above the revised MCL.
- EPA compiled this map from available compliance data. As noted on the map, almost half of the states did not provide compliance data.
- For more information on the occurrence of arsenic see:
  - *Arsenic Occurrence In Public Drinking Water Supplies* (EPA-815-R-00-023) at <http://www.epa.gov/ogwdw/ars/occurrence.pdf>
  - The US Geological Service Arsenic in Drinking Water web page at [http://co.water.usgs.gov/trace/pubs/arsenic\\_fig1.html](http://co.water.usgs.gov/trace/pubs/arsenic_fig1.html)

# Health Effects

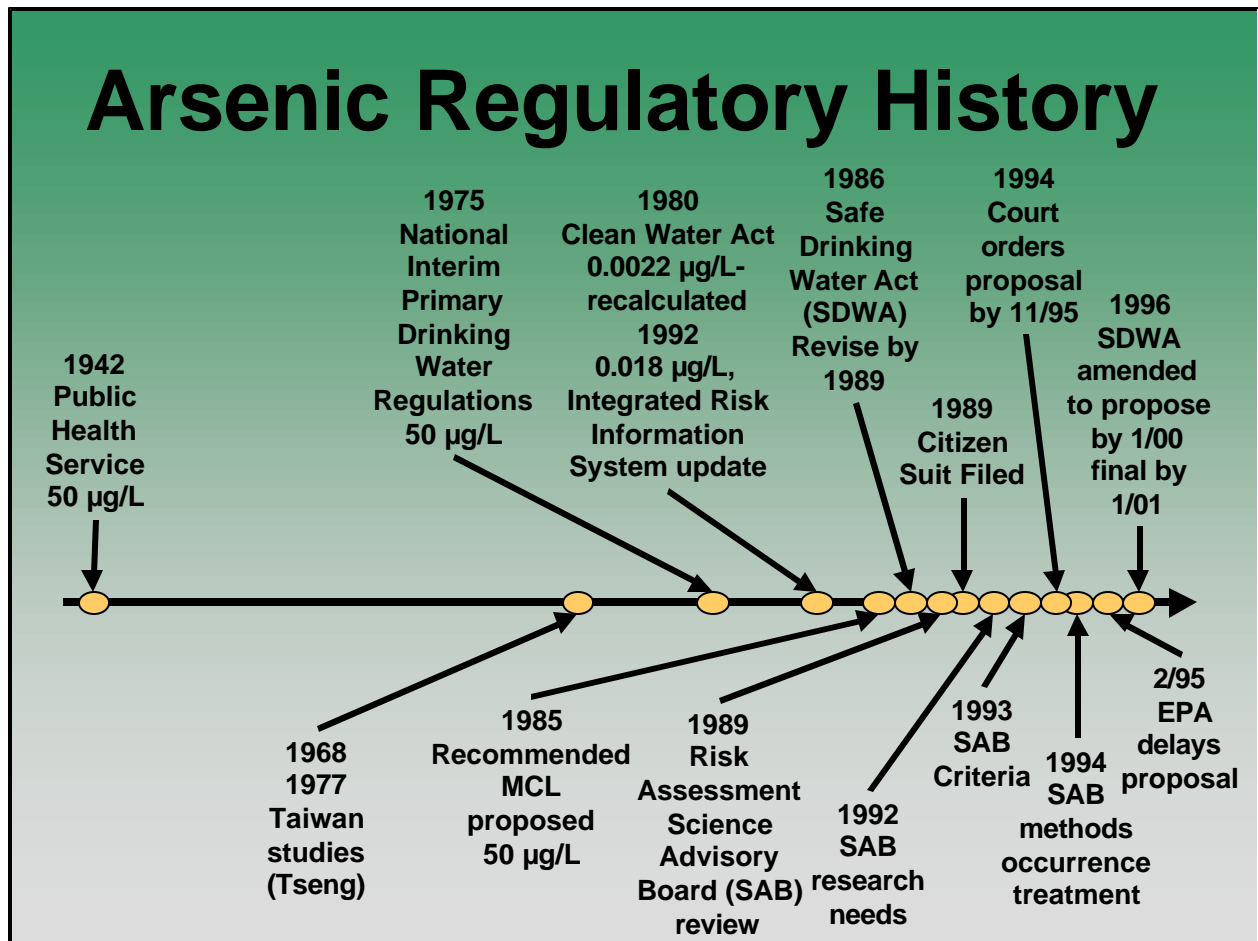


- Cancer
  - Bladder cancer
  - Lung cancer
- Non-Cancer
  - Heart disease
  - High blood pressure

- Arsenic ingestion has been linked to both cancerous and non-cancerous health effects. These include cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate. Arsenic ingestion has also been linked to cardiovascular, pulmonary, immunological, and neurological effects.
- For additional health effects information see:
  - Chapter 5 in EPA's *Economic Analysis* (EPA 815-R-00-026) at [http://www.epa.gov/ogwdw/ars/econ\\_analysis.pdf](http://www.epa.gov/ogwdw/ars/econ_analysis.pdf)
  - National Academy of Sciences' *Arsenic in Drinking Water: 2001 Update* at <http://bob.nap.edu/books/0309076293/html/>
- These are the health effects EPA used to set the maximum contaminant level goal (MCLG) of 0 mg/L and revise the MCL, and are based on lifetime exposure.



# Arsenic Regulatory History



- The federal government recognized the adverse health effects of arsenic ingestion long ago and has consistently reviewed the standard for arsenic in drinking water. In 1942, the U.S. Public Health Service established an arsenic drinking water standard for interstate water carriers of 50 µg/L.
- The first studies reporting dose-dependent effects came from studies published in 1968 and 1977. Tseng, W.-P., Chu, H.M., How, S.W., et. al. 1968. *Prevalence of Skin Cancer in an Endemic Area of Chronic Arsenicism in Taiwan*. J. Natl. Can. Inst. 40(3):453-463; Tseng, W.-P. 1977. *Effects and Dose-response Relationships of Skin Cancer and Blackfoot Disease With Arsenic*. Environ. Health Perspect. 19:109-119.
- Arsenic was one of the first regulated drinking water contaminants. On December 24, 1975, under the authority of the Safe Drinking Water Act (SDWA) of 1974, EPA issued a National Interim Primary Drinking Water Regulation (NIPDWR) for arsenic of 0.05 mg/L (40 FR 59566).
- **The 80s.** In 1980, EPA issued Water Quality Criteria Documents under the Clean Water Act (45 FR 79318). They included 0.0022 µg/L criteria for arsenic to protect human health from ingestion of contaminated water and aquatic organisms. [Note: In 1992, the criteria were recalculated with an updated cancer slope factor data to yield 0.018 µg/L for arsenic (57 FR 60848).] On **November 13, 1985** EPA proposed a MCLG of 50 µg/L based on the National Academy of Sciences (NAS) conclusion that 50 µg/L balanced toxicity and possible essentiality (50 FR 46936). The **1986 SDWA Amendments** converted the 1975 NIPDWR to a National Primary Drinking Water Regulation (NPDWR), directed EPA to revise NPDWRs by 1989, and specified that MCLGs be promulgated simultaneously with MCLs. EPA missed the **1989 deadline** imposed by the 1986 SDWA Amendments for proposing a revised NPDWR, a citizen suit was filed, and EPA entered into a consent decree providing deadlines for issuing a new arsenic regulation.
- **The 90s.** In 1992, the Science Advisory Board (SAB) reviewed EPA's 1991 Arsenic Research Recommendations and recommended mechanism research projects (EPA-SAB-DWC-92-018) that would substantially impact the risk assessment in 3-5 years. Due to the potential significance of two internal cancer studies published in 1992 (Smith et. al., and Chen et. al.), the Agency decided to evaluate and incorporate this new risk information into the revision of the arsenic regulation. In 1993, the SAB reviewed EPA's draft "Drinking Water Criteria Document on Inorganic Arsenic" and concluded that current data support an association between high levels of arsenic and cancer in humans (EPA-SAB-DWC-34-005). In 1994, the consent decree from the citizen suit was amended and EPA was required to propose a rule by November 1995. **During 1994**, the SAB reviewed occurrence, treatment technology, and analytical methods (EPA-SAB-DWC-95-015). In 1995, EPA decided to delay rule proposal in order to better characterize health effects and assess cost-effective removal technologies for small utilities. The **1996 Amendments** to the SDWA included new statutory deadlines for the arsenic regulation, requiring EPA to propose a revised Arsenic Rule by January 1, 2000, and issue a Final Rule by January 1, 2001.

