The Safe Drinking Water Act and the Arsenic Rule

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Arsenic in Drinking Water
Discussion Panel - ITRC Fall Meeting
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Overview

- SDWA regulatory framework
- Arsenic final rule
- Analysis of system impacts
- Implementation
SDWA’s Approach to Public Health Protection

- Prevention
- Standards & Treatment
- Distribution System

Multiple opportunities for health protection from source to use
SDWA Standards and Treatment

- CCL
  - Unregulated Contaminant Monitoring Regulation
  - Occurrence Data
  - National Contaminant Occurrence Database
    - Human Exposure
      - Health Risks
      - Regulation?
        - Health Effects Studies
Roles and Responsibilities under SDWA

**EPA** sets health-based drinking water standards and provides implementation guidance for States and systems.

**Primacy States** implement standards and provide financial and technical assistance to systems.

**Public water systems** comply with water quality standards.

**Consumers** benefit from standards and pay “pass-through” compliance costs.
SDWA Regulates Public Water Systems

- Public Water Systems serve 15 connections or 25 people for at least 60 days/year
- Three types of PWS
  - Community Water Systems (CWS’s)
    - 15 connections or 25 people serving year-round residents
  - Non-Community Water Systems
    - Non Transient (NTNCWS) -- serves 25 of same persons for 6 months/yr
    - Transient (TNCWS) -- serves 25 persons/day for 60 days/yr
Public Water Systems

Number of systems
- CWS: 88,000
- NTNCWS: 54,000
- TNCWS: 20,000

Population served (mil.)
- CWS: 6.3
- NTNCWS: 23.2
- TNCWS: 273.3
1. Identify Maximum Contaminant Level Goal (MCLG): 0 ppb

2. Identify a Maximum Contaminant Level (MCL): 10 ppb

3. Identify Best Available Technology (BAT)

4. List affordable compliance technologies for small systems

5. Establish monitoring, analytical methods, reporting, and record keeping requirements
## Arsenic Rule Benefit-Cost Analysis

<table>
<thead>
<tr>
<th>MCL Option</th>
<th>Economic Analysis ($million)</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantified Benefits</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$213.8 - $490.9</td>
<td>$792.1</td>
</tr>
<tr>
<td>5</td>
<td>$191.1 - $355.6</td>
<td>$471.7</td>
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<tr>
<td>10</td>
<td>$139.6 - $197.7</td>
<td>$205.6</td>
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<tr>
<td>20</td>
<td>$46.1 – $53.8</td>
<td>$76.5</td>
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</tbody>
</table>
Arsenic Rule Cost Analysis

- Costs include:
  - Capital cost of new treatment
  - O&M cost of new treatment
  - Monitoring costs
  - Administrative costs
- “Bottom-up” analysis for national costs
  - Estimate costs at facility level
  - Monte-Carlo simulation to incorporate uncertainty
Arsenic Rule Cost Analysis

Expected Number of Affected Systems
- national GW and SW arsenic distributions
- national GW and SW systems

Expected System Capital and O&M Treatment Cost
- system flow
- occurrence
- # entry points
- treatment options

National Cost Analysis
- total annual costs
- average household costs

\[ \text{National Cost Analysis} = \text{Expected Number of Affected Systems} \times \text{Expected System Capital and O&M Treatment Cost} \]
## Arsenic Rule BAT and SSCT

<table>
<thead>
<tr>
<th>Technology</th>
<th>BAT</th>
<th>SSCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mod. lime softening</td>
<td>yes</td>
<td>1,2,3</td>
</tr>
<tr>
<td>Mod. coagulation/filtration</td>
<td>yes</td>
<td>1,2,3</td>
</tr>
<tr>
<td>Anion exchange</td>
<td>yes</td>
<td>1,2,3</td>
</tr>
<tr>
<td>Coag.-assisted microfiltration</td>
<td>no</td>
<td>2,3</td>
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<tr>
<td>Oxidation-filtration (greensand)</td>
<td>yes</td>
<td>1,2,3</td>
</tr>
<tr>
<td>Activated alumina</td>
<td>yes</td>
<td>1,2,3</td>
</tr>
<tr>
<td>Reverse osmosis</td>
<td>yes</td>
<td>2,3</td>
</tr>
<tr>
<td>Electrodialysis reversal</td>
<td>yes</td>
<td>2,3</td>
</tr>
<tr>
<td>POU reverse osmosis</td>
<td>no</td>
<td>1,2,3</td>
</tr>
<tr>
<td>POU activated alumina</td>
<td>no</td>
<td>1,2,3</td>
</tr>
</tbody>
</table>

1 = 25 to 500, 2 = 501 – 3,300, 3 = 3,301 – 10,000
Implementation Challenge

2,500 water systems serving 25 to 500 people + Many have minimal or no treatment + < 2 years to compliance date = Implementation Challenge
Small System Impacts

- EPA identified multiple SSCT
- No variance technologies
- General variance
- Exemption
  - Extends compliance schedule
  - Cannot pose unreasonable health risk
SDWA Exemptions

- **Any Size System**
- **Systems 25 - 3,300**

- 3 Year Exemption
- 2 Year Extensions
EPA’s Technical Assistance

- Treatment Technology Demonstration Projects ($12 million budget)
- Under development/review
  - GFH (granulated ferric hydroxide)
  - Media G2® (granular calcined diatomite)
  - SORB 33™ (granular ferric oxide)
  - AAFS-50 (activated alumina, iron modified)
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