Introduction to the United States Drinking Water Regulations

米国の飲料水に関する規制の紹介

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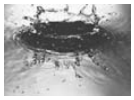

Introduction to the United States Drinking Water Regulations

Japan - U.S. Governmental Conference on Drinking Water Quality Management and Wastewater Control

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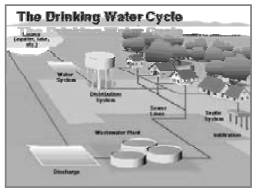
Outline of Presentation

- Background on the Safe Drinking Water Act (SDWA)
- Components of the SDWA
  - U.S. Regulatory Process
  - Implementation
  - Preventing Contamination
  - Compliance & Enforcement
- Future Goals and Challenges



Background

History of Drinking Water Regulation in the U.S.

- **Early History of Federal Drinking Water Standards**
  - 1914 U.S. Public Health Service (USPS) issued first national standards; were limited to bacteriological quality and were not binding on States or local governments
  - Standards were revised in 1925, 1942, 1946, and again in 1962.
  - The 1962 standards covered 28 contaminants and were the most comprehensive national drinking water standards at the time.
- **Concerns Led to Call for Comprehensive Regulations and Establishment of the Environmental Protection Agency**
  - A 1969 study found that 41% of the 1000 systems surveyed did not meet the required standards.
  - A 1972 EPA report on the quality of drinking water in New Orleans, Louisiana (which draws its water from the Mississipi River) listed 36 organic compounds.
  - In 1973, a government study (GAO) found that only 60 of 446 public water systems surveyed were in compliance with the USPHS standards.
  - In 1974, researchers in the U.S. and the Netherlands discovered that trihalomethanes (THMs) were formed as a by-product of disinfection.

Background

U.S. Congress Approves the Safe Drinking Water Act

- **1974: Congress Enacts the Safe Drinking Water Act (SDWA)**
  - SDWA established roles and responsibilities for EPA, States, and drinking water systems.
  - SDWA required EPA to establish mandatory National Primary Drinking Water Standards (NPDWRs)
  - EPA must develop a public health goal for contaminants and a mandatory level, the maximum contaminant level (MCL), set as close as feasible to the goal
  - SDWA gave States the responsibility for implementation and enforcement
  - SDWA established the Underground Injection program
  - SDWA established Sole Source Aquifer program
- **1986: Congress Amends the Safe Drinking Water Act**
  - Tried to address concerns about organic contamination and continuing violations of standards
  - Amendments accelerated rate of drinking water standard development (List of 83 by 1989 & 25 contaminants every 3 years -- focus on carcinogens)
  - SDWA mandated filtration and disinfection
  - SDWA banned the use of lead in public water systems
  - The Act required monitoring for unregulated contaminants
  - SDWA established the Wellhead Protection Program (WHP)

1996 SDWA

1996: Congress Amends the Safe Drinking Water Act

- **Congress made many important changes to the drinking water program when it revised the Safe Drinking Water Act in 1986.**
- **Congress changed *what* EPA does as an Agency and *how* it does its work.**
- **SDWA provided a new focus for the U.S. in the following areas:**
  - Improved the ability to *prevent* drinking water contamination wherever possible;
  - Elevated the importance of *public access* to drinking water quality data (Public Right-to-Know) to help ensure that the public is involved and active;
  - Focused on making U.S. drinking water *infrastructure* sound through new funding;
  - Renewed commitment to *risk-based* standard setting, strong science & robust data collection and analysis; and
  - Required notices that increased public participation and *accountability* of drinking water systems, states, and EPA to the public.

1996 SDWA

What Problem is being solved by U.S. Drinking Water regulations?

- ***U.S. regulations address acute health risks and the effects of short term exposure to contaminants.***
  - **Bacteria** (e.g., *e.coli)*
  - **Viruses** (e.g., Hepatitis-B)
  - **Protozoa (e.g., *Cryptospordium*, *Giardia*)**
  - **Nitrate** (methemoglobinemia --Blue Baby syndrome)
- ***U.S. regulations also address chronic health risks and the effects of long term exposure to contaminants.***
  - **Chemicals: metals** (e.g., arsenic); **synthetic organics** (e.g., pesticides), **and volatile organics** (e.g., benzene)
  - **Disinfectants and byproducts** (e.g., chlorine, chloroform)
  - **Radiation** (e.g., radon)
- ***U.S. regulations address risks that come from multiple sources.***
  - **Groundwater**
  - **Surfacewater**
  - **Distribution Systems**
  - **Etc**.