# Arsenic Rulemaking



- **Proposed Arsenic Rule**
  - June 22, 2000
  - 5 ppb standard for arsenic
  - EPA requested comment on 20 ppb, 10 ppb, and 3 ppb
- **Final Arsenic Rule**
  - January 22, 2001
  - 10 ppb standard for arsenic

- In the Proposed Arsenic Rule published in the Federal Register on June 22, 2000 (65 FR 38888), EPA:
  - Proposed to revise the existing NPDWR for arsenic to 5 ppb;
  - Requested comment on setting the standard at 20 ppb, 10 ppb, and 3 ppb; and,
  - Proposed an MCLG of 0 mg/L.
- An October 2000 appropriations bill required EPA to promulgate a final arsenic standard no later than June 22, 2001.
- The Final Arsenic Rule, published on January 22, 2001, established the MCL at 10 ppb.
  - The Rule was to become effective on March 23, 2001, 60 days after publication.
  - The Rule established that the 0.010 mg/L (10 µg/L) MCL becomes enforceable on January 23, 2006, and that the clarifications to compliance and new source contaminants monitoring regulations become enforceable on January 22, 2004.

## 2001 Expert Panel Reviews of Arsenic Regulation



- **National Academy of Sciences (NAS)**
  - Risks of bladder and lung cancer are higher than EPA estimated
  - There are other health effects to consider
- **Arsenic Cost Working Group to the National Drinking Water Advisory Council (NDWAC)**
  - EPA “produced a credible estimate of the cost...”
  - Provided recommendations to improve costs, including small system issues and waste disposal
- **Science Advisory Board (SAB)**
  - Could consider time lag (after reducing arsenic exposure) before risk decreases
  - Could quantify benefits of reducing other health outcomes including noncancer effects (e.g., diabetes, high blood pressure)

- Because of the importance of the Arsenic Rule and the national debate surrounding it related to science and costs, EPA's Administrator publicly announced on March 20, 2001, that the Agency would take additional steps to reassess the scientific and cost issues associated with this Rule.
- All three reviews essentially supported EPA's work.
- The NAS reviewed and analyzed relevant toxicological and health-effects studies published since the 1999 NRC report. The 2001 NAS report affirmed the use of southwestern Taiwan data and noted that new studies in Chile and Taiwan discount the effects of poor nutrition, differences in diet, smoking, and lifestyle in the quantitative risk assessments. NAS noted that study limitations in recent studies in New Hampshire and Utah prevent their use in quantifying risk in the U.S. The risks calculated in the 2001 NAS report were higher than those in the 1999 NAS report on arsenic.
- The National Drinking Water Advisory Council (NDWAC) reviewed the cost of compliance estimates by EPA and other organizations. The overall finding of the NDWAC was that, given the various limitations and uncertainties, EPA produced a credible estimate of the cost of compliance. The committee made recommendations where the estimates could better account for costs of equipment, labor costs, emerging technologies, and engineering and other secondary costs. The net result would be a modest increase in EPA's cost of compliance estimates.
- The SAB reviewed the Agency's analysis of quantified and unquantified benefits associated with the Rule and made recommendations to improve benefits calculations. EPA believes that the net result of incorporating the SAB recommendations into a revised economic analysis would be an increase in net benefits for any of the regulatory levels considered, as compared to the benefits estimated for the January 2001 Rule.

# As a Result...



- On October 31, 2001  
Administrator Whitman announced that there would be no further delay in implementing the January 2001 Rule

- As a result of the input received, the EPA Administrator announced on October 31, 2001 that there would be no further delay in implementing the January 2001 Rule.
- After review by two Administrations and several independent groups, the Arsenic level remains at 10 ppb.
- In her press statement, Administrator Whitman reiterated that the additional study and consultation did not delay the compliance date for implementing a new standard for arsenic in 2006. “Instead it has reinforced the basis for the decision,” said Whitman. “I said in April that we would obtain the necessary scientific and cost review to ensure a standard that fully protects the health of all Americans, we did that, and we are reassured by all of the data that significant reductions are necessary. As required by SDWA, a standard of 10 ppb protects public health based on the best available science and ensures that the cost of the standard is achievable.”



# **Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring**

## **Rule Provisions**

- The remainder of this presentation provides an overview of the major points of the Arsenic Rule. It is one part of the overall training sessions on the Arsenic Rule held by EPA during 2002. Additional details on the Rule and its implementation are provided in other training session presentations on:
  - Compliance, Reporting, and Enforcement Issues
  - Primacy Revision Applications
  - Small Systems Implementation Strategy & Exemptions
  - Arsenic Rule Implementation Research
  - Arsenic Mitigation Strategies
  - Water Treatment Plant Residuals

# Major Points



- Dates
- Monitoring requirements
- Compliance determinations
- Analytical methods
- Consumer Confidence Report (CCR) and Public Notification (PN) Rules
- Rule flexibilities

- The major points of this presentation include:
  - Important dates of the Arsenic Rule for States and systems;
  - The monitoring requirements;
  - Calculating compliance;
  - Changes to the approved analytical methods;
  - The requirements related to arsenic of the Consumer Confidence Report (CCR) Rule and the Public Notification (PN) Rule;
  - The Rule's flexibilities including:
    - Point-of-Use (POU) treatment strategies;
    - Variances; and,
    - Exemptions.
  - The Administration is committed to fully implementing SDWA's flexibilities while still providing public health protection.

