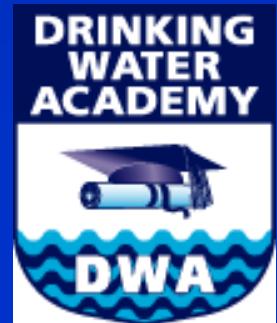


# Introduction To The Public Water System Supervision Program



# Drinking Water Academy Modules

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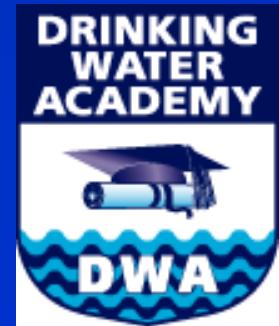
- **Introductory modules**
  - Overview of the Safe Drinking Water Act
  - Introduction to the EPA's Source Protection Programs
  - Introduction to the Underground Injection Control Program
- **\*Introduction to the Public Water System Supervision Program**
- Regulatory modules
- Technical modules

# Objectives

---

- By the end of this module, participants will be able to answer the following questions:
  - What is a public water system?
  - What is the PWSS program and what are its components?
  - What are the roles of EPA, States, Tribes, and public water systems under the PWSS program?
  - How are regulations developed under the PWSS program?
  - What does primacy mean in the PWSS program?
  - What are the National Primary Drinking Water Regulations?