Giardia


Crypotosporidium

1996 SDWA

The Solution: SDWA's Multiple Barrier Approach to Public Health Protection


Prevention


Standards & Treatment


Distribution System


Public Information

Goal: Protect Current & Future Sources of Drinking Water

Standard Setting

U.S. Process for Establishing National Primary Drinking Water Regulations

Identify Maximum Contaminant Level Goal (MCLG)
(The level where "no known or anticipated adverse effects... [occur with] an adequate margin of safety.")

Identify a Maximum Contaminant Level (MCL) "as close to the MCLG as is feasible"
("means feasible with the use of the best technology, treatment techniques, and other means")

Do benefits justify costs?

No → **Consider raising MCL** ("to MCL ... that maximizes health risk reduction benefits at a cost justified by the benefits")

Yes →
- **Set MCL at the feasible level**
- **Identify Best Available Technology (BAT)**
- **List affordable compliance technologies for small systems**
- **List variance technologies**
- **Establish monitoring, analytical methods, reporting, and recordkeeping requirements**

Key Considerations

- Health Effects Occurrence Data
- Affordability Cost/Benefit Analysis Acceptable Risk Range
- Reliable & Accurate Methods Monitoring Burden

Standard Setting

Roles & Responsibilities Under SDWA

- EPA sets health-based drinking water standards
- States with primacy implement standards
- Public water systems are the regulated entity
- Costs of compliance are passed through to consumers

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Standard Setting

SDWA 96: A Changed Approach to Reflect Changing Priorities (SDWA Section 1412)

Risk-Based Contaminant Selection

Publish a list of contaminants known or anticipated to occur in drinking water *every 5 years*

Decide whether to regulate at least 5 contaminants *every 5 years*

Final regulations within 3 ½ years after determination

6 Year Review of Existing Regulations

Review and revise existing regulations *every 6 years*

Revisions shall maintain, or provide for greater protection of public health

Specific Priority Contaminants

- Arsenic
- Radon
- Sulfate
- Microbial/Disinfectant Byproducts
- Ground Water Rule
- Filter Backwash Recycling

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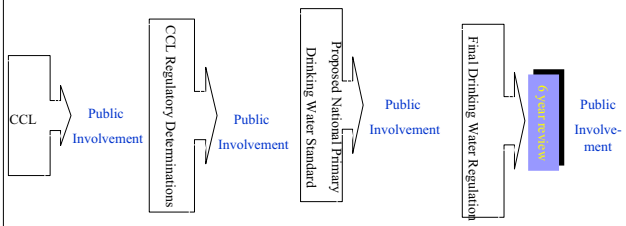
Steps in the U.S. Drinking Water Regulation Process



*CCL=Contandidate Candidate List

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Steps in the U.S. Drinking Water Regulation Process (cont'd)

- Step 1: Develop a preliminary drinking water contaminant candidate list (CCL).
- Step 2: Develop a final CCL after considering comments and information submitted during the public comment period.
- Step 3: Make regulatory determinations from the CCL either to regulate, or not to regulate a contaminant.
- Step 4: For contaminants EPA decides to regulate, develop a proposed regulation and publish a notice for public review.
- Step 5: Take comment on all aspects of the proposed regulation.
- Step 6: Publish a final national primary drinking water regulation (NPDWR).
- Step 7: Review NPDWRs and makes changes as necessary.

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Components in the Regulation Development Process

- **Science**
  - **Health Effects (acute, subchronic, chronic)**
  - **Treatment Effectiveness**
  - **Analytical Methods Development**
  - **Occurrence**
- **Economic Analysis**
  - **Cost of Compliance (capital, O&M, monitoring, reporting)**
  - **Benefits (illnesses & deaths avoided, quantified & unquantified)**
  - **Sensitive Subpopulations**
- **Technical Guidance**
- **Implementation Assistance**
- **Stakeholder Outreach**

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Standard Setting

EPA Promulgated 91 Health-Based Standards Through 2001

Year	Rule
1976	Interim: Synthetic Organics (pesticides), Inorganics (metals, nitrate), Radionuclides
1979	Trihalomethanes
1986	Fluoride
1987	Volatile Organics (benzene)
1991 -1992	Total Coliform Surface Water Treatment Lead & Copper Synthetic Organics (pesticides) Inorganic (metals)
1998	Stage 1 Disinfectants Byproducts Rule Interim Enhanced Surface Water Treatment
2000	Radionuclides (uranium) Arsenic

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Implementation

State Implementation -- Public Water Supply Supervision Program (SDWA Section 1413)

- **States**
  - Apply for "primacy" which gives them authority to implement drinking water regulations. They must demonstrate legal authority & technical/financial capacity.
  - 49 States have primacy (Wyoming, DC do not).
  - For each new regulation, States must apply to receive primacy authority - must adopt standards "at least as stringent" as the federal standards.
  - Until States receive Primacy -- EPA is responsible for implementing.
- **U.S. government provides support to States**
  - The *Public Water Supply Supervision* Grant Program provided $100M/yr (for 1997 - 2003).
  - EPA provides support via training, technical assistance, and data systems.