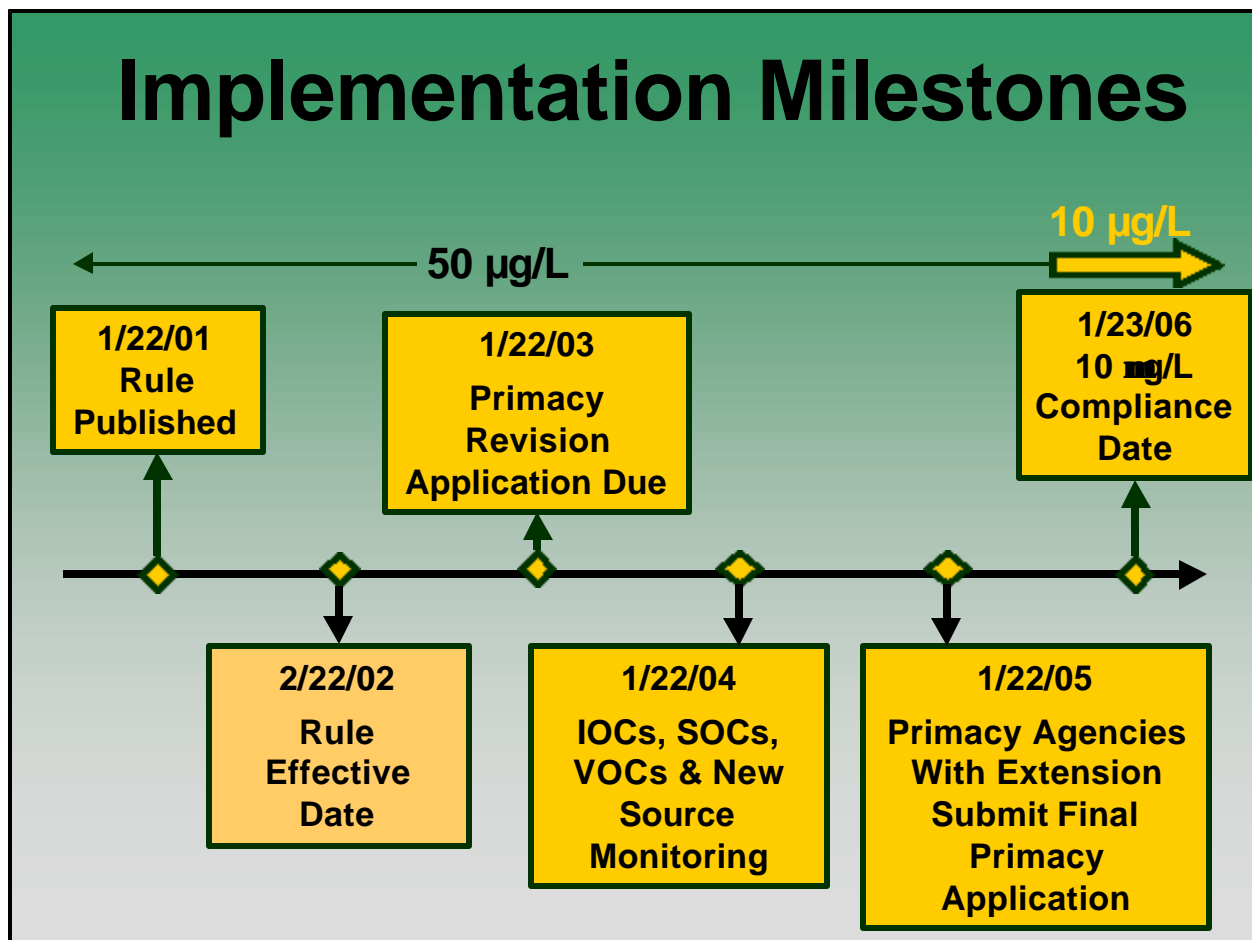
# Arsenic: Summary of New Rule



- Lowers maximum contaminant level (MCL) to 10 µg/L
- Establishes maximum contaminant level goal (MCLG) at 0
- Applies to community water systems (CWSs) **AND** nontransient noncommunity water systems (NTNCWSs)
- Incorporated into Standardized Monitoring Framework
- Becomes enforceable on January 23, 2006
- Adds new requirements for consumer confidence reports (CCRs)
- Requires Tier 2 public notification

- The Arsenic Rule:
  - Lowers the MCL to 0.01 mg/L (10 µg/L or 10 ppb) (40 CFR 141.62(b)(16));
  - Establishes a MCLG of 0 mg/L (40 CFR 141.51(b));
  - Applies to all CWSs AND for the first time, all NTNCWSs (40 CFR 141.62(b)); and,
  - Makes monitoring for arsenic consistent with the Standardized Monitoring Framework for inorganic contaminants (IOCs) (40 CFR 141.23).
- The revised arsenic MCL becomes enforceable on January 23, 2006, five years after the Rule was promulgated. The gap is intended to provide water systems with adequate time to develop a compliance strategy (i.e., developing a new source, installing new treatment, or forming partnerships with other water systems).
- The Arsenic Rule also adds certain new requirements for the CCRs due July 1, 2002 and beyond (40 CFR 141.151):
  - A health effects statement if the water system's arsenic sampling results are greater than 0.010 mg/L and less than 0.05 mg/L (40 CFR 141.154(f)). This requirement ends in 2006; and,
  - An informational statement about arsenic if a system's results are less than or equal to 0.010 mg/L, but greater than 0.005 mg/L (40 CFR 141.154(b)).
- The Arsenic Rule also requires systems to provide a Tier 2 public notice for an arsenic MCL violation and to provide a Tier 3 public notice for a violation of the arsenic monitoring and testing procedure requirements (40 CFR Part 141, Subpart Q, Appendix A).

# Implementation Milestones



- There are a few Implementation Milestones associated with the Arsenic Rule.
  - On **January 22, 2001** EPA promulgated the Final Arsenic Rule. All compliance dates are set by SDWA and are based on the Rule promulgation date.
  - The Rule was to become final on March 23, 2001. However, after taking public comment on the Agency's plan to review the basis for the Arsenic Rule, EPA extended the effective date to **February 22, 2002**, while maintaining the compliance dates of **January 23, 2006** for the arsenic MCL, and **January 22, 2004** for the clarifications to compliance and new source contaminants monitoring (66 FR 28350).
  - States must submit their primacy revision applications for the Arsenic Rule by **January 22, 2003** (i.e., 2 years from the date of promulgation) (40 CFR 142.12(b)(1)).
    - States may apply for a 2-year extension. Applications for an extension must be submitted to EPA by **January 22, 2003** (40 CFR 142.12(b)(1)).
  - All new systems, or systems that use a new source of supply, that begin operation after **January 22, 2004** must demonstrate compliance with the MCLs within a period of time specified by the State. (40 CFR 141.23(c)(9), 141.24(f)(22), and 141.24(h)(20)).
  - The clarifications to compliance determinations for SOCs, IOCs, and VOCs take effect on **January 22, 2004**.
  - State primacy revision application package for those States receiving two-year extensions are due on **September 22, 2005**.
  - On **January 23, 2006** the revised MCL becomes enforceable.



# Arsenic Monitoring




- Placed in Standardized Monitoring Framework
- Rule flexibilities allow systems to continue current monitoring schemes
  - Grandfathered data allowed
  - Extension of monitoring deadline
- Waivers can be granted
- New system/new sources requirements

- An arsenic standard has existed since 1975. EPA, in the Final Rule, kept requirements simple.
- The Rule makes the arsenic monitoring requirements consistent with monitoring for other IOCs regulated under the Phase II/V standardized monitoring framework (SMF).
- The compliance date for requirements related to the revised arsenic standard is January 23, 2006. The 2005-2007 compliance period is the first monitoring period under the new MCL.
  - Because the Final Arsenic Rule allows grandfathered data and waivers, systems should not have to deviate from their current monitoring scheme.
  - Under the Final Arsenic Rule, States can grant a system a monitoring waiver for arsenic.
- To satisfy the monitoring requirements, all new systems or systems that use a new source, or that begin operation after January 22, 2004, must begin complying with the clarified compliance and new source contaminant monitoring, in accordance with a State-specified plan (40 CFR 141.23(c)(9)).
- States can modify the monitoring requirements of a PWS that supplies water to one or more other PWSs and the interconnection of the systems justifies treating them as a single system for monitoring purposes (i.e., consecutive PWSs) (40 CFR 141.29).

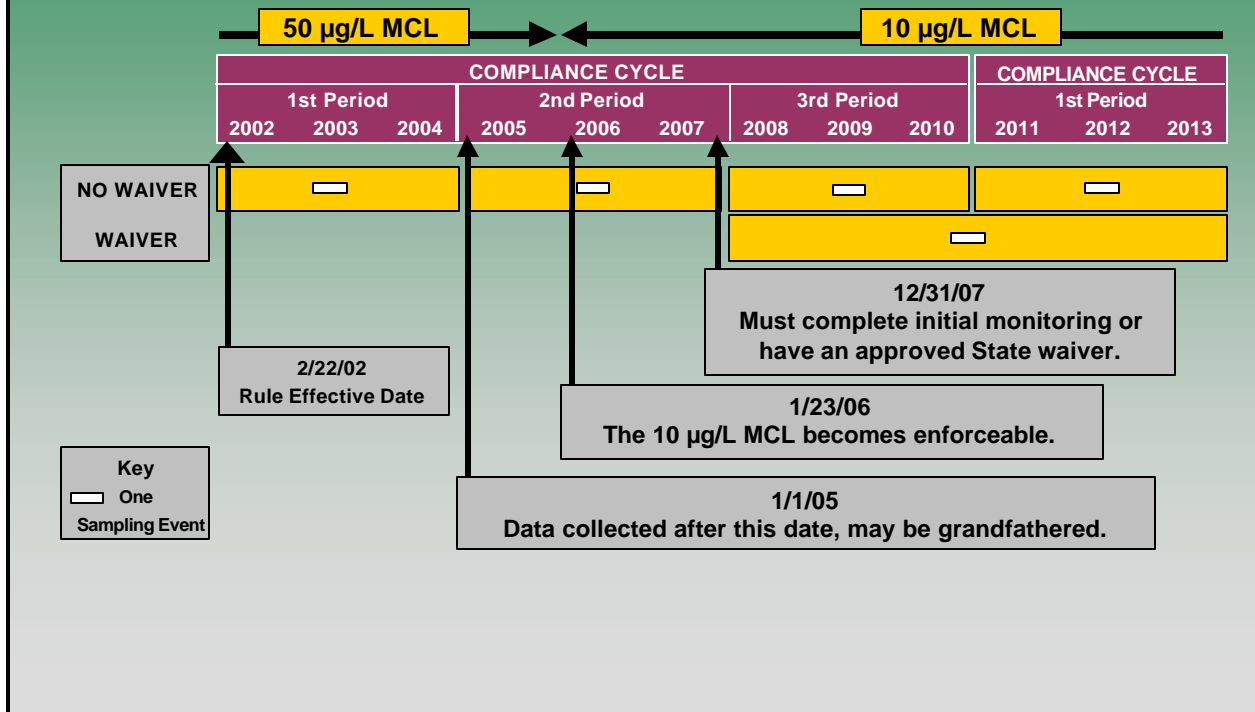
# Standardized Monitoring Framework for Inorganic Contaminants (IOCs)

	COMPLIANCE CYCLE									COMPLIANCE CYCLE		
	1st Compliance Period			2nd Compliance Period			3rd Compliance Period			1st Compliance Period		
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<b>GROUND WATER</b>	-			-			-			-		
<b>SURFACE WATER</b>	-	-	-	-	-	-	-	-	-	-	-	-

Key  
 One Sampling Event

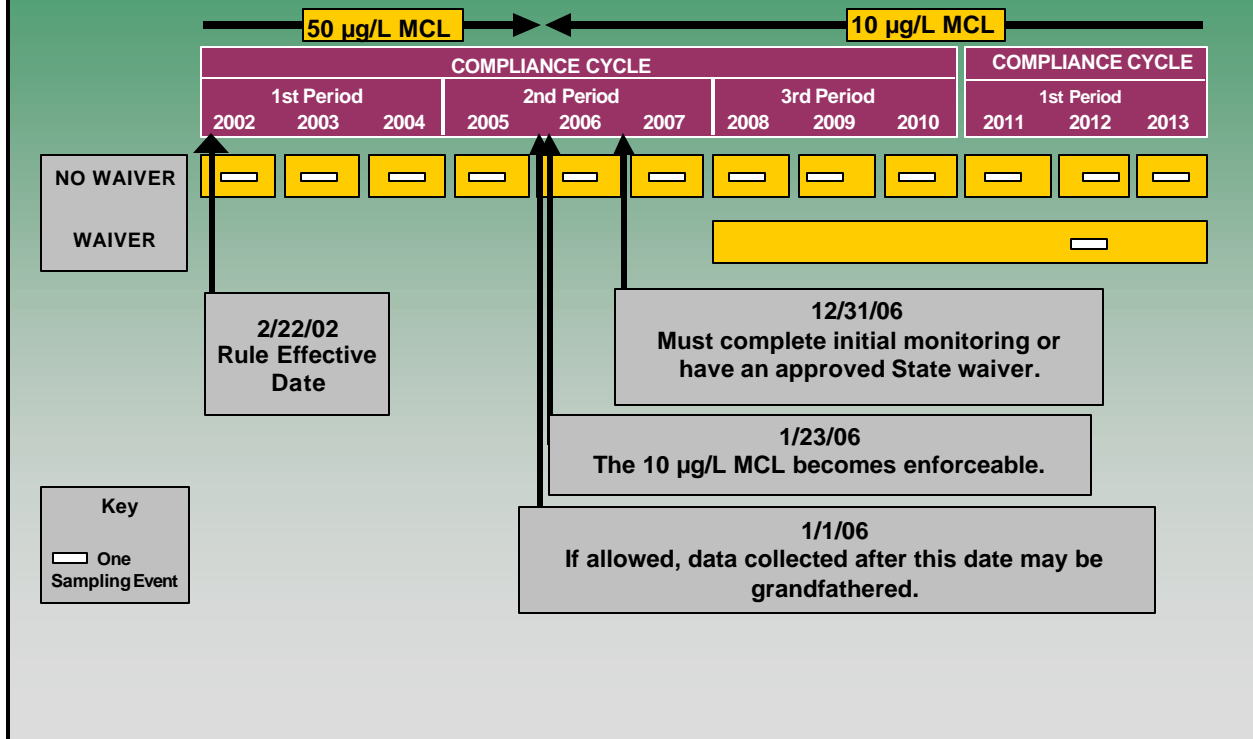
- The Phase II rule promulgated the SMF. The SMF standardized monitoring requirements within contaminant groups and synchronized monitoring schedules across the VOCs, IOCs, and SOCs.
  - Under the Phase II Rule, the monitoring requirements for asbestos, nitrate, nitrite, arsenic, and fluoride were different from other Phase II/V IOCs because of their unusual characteristics.
  - The Arsenic Rule makes the arsenic monitoring requirements consistent with monitoring for other IOCs regulated under the Phase II/V SMF.
- The SMF established a 9-year "compliance cycle" which is comprised of three, 3-year "compliance periods".
  - States may specify the year within the period that monitoring is required.
- Under the SMF for IOCs, surface water systems monitor once a year, and ground water systems monitor once in a compliance period (i.e., once every 3 years).
- The State may require more frequent monitoring or may require confirmation samples for positive or negative results (40 CFR 141.23(g)). Similarly, systems may apply to the State to conduct more frequent monitoring (40 CFR 141.23(h)).

# Standardized Monitoring Framework: Ground Water Systems



- Under the SMF, ground water systems are required to sample for arsenic once every three years.
- To allow systems to stay on their current monitoring schedule, the Arsenic Rule extends the date to complete the first round of monitoring under the Rule and allows systems to grandfather data (if allowed by the State).
- In accordance with the Arsenic Rule, ground water systems must complete sampling by December 31, 2007 or have a State approved waiver.
- States can allow ground water systems to grandfather data taken between January 1, 2005 and January 23, 2006 under certain circumstances.
  - Additional information on grandfathered data appears later in this presentation.