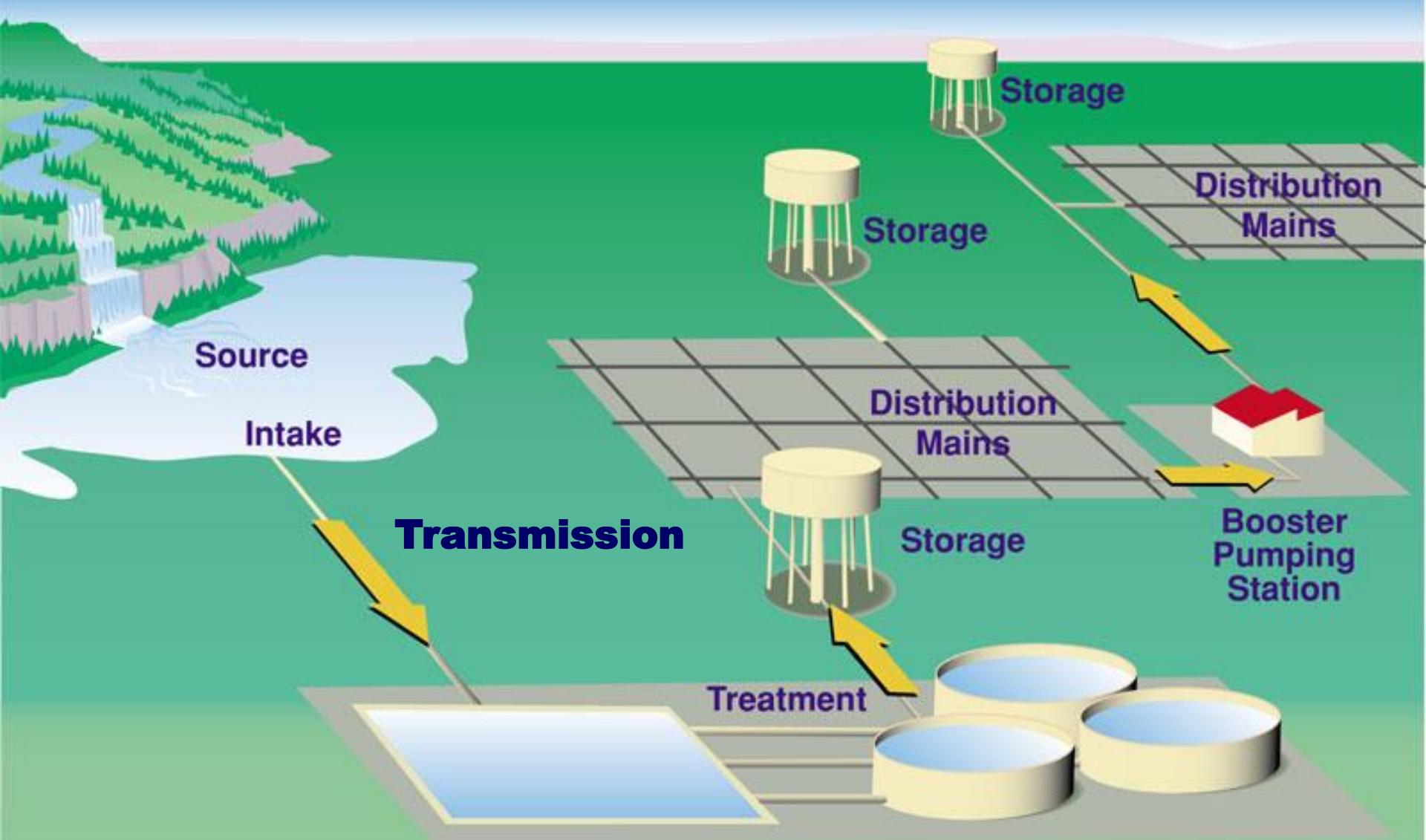
# Water Systems

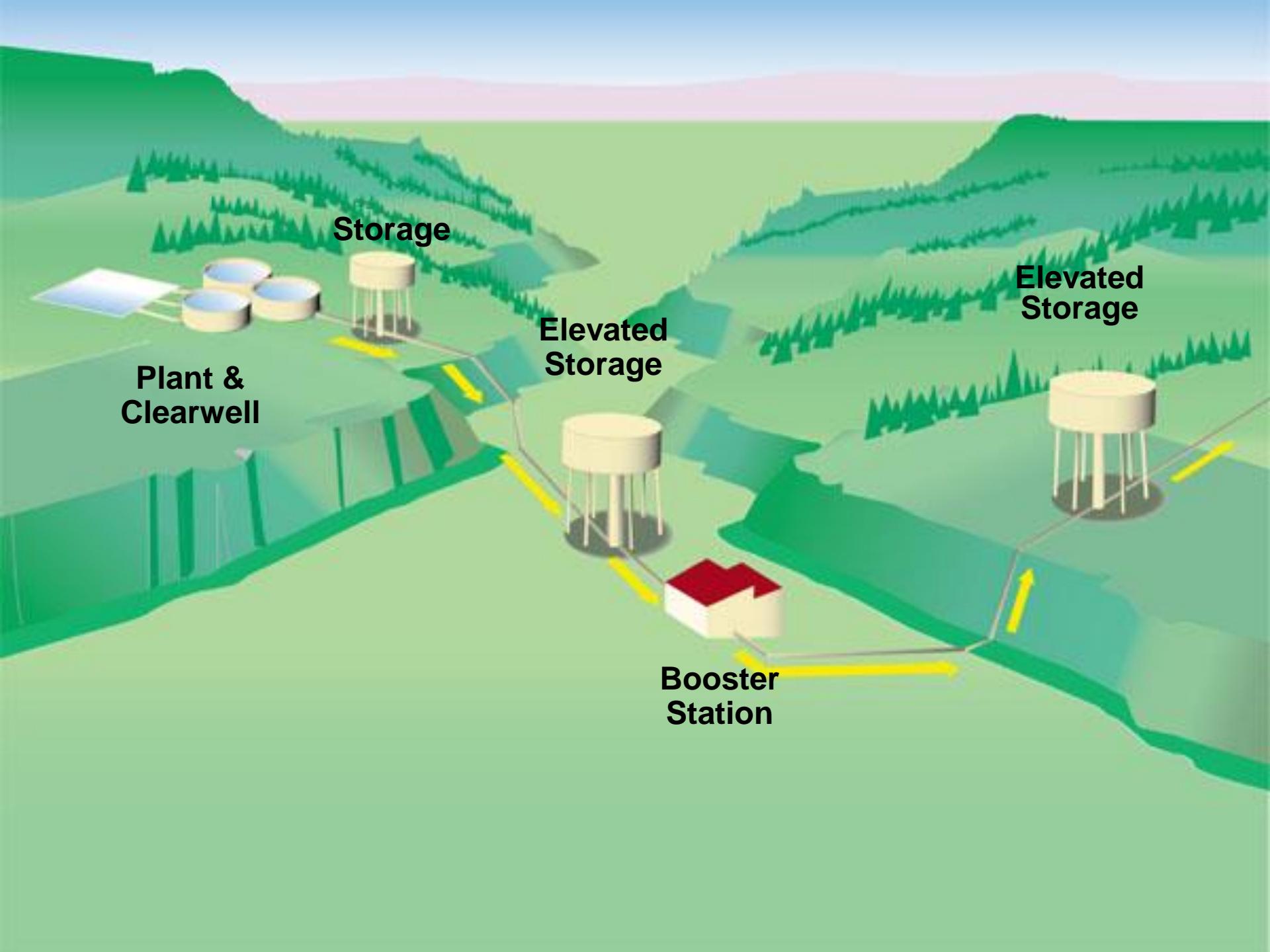


# What is a Water System?

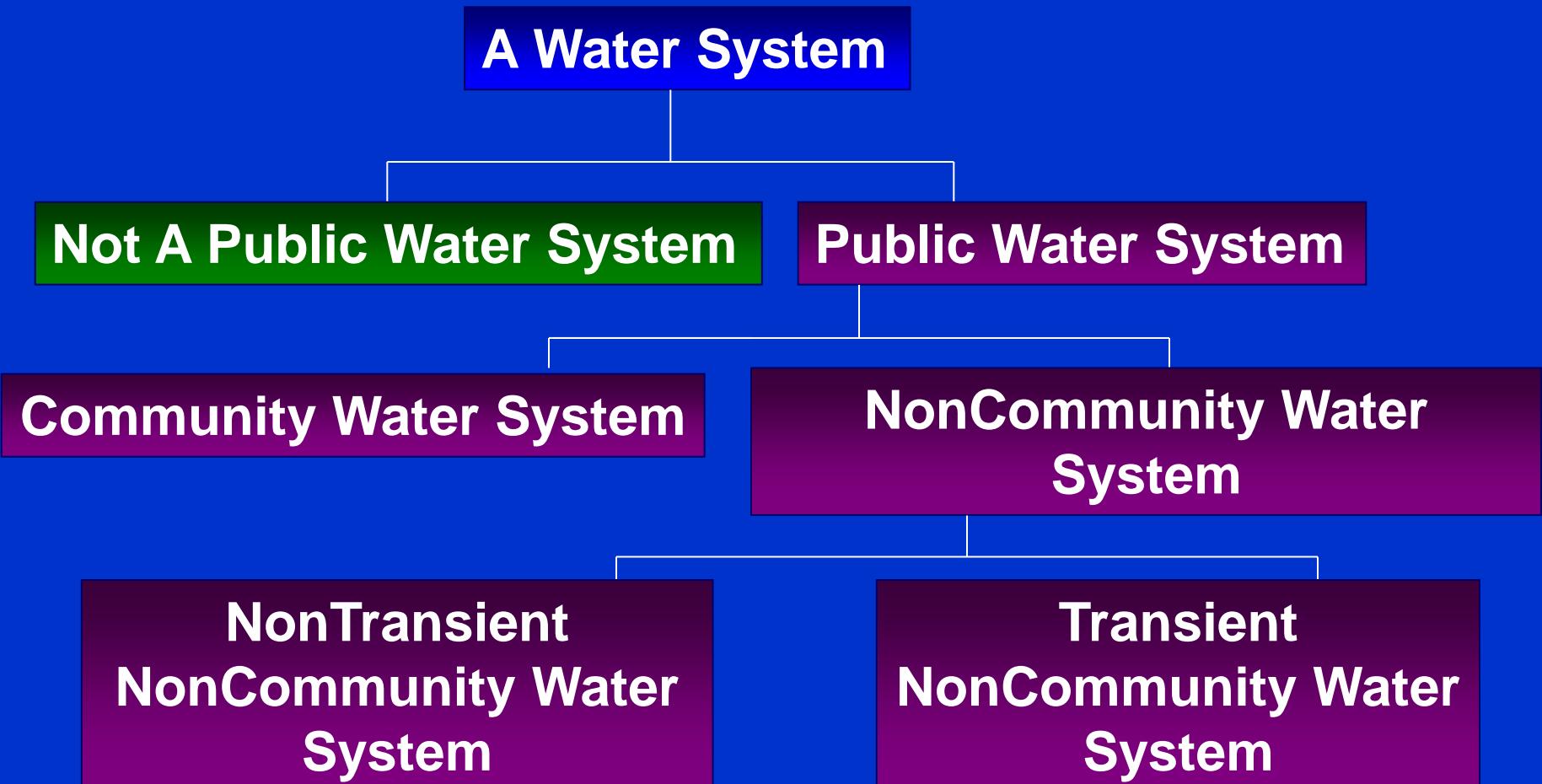
---

- Provides water for domestic use, fire prevention, industrial use, irrigation
- Many variations of water systems:
  - May be regulated **or** unregulated by Federal or State governments
  - May be very simple **or** very complicated
  - May use a ground water source **or** a surface water source **or** a combination
  - May be small **or** large



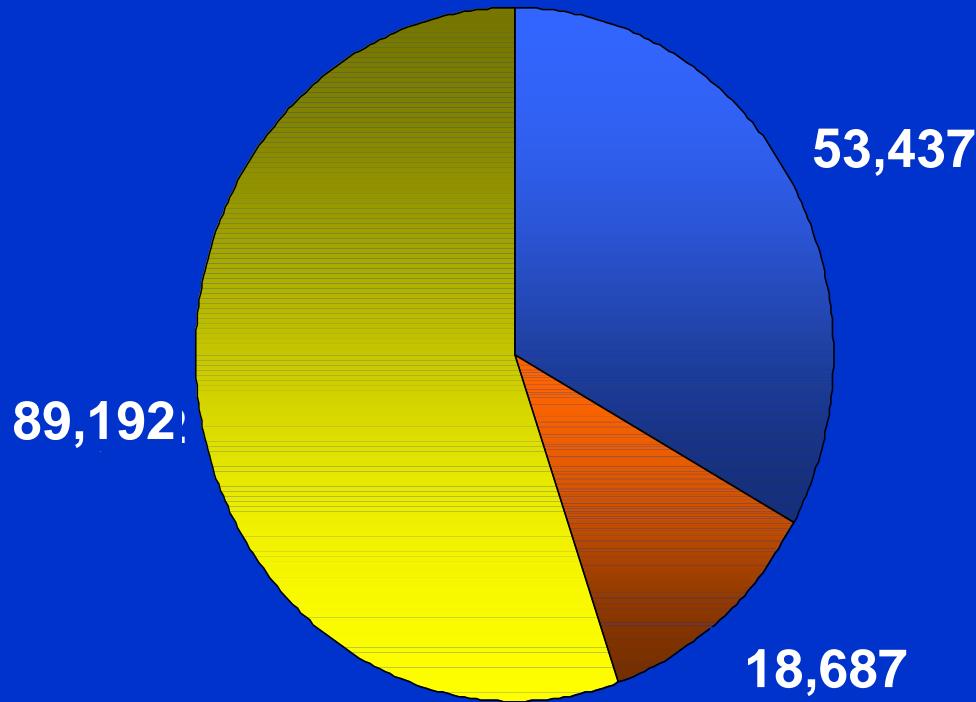


# Regulatory Distinctions Among Water Systems



# Over 161,000 Public Water Systems Nationwide

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■ CWSs ■ NTNCWSs ■ TNCWSs

# **Public Water System Supervision Program**

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- PWSS program authorized by SDWA
- SDWA regulations for **public water systems** implemented through PWSS program
- Helps ensure safe and adequate supplies of drinking water
- Addresses drinking water systems that provide water to more than 90 percent of the population