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Implementation

Assistance to States: The Drinking Water State Revolving Fund

- **EPA assesses State needs and distributes funds to states based on needs.**
- **States must fund highest priority projects needed for public health, compliance and affordability.**
- **States can help disadvantaged systems through principal forgiveness or 30 year loan terms.**
- **States can reserve a portion of their grant for activities that support the drinking water program, protect source water, and improve water system management.**

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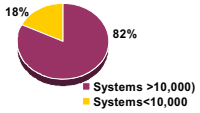
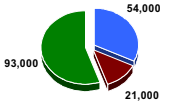
Public Water Systems: population served

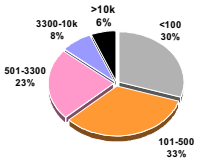
- **Non-Community Water Systems**
  - **Non Transient** -- e.g., some schools, hospitals
  - **Transient** -- e.g., highway rest stops, restaurants
- **Community Water Systems (CWSs)**
  - Serve year-round residents
  - Serve 93% of the population
  - Most of the population receives drinking water from large CWSs yet most water systems are small.



Population served by CWSs

168,000 Public Water Systems





Size Distribution of CWSs

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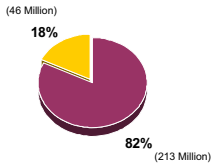
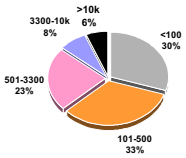
Most of the Population Receives Drinking Water from Large Community Water Systems -- Demographics of Community Water Systems

Population served by system size



Size Distribution of Community Water Systems



…yet most water systems are small (86%)

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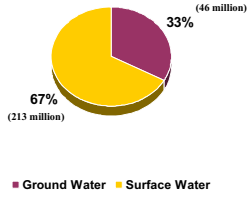
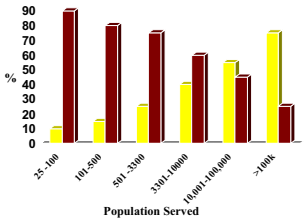
Most of the Population Receives Drinking Water from Surface Waters

Population Served by Drinking Water Source



Distribution of Community Water Systems by Source Water



…but most small systems use ground water

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Implementation

Public Awareness -- Consumer Confidence Reports (CCR) Required by the Safe Drinking Water Act

- **Drinking water systems are required to report to consumers annually on the quality of their drinking water.**
  - **CCRs must include:**
    - **(1) Information on the source of the drinking water.**
    - **(2) For regulated contaminants, the level found and associated MCLG & MCL.**
    - **(3) Information on the potential health effects from exposure to the contaminant (if there is a violation of the MCL).**

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Prevention

Protecting Drinking Water sources: Programs to Prevent Drinking Water Contamination

- **Wellhead Protection Program** (SDWA Section 1428)
  - States develop programs to protect areas around public water system wells
  - 49 States with EPA approved programs
- **Sole Source Aquifer** (SDWA Section 1424(e))
  - Communities, organizations, or individuals can petition EPA for protection of an aquifer that is the sole source of drinking water
- **National Ground Water Policy** (Agency Initiative, 1991)
  - Policy on use of quality standards in ground water prevention & remediation activities (e.g. Superfund clean-ups)
  - Ground water resource oriented & State centered
- **Underground Injection Program**
  - Protects underground sources of drinking water
  - Controls the subsurface placement of fluids

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Compliance and Enforcement

- **Public Water Systems provide information to States concerning their drinking water compliance.**
- **States with primacy enforce the drinking water regulations. EPA serves as backup in rare cases or until States receive primacy.**
- **The public must be notified of violations thereby encouraging compliance.**
- **Recent enforcement has centered around large unfiltered surface sources that present an acute threat to health (e.g., Boston and New York).**

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Future Goals and Challenges

- **Safe and affordable drinking water for all Americans**
- **Decisions based on sound science and risk**
- **Integrated water supply management**
- **Effective source water protection**
- **Well-managed and operated water systems**
- **Strong public information and outreach**

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FOR MORE INFORMATION

- WEBSITE: http://www.epa.gov/safewater
- EPA's Safe Drinking Water Hotline: 1-800-426-4791
- U.S. EPA - Office of Ground Water & Drinking Water: 202-564-3750

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