# Standardized Monitoring Framework: Surface Water Systems



- Under the SMF, surface water systems are required to sample for arsenic every year.
  - Surface water systems include systems using ground water under the influence of surface water (GWUDI).
- In accordance with the Arsenic Rule, surface water systems must complete sampling by December 31, 2006 or have a State approved waiver.
  - Additional information on waivers appears later in this presentation.
- States can allow surface water systems to grandfather data taken between January 1, 2006 and January 23, 2006 under certain circumstances.
  - Additional information on grandfathered data appears later in this presentation.

# Systems May Grandfather Data If:



- State approves
- Samples are less than 10 µg/L
- Samples are taken:
  - 01/01/05 and 01/23/06 (Ground Water)
  - 01/01/06 and 01/23/06 (Surface Water)
- Lab analyzed with approved method
  - Two inductively coupled plasma-atomic emission spectroscopy (ICP-AES) methods (EPA Method 200.7 and SM 3120 B) no longer allowed for compliance

- Grandfathering of data is at the State's discretion. States may allow systems to grandfather data under the following circumstances (40 CFR 141.23(c)(4)):
  - A ground water system collects its sample for the 2005-2007 compliance period between January 1, 2005, and January 23, 2006.
  - A surface water system collects its annual sample for 2006 between January 1, 2006, and January 23, 2006.
  - The data are consistent with the sampling/analytical methodology approved for use by this Rule;
  - Analytical results are less than 0.010 mg/L; and,
  - The analytical detection limit used to analyze the samples is less than 0.008 mg/L (8 µg/L).
    - Data collected using methods with detection levels at or above 0.008 mg/L (8 µg/L) (e.g., EPA method 200.7 or Standard Method (SM) 3120B, which both use inductively coupled plasma-atomic emission spectroscopy (ICP-AES) technology) are not eligible for grandfathering.
- If grandfathered data are used to comply with the compliance period and the analytical result is greater than 10 Fg/L, that system will be in violation of the revised MCL on January 23, 2006.
- Grandfathering is beneficial because systems will:
  - Remain on the SMF;
  - Not need to take any additional samples; and,
  - Not incur additional analytical costs.

# 9-Year Waivers Allowed for IOCs



- Ground water systems must have at least 3 rounds of monitoring results
- Surface water systems must have at least 3 years of monitoring results
- All previous samples must be under 10 ppb
- Once waiver issued, system must sample once during each 9-year waiver period

- The final Arsenic Rule allows States to issue waivers for arsenic monitoring by incorporating arsenic into the SMF (40 CFR 141.23(c)(4)).
- Systems may be eligible for waivers if (40 CFR 141.23(c)(3)&(4)):
  - The system has data from at least three sampling periods.
    - Ground water systems must have sampling results from a minimum of 3 compliance periods.
    - Surface water systems must have at least 3 years of sampling results.
  - The data were collected consistent with the analytical methodology of the Arsenic Rule.
    - After January 23, 2006, analytical methods using ICP-AES technology may not be used because the detection limits for these methods are 0.008mg/L (8µg/L) or higher (40CFR 141.23(k)(1)). This restriction means that the two ICP-AES methods (EPA Method 200.7 and SM 3120 B) may not be used for waivers.
  - All sampling results are below the MCL.
- Once a waiver is issued, the system must take at least one sample during each nine-year waiver period.

# IOC Waiver Criteria



- 40 Code of Federal Regulations (CFR) 141.23(c)
- Factors to Consider
  - All previous monitoring data
    - Quality and amount of data
    - Length of time covered
    - Proximity of results to MCL
    - Detection limit of method
  - Variations in reported concentrations
  - Factors that may affect concentrations

- When issuing a waiver, a State **must** consider:
  - All previous monitoring data;
  - The variation in reported concentrations; and
  - Other factors that may affect concentrations such as changes in pumping rates, system configuration, operating procedures, or stream characteristics (40 CFR 141.23(c)(5)).
- States **should** also consider:
  - The quality and amount of data available;
  - The length of time covered;
  - The volatility/stability of the sampling results; and,
  - The proximity of results to the MCL.
- Data can be gathered from sanitary surveys, emergency response activities, source water assessments, and from new source monitoring records.

# Source Water Assessments Can Help



- Substitute Vulnerability Assessment for Waiver Criteria if:
  - It was completed under an approved Source Water Protection Program
  - State considered
    - All previous monitoring data
    - Variations in reported concentrations
    - Factors that may affect concentrations

- Many States have found their source water assessments to be useful tools for waivers.
- States may substitute the assessment from an approved source water assessment program if when doing the assessment, the State considered all of the 40 CFR 141.23(c) requirements.
- In order to make a waiver determination using a vulnerability assessment, States should gather data on such things as:
  - Land use patterns;
  - Source water protection activities; and,
  - The use or occurrence of arsenic near the source of supply.
- Potential Data sources include:
  - Source Water Assessments;
  - State/USGS;
  - Well data;
  - GIS systems;
  - United States Department of Agriculture (USDA);
  - Pesticide State Management Plan; and,
  - EPA's *A Review of Contaminant Occurrence in Public Water Systems* which can be found at <http://www.epa.gov/safewater/occur/occur.html>.



# New Source Contaminants Monitoring



- For new systems and new sources beginning operation after January 22, 2004:
  - Must demonstrate compliance using State-specified sampling and compliance periods
  - For all IOCs, synthetic organic contaminants (SOCs), and volatile organic contaminants (VOCs)

- EPA codified current practice. EPA was asked to make this clarification during development of the Arsenic Rule.
- New systems commencing operation after January 22, 2004, or systems using a new source of supply after this date, must collect monitoring samples for all IOCs, SOCs, and VOCs within a period and at a frequency determined by the State (40 CFR 141.23(c)(9), 141.24(f)(22), and 141.24(h)(20)).
- The State must specify sampling frequencies to ensure that a system can demonstrate on-going compliance with MCLs (40 CFR 141.23(c)(9), 141.24(f)(22), and 141.24(h)(20)).

# Compliance



- New compliance determination for IOCs, SOCs, VOCs
- Violations
- Rounding

- EPA, in the final Arsenic Rule, clarified compliance for monitoring after an exceedance for IOCs, SOCs, and VOCs.
- The next few slides provide information on how to:
  - Calculate compliance;
  - Determine whether a system has violated the arsenic MCL; and,
  - Round arsenic analytical results.

# IOC, VOC, & SOC Compliance -- New Requirements



- For systems monitoring annually or less often
  - MCL exceedance triggers quarterly monitoring
  - Violation based on 4 quarters of monitoring
    - Unless a sample will cause the running annual average to exceed the MCL
  - Violation if annual average exceeds MCL

- Currently, for systems monitoring annually or less often, an exceedance of the MCL is a violation. The new compliance determination, which takes effect for compliance purposes on January 22, 2004, bases compliance determinations on a running annual average.
- Any system that has a sampling point monitoring result which exceeds the MCL must increase the frequency of monitoring at that sampling point to quarterly sampling (40 CFR 141.23(c)(7)).
  - Quarterly sampling must begin the quarter after the exceedance occurred. States may require confirmation samples after the initial exceedance.
  - Systems are only required to conduct quarterly monitoring at the sampling point at which the sample was collected and for the specific contaminant that triggered the system into the increased monitoring frequency (40 CFR 141.23(i)).
  - The original exceedance, or the average of the exceedance and any required State confirmation samples, counts as the first quarter.
- If the running annual average after four consecutive quarters of sampling exceeds the MCL, the system is in violation of the MCL.
  - However, any sample result that would cause the running annual average to exceed the MCL at any sampling point (e.g., the sampling result is 4 times the MCL), the system is out of compliance with the MCL immediately.
- The running annual average is calculated during the initial year of quarterly sampling with the “best-case scenario” assumption that future quarterly samples will be 0.0 mg/L. Therefore, a system will not be considered in violation of the MCL until it has completed one year of quarterly sampling UNLESS a single sample during this period would cause the running annual average to exceed the MCL.
  - For example, if the results from any sample during the first year of quarterly sampling for arsenic are above 0.04 mg/L (40 µg/L), the system is immediately in violation of the MCL, because even in the best case scenario (the other quarterly samples = 0.00 mg/L) the running annual average would still exceed the MCL.