# **Systems Not Regulated Under PWSS Program**



**Private Wells**

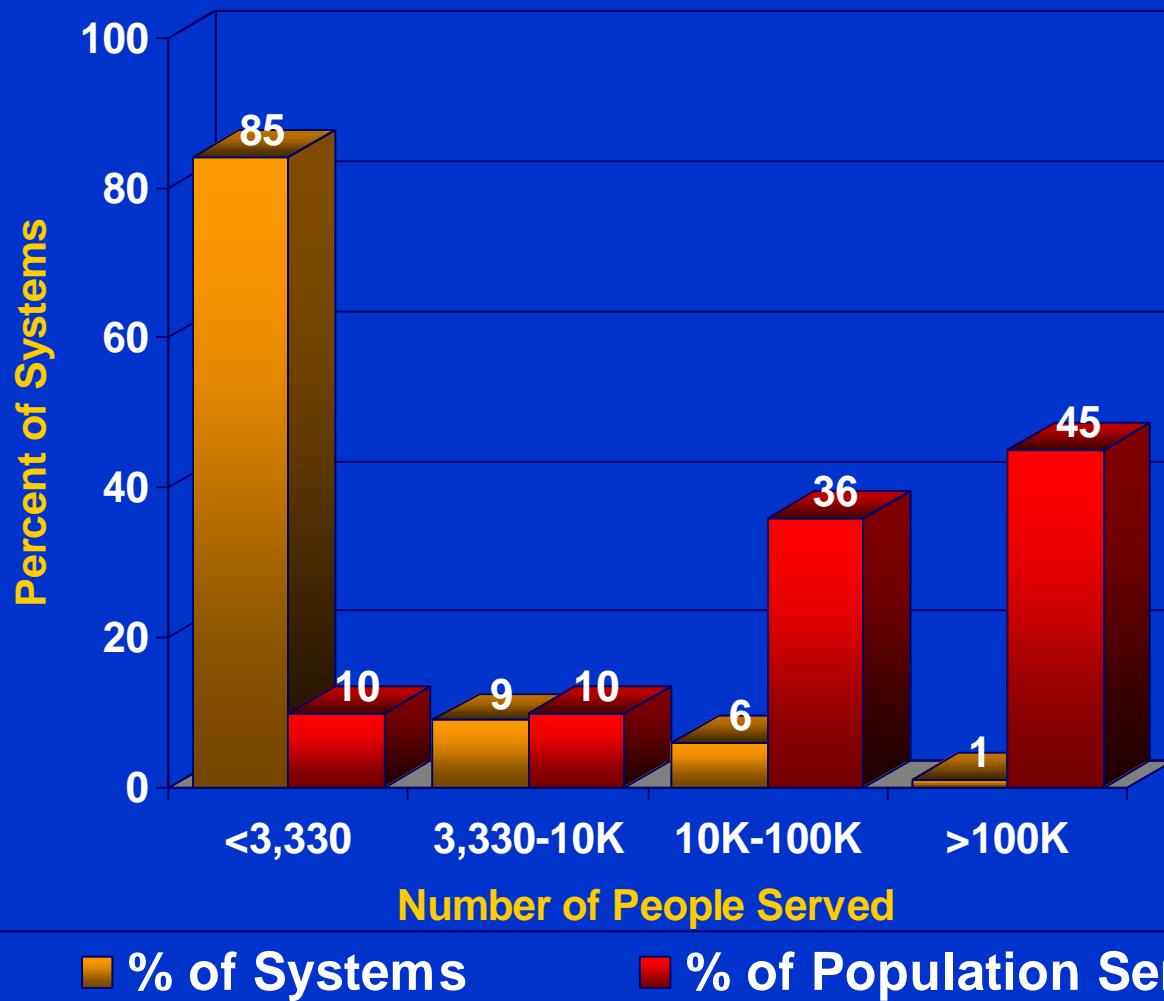


# Sizes and Types of Regulated Water Systems