# Compliance Determination



**Step 1** Sample each sampling point

**If >10 mg/L**

**Step 2** Step 2a: Take any required confirmation samples and average results  
Step 2b: If average >10 mg/L begin quarterly sampling

**Step 3** After 4 consecutive quarters determine running annual average by adding results and dividing by number of samples taken

- Systems with an entry point result that exceeds the MCL must:
  - Take any State required confirmation samples;
  - Average the results of the initial sample and any required confirmation samples; and,
  - Return to quarterly sampling if the average exceeds the MCL, or if required by the State.
- Systems triggered into increased monitoring will not be considered in violation of the MCL until they have completed one year of quarterly sampling. However, if any sample result will cause the running annual average to exceed the MCL at any sampling point (e.g., the sampling result is four times the MCL), the system is out of compliance with the MCL immediately.
- For the purpose of calculating the running annual average, the initial exceedance is considered to be the first quarterly sample.
- If a system does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance is based on the running annual average of the samples collected (40 CFR 141.23(i)(1)).
  - States may require a system that fails to take a quarterly sample to either collect the missing sample as soon as possible, or to collect the sample the following year in the quarter that was missed.
- If a sample result is less than the method detection limit, zero should be used to calculate the annual average.
- NOTE: The preamble of the Arsenic Rule is clear that this change should effect IOCs, VOCs, & SOCs. However, an editorial oversight retained the proposed regulatory language in 40 CFR 141.23(i)(2) while correctly stating the quarterly monitoring for compliance for organics in 40 CFR 141.24(f)(15)(i) and 141.23(h)(11)(i) in the Final Arsenic Rule. EPA intends to consistently implement compliance determination. Compliance determination for IOCs is the same as for organic contaminants. States adopting these regulations by reference need to take note.

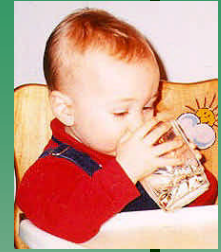
# Speaking of 10....



14 <sup>1</sup> 10

- EPA's position is clear: the arsenic standard is meant to be 0.010 mg/L (10 ppb).
- States need to take into account systems with arsenic levels between 10 ppb to 14 ppb as they establish their arsenic compliance strategy.

# Determining Compliance & Rounding



- Arsenic added to IOCs listed in the 40 CFR 141.62 (b) table as .01 mg/L
- EPA guidance says round to same number of significant figures
- **HOWEVER:** Special rule requirement for arsenic
- Compliance governed by 40 CFR 141.23
- **“Arsenic sampling results will be reported to the nearest 0.001 mg/L”  
40 CFR 141.23(i)(4)**

- EPA’s Water Supply Guidance #72 (now Guidance # 21), issued on April 6, 1981, states that MCLs are expressed in the number of significant figures permitted by the analytical data and that data reported to the State and EPA should be expressed in the same form as the MCL.
  - However, Water Supply Guidance #21 does not apply to arsenic because of special provisions written into the Arsenic Rule.
  - Guidance #21 would allow a system to round 14.5 µg/L and report 0.01 mg/L. This would allow the system to be in compliance when in reality, a result of 14.5 µg/L is an exceedance of the revised MCL.
  - It was clearly not the intent of the Rule to have 14 equal 10.
- For the purposes of compliance determination, analytical results for arsenic will be reported to the nearest 0.001 mg/L (40 CFR 141.23(i)(4)).
- For purposes of rounding, the last digit should be increased by one unit if the digit dropped is 5 or greater. If the digit dropped is 4 or less, do not alter the preceding number.
  - For example, analytical results for arsenic of 0.0105 mg/L would round off to 0.011 mg/L while a result of 0.0104 mg/L would round off to 0.010 mg/L.
- EPA looking into actions necessary to enforce the 0.010 mg/L, and 40 CFR 141.23(i)(4) states that “arsenic sampling results will be reported to the nearest 0.001 mg/L” (one significant-figure past the MCL figure).

# 10.5 ppb is a Violation



- EPA clearly intended a standard of 10 ppb
- Cost analysis in Rule is based on 10 ppb (0.010 mg/l)
- Rule preamble consistently refers to 10 ppb (98 times)
- EPA consistently discussed 10 ppb in press releases and stakeholder meetings

- Reporting to the nearest 0.001 mg/L means that any sampling result that is equal to or greater than 0.0105 mg/L is an exceedance of the arsenic MCL.
- January 25, 2002 memo from Cynthia Dougherty to the EPA Regions Water Division Directors, reiterates EPA's position.
- EPA clearly intended the arsenic MCL to be 10 ppb. Any rounding scheme that allows anything over 10 ppb to escape enforcement action, is not acceptable.



# Analytical Methods

- In previous rulemakings, several analytical methods and method updates were approved for the analysis of arsenic in drinking water. The methods and updates are based on atomic absorption, atomic emission and mass spectroscopy methodologies and have been used for compliance monitoring of arsenic at the 0.05 mg/L (50 Fg/L) MCL by State, federal and private laboratories for many years.



# Approved Analytical Methods

Reference Method	Technique	MDL (µg/L)
EPA Method 200.8	Inductively Coupled Plasma-Mass Spectrometry	1.4 (0.1) <sup>1</sup>
EPA Method 200.9	Stabilized Temperature Graphite Furnace Atomic Absorption	0.5 (0.1) <sup>2</sup>
Standard Methods 3113 B	Electrothermal Atomic Absorption Spectrometric Method	1
ASTM D 2972-93C	Atomic Absorption, Graphite Furnace	5
Standard Methods 3114 B	Manual Hydride Generation/Atomic Absorption Spectrometric Method	0.5
ASTM D 2972-93B	Atomic Absorption, Hydride Generation	1

- Six methods are currently approved for the analysis of arsenic in drinking water.
- In 1994, EPA approved the use of selective ion monitoring with Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). ICP-MS with this modification is capable of achieving a method detection limit of 0.1 µg/L ("Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA/600/R-4/111, USEPA, 1994). Advantages include a short analysis time, lower detection limits and multi-analyte capabilities. However, instrument acquisition can be costly and the analysis for arsenic is subject to interference from the formation of an argon chloride in high chloride water samples.
- In 1994, EPA approved the use of multiple depositions with stabilized temperature platform graphite furnace atomic absorption (STP-GFAA). The use of multiple depositions with STP-GFAA is capable of attaining a method detection limit of 0.1 µg/L ("Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA/600/R-4/111, USEPA, 1994). GFAA instrumentation is widely available; however analysis time is longer using multiple injections.

# Withdrawn Analytical Methods



- ICP-AES 200.7
- Standard Method (SM) 3120B

**Rationale? They don't detect low enough**

- EPA is withdrawing two ICP-AES methods (EPA methods 200.7 and SM 3120B) because these methods are inadequate to reliably determine the presence of arsenic at the MCL of 0.01 mg/L (10 Fg/L).
  - ICP-AES 200.7 was not widely used. EPA does not expect that removal of this method will interfere with water quality analysis.
- Until January 23, 2006 systems may have compliance samples analyzed with these less sensitive methods.
  - Note that Primacy Agencies cannot grandfather compliance sample data analyzed with these methods.

Technique	Reference Method	Advantages	Disadvantages
ICP-MS	EPA 200.8	<ul style="list-style-type: none"> <li>• Multi-analyte</li> <li>• Low MDL</li> <li>• Demand increasing</li> </ul>	<ul style="list-style-type: none"> <li>• High capital cost</li> <li>• Subject to interference from argon chloride in high chloride water samples.</li> </ul>
STP- GFAA	EPA 200.9	<ul style="list-style-type: none"> <li>• Widely Used</li> <li>• Low MDL</li> </ul>	<ul style="list-style-type: none"> <li>• Single Analyte</li> </ul>
GFAA	SM 3113B	<ul style="list-style-type: none"> <li>• Widely Used</li> <li>• Low MDL</li> </ul>	<ul style="list-style-type: none"> <li>• Single Analyte</li> </ul>
	ASTM D-2972-93C		
GHAA	SM 3114B	<ul style="list-style-type: none"> <li>• Low MDL</li> </ul>	<ul style="list-style-type: none"> <li>• Single Analyte</li> </ul>
	ASTM D-2972-93B		

- EPA Method 200.8 is a multi-analyte method, meaning other analytes besides arsenic can be measured during the analysis. The primary advantage of using a multi-analyte method is realized if the same method is approved for compliance monitoring of other regulated analytes.
  - Most labs usually charge per analyte. The multi-analyte method therefore is not significantly less expensive than the single analyte methods.
- The remaining five analytical methods approved by EPA for the measurement of arsenic in drinking water are all element-specific or single-analyte techniques (can only measure arsenic).
- The graphite furnace atomic absorption (GFAA) techniques:
  - EPA 200.9 and SM 3113 B employ the use of STP-GFAA technology that significantly reduces interferences and improves analytical sensitivity.
  - ASTM 2972-93 C employs regular hollow graphite tubes with off-the-wall atomization.
- The gaseous hydride atomic absorption (GHAA) techniques employ zinc in hydrochloric acid or sodium borohydride to convert arsenic to its volatile hydride.
  - In ASTM 2972-93 B, the arsenic hydride is removed from the sample by a flow of nitrogen into an argon- or nitrogen-entrained hydrogen flame where it is determined by atomic absorption at 193.7 nm.
  - In SM 3114 B, the volatile hydrides may also be swept into an entrained hydrogen flame, or alternatively, into a quartz atomization cell positioned in the optical path of an atomic spectrophotometer. Quartz atomization cells provide the most sensitive arsenic hydride determinations and minimize background noise associated with hydrogen flames.

# Consumer Information for Arsenic



- Consumer Confidence Reports (CCRs)
  - Effective 2/22/02
  - New health effects requirement
  - New education statement
- Public Notification Rule

- The 1996 Amendments to the SDWA focused on increased public safety and public right-to-know provisions.
- In response, EPA promulgated the Consumer Confidence Report (CCR) Rule and revisions to the Public Notification (PN) Rule to increase the quantity and quality of information reaching consumers.
- The 2001 Arsenic Rule updates the specific CCR health effects language for arsenic (40 CFR 141.154(f)) and requires the inclusion of an informational/educational statement under certain conditions.
  - Systems must begin complying with the revised CCR requirements for those CCRs distributed after February 22, 2002 (40 CFR 141.6(j)).
- Systems must provide public notice for violations and in certain other circumstances (40 CFR Part 141, Subpart Q). The revised PN Rule (40 CFR Part 141, Subpart Q) went into effect for Primacy Agencies on May 6, 2002, or the date the revised primacy became effective, whichever was sooner.

# CCR: Major Points



- Applies to all CWSs
- Reports due by July 1 annually
- Includes:
  - Water system information
  - Sources
  - Detected contaminants
  - Violations information
  - Required educational information
  - Information on variance or exemption

- All CWSs must deliver a CCR to their customers by July 1 of each year (40 CFR 141.152(b)).
- The CCR provides a snapshot of water quality over the preceding year. CCRs must include:
  - The source of the drinking water;
  - A brief summary of the susceptibility to contamination;
  - How to get a copy of the water system's complete source water assessment;
  - The level (or range of levels) of any contaminant found;
  - EPA's health-based standard (MCLs);
  - The likely source of contamination;
  - Health effects language;
  - Compliance record;
  - An educational statement in certain circumstances; and,
  - Phone numbers of additional sources of information, including the water system's and EPA's Safe Drinking Water Hotline (800-426-4791).

CCR Due Date	And Detects Arsenic at . . .	Then the System Must Include the Following Statement(s) in the CCR		And the System Is Out of Compliance With the MCL
		Informational Statements	Health Effects Statements	
July 1, 2002 and beyond	> 0.005 mg/L (5 µg/L) but ≤ 0.01 mg/L (10 µg/L)	√		
July 1, 2002 thru July 1, 2006	>0.01 mg/L (10 µg/L) but ≤ 0.05 mg/L (50 µg/L)		√	
July 1, 2007 & beyond	>0.01 mg/L (10 µg/L)		√	√

- SDWA 1414(c)(4)(B)(vi) allows the EPA Administrator to require systems to include health effects language for up to three regulated contaminants even if the system has not violated the MCL. EPA believes that customers should be provided the most current understanding of the risk presented by arsenic.
  - Currently, systems must include health effects information for any sampling points violating the 0.05 mg/L (50 µg/L) standard (40 CFR 141.154(b) and 141.153(d)(6)).
- The Arsenic Rule added two new requirements, which became effective with the 2002 CCRs.
  - Systems are required to include the informational statement if they detect arsenic at levels above 0.005 mg/L and up to and including 0.010 mg/L.
  - In addition, until January 22, 2006, systems detecting arsenic at levels above 0.010 mg/L and up to and including 0.05 mg/L must include the health effects statement.
  - Systems with sampling results above 0.05 mg/L must also include a notification explaining that they are in violation of the arsenic MCL and provide the health effects statement.
  - After January 22, 2006, systems with a running annual average of arsenic at levels above 0.010 mg/L must include a notification explaining that they are in violation of the arsenic MCL and provide the health effects statement.
- The February 22, 2002 effective date affects systems that monitored for arsenic before that date. A system that collected samples before the February 22, 2002 effective date from all required sampling points, and does not sample again in 2002 or 2003, must use results from the samples taken before February 22, 2002, for CCRs due 2003 and 2004 (40 CFR 141.153(d)(3)(i)). If the result of the sample is greater than 0.005 mg/L but less than or equal to 0.010 mg/L, the system must include an informational statement. If the sample result is greater than 0.010 mg/L but less than or equal to 0.05 mg/L, the system must include the health effects statement from the Final Arsenic Rule (40 CFR 141.154(b)&(f)).

**Health  
Effects  
Statement**

- 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.

**Informational  
Statement**

- 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.

- This slide provides the health effects statement and the informational statement that must be included if arsenic is found in the finished water at certain levels.
- Systems are required to include the health effects statement if any sampling result is above 10 ppb and the informational statement if any sampling result is between 5 and 10 ppb.
- States may allow alternate informational statements that are consistent with EPA's statement. It should include at a minimum, information that the drinking water contains low levels of arsenic and EPA is continuing to research the effects of low levels of arsenic.

# Public Notification Rule: Requirements for Arsenic



- **In 2006, applies to NTNCWSs**
- **Tier 2 public notice after MCL violation**
  - Report to State within 24 hours
  - Send notice to customers within 30 days
  - Standard health effects language in Appendix B to Subpart Q
  - Population at risk & actions to take
  - Posted in conspicuous locations (e.g., newspapers)
  - Repeat every 3 months unless State decreases to annual
- **Tier 3 for arsenic monitoring & testing violations**

- The revised PN Rule (40 CFR Part 141, Subpart Q) was effective for Primacy Agencies on May 6, 2002, or the date the revised primacy became effective, whichever was sooner. For Direct Implementation programs, the revised PN Rule went into effect October 31, 2000.
- PN requirements will apply to NTNCWSs for the first time in 2006.
- The Arsenic Rule requires CWSs and NTNCWSs to provide
  - A Tier 2 public notice for an arsenic MCL violation. Notice is required within 30 days. Primacy agencies may grant extensions of up to three months for the initial notice under certain conditions.
  - A Tier 3 public notice for a violation of the arsenic monitoring and testing procedure requirements. Notices for Tier 3 violations can be combined into one annual notice, including the CCR, if timing and delivery requirements can be met.
- After providing notice to consumers, the water system must send the State a copy of each type of public notice (e.g., newspaper, radio, mail notices, etc.) along with a letter certifying that the system has met all of the public notification requirements.
  - The system must send this information to the State within 10 days of completion of each public notice (40 CFR 141.31(d)).





# Rule Flexibilities

POU Treatment Strategies

Variances

Exemptions

- The Arsenic Rule includes certain flexibilities that may help systems meet the January 23, 2006 MCL compliance date. These include:
  - The option to use point-of-use treatment technologies;
  - Variances; and
  - Exemptions.
- The next few slides will introduce these three flexibilities. Additional information can be found:
  - In other presentations delivered during the Arsenic Rule training sessions conducted by EPA in 2002;
  - On EPA's web site at <http://www.epa.gov/safewater/arsenic.html>;
  - and,
  - In Appendix G of the Arsenic State Implementation Guidance.

# Treatment Options



- Rule listed Best Available Technologies (BATs) and Small System Compliance Technologies (SSCT)
- Adsorptive media on a throwaway basis is expected to be most commonly used
- Point-of-Use Treatment Devices (POU) listed as SSCT
  - Reverse Osmosis
  - Activated Alumina
  - Affordable option for very small water systems

- EPA listed seven best available technologies (BATs) in the Final Arsenic Rule (66 FR 6976).
  - EPA determined these technologies to be the BATs for the removal of arsenic in drinking water based on a demonstration of efficacy under field conditions taking cost into consideration (40 CFR 141.62(c) and SDWA 1412(b)(4)(D)).
  - Additional details can be found in the EPA's *Technologies and Costs for the Removal of Arsenic From Drinking Water*, December 2000.
- The technologies examined for BAT determinations were also evaluated as small system compliance technologies (SSCTs). EPA has listed SSCTs that may achieve compliance with the arsenic MCL and that are affordable and appropriate for small drinking water systems.
- The challenges facing small drinking water systems were a major focus of the 1996 Amendments to the SDWA. One way Congress sought to help systems meet these challenges was by allowing systems to install POU treatment devices to achieve compliance with the NPDWRs (SDWA §1412(b)(4)(E)(ii)). Point-of-entry (POE) devices were already allowed under the SDWA and are regulated under 40 CFR 141.100.
  - After evaluating a variety of treatment technologies, EPA has concluded that POU reverse osmosis and POU activated alumina are SSCTs (40 CFR 141.62(d)).

# POU/POE (Point-of-Use/Point-of-Entry)



- Require programs to ensure proper long-term operation, maintenance, and monitoring
- Safe Drinking Water Act (SDWA) Requirements
- Must be owned, controlled and maintained by the system
- Must be equipped with mechanical warnings

## EPA Is Developing POU Guidance for Water Systems and Primacy Agencies

- To ensure that POU and POE devices are as protective of public health as central treatment, SDWA requires that (SDWA §1412(b)(4)(E)(ii)):
  - POU and POE units to be owned, controlled, and maintained by the PWS or by a contractor hired by the PWS to ensure proper operation and maintenance of the devices and compliance with the MCLs.
  - POU and POE units to have mechanical warnings to automatically notify customers of operational problems.
- EPA believes that it is feasible for a small system to own, control, and maintain POE/POU devices for arsenic MCL compliance.
- SDWA allows PWSs to contract out these functions to reduce labor burden.
- The compliance agreement between the State and the system must require monitoring that is as protective of public health as is monitoring for a system using centralized treatment.
  - The State can amend the agreement to increase or reduce the monitoring frequency depending on the initial monitoring results.
- EPA has a draft POU guidance on its website at:  
<http://www.epa.gov/safewater>

# Variations



- No small system variations allowed [SDWA 1415(c)]
  - Small system compliance technologies identified
- General variations allowed [SDWA 1415(a)]
- The system must:
  - Install a BAT
  - Follow a compliance schedule established by the State

- EPA did not identify small system variance technologies for arsenic under SDWA 1415(e). Therefore, small system variations are not available for the Final Arsenic Rule.
- If a system cannot meet the arsenic MCL because of the characteristics of its raw water sources, it may be eligible for a variance under SDWA 1415(a) and 40 CFR 142.20(a) on condition that:
  - The system install, operate, and maintain a BAT (all system sizes), a SSCT (systems serving fewer than 10,001 people), or other means as determined by EPA (SDWA 1415(a)(1)(A) and 40 CFR 142.62(c)); and,
  - A State evaluation indicates that alternative sources of water are not reasonably available (SDWA 1415(a)(1)(A)).
  - Enter into a compliance schedule with the State; and,
  - Continue to deliver water that does not create an unreasonable risk to its customers' health.
- Eligibility for a variance from the MCL for arsenic also requires that the public be given an opportunity for a public hearing on the compliance schedule.

# Exemptions [1416(a)]



- Useful prioritization tool for states
- Provides additional time for the most disadvantaged systems
  - Up to 9 additional years for small water systems
- Puts system on path to compliance
- EPA is developing guidance to streamline approach

- EPA believes that the best option is for all systems to be in compliance by 2006. EPA recognizes that some systems may need more time due to economics or other reasons. Exemptions can be a way to help these systems while reducing the public health risk.
- EPA believes that exemptions can be granted in a straightforward and streamlined manner and are practical options that States can use during the implementation of the Arsenic Rule as part of an overall enforcement and compliance program.
- Exemptions allow States to meet several goals including:
  - Setting appropriate and realistic compliance schedules.
  - Providing systems with additional, and often necessary, time to come into compliance.
  - Reducing the implementation and enforcement burden on States since they can begin issuing exemptions now, well before the January 23, 2006 compliance date.
- Eligible systems can receive up to three additional years. Systems serving up to 3,300 people can receive extensions of up to 6 additional years.
- More information about variances and exemptions can be found at:
  - EPA's Exemptions and Variance web page [www.epa.gov/safewater/standard/ve-fs.html](http://www.epa.gov/safewater/standard/ve-fs.html)
  - Final Arsenic State Implementation Manual at <http://www.epa.gov/safewater>

# Additional Information



- [www.epa.gov/safewater/ars/implement.html](http://www.epa.gov/safewater/ars/implement.html)
  - Draft Arsenic Implementation Guidance
    - POU & Exemption Draft Guidance
  - Quick Reference Guide
  - January 22, 2001 Final Rule
  - Rulemaking documents
    - Proposed rule
    - Technologies & Costs, 4/99 and 12/00 (pdf)
    - Economic Analysis for Final Rule

**Safe Drinking Water Hotline**  
**(800) 426-4791 or (703) 285-1093**  
**[sdwa@epa.gov](mailto:sdwa@epa.gov)**

- EPA has posted many documents on their web site concerning the development and implementation of the Arsenic Rule. These documents can be obtained by visiting EPA's web site or by calling the Safe Drinking Water Hotline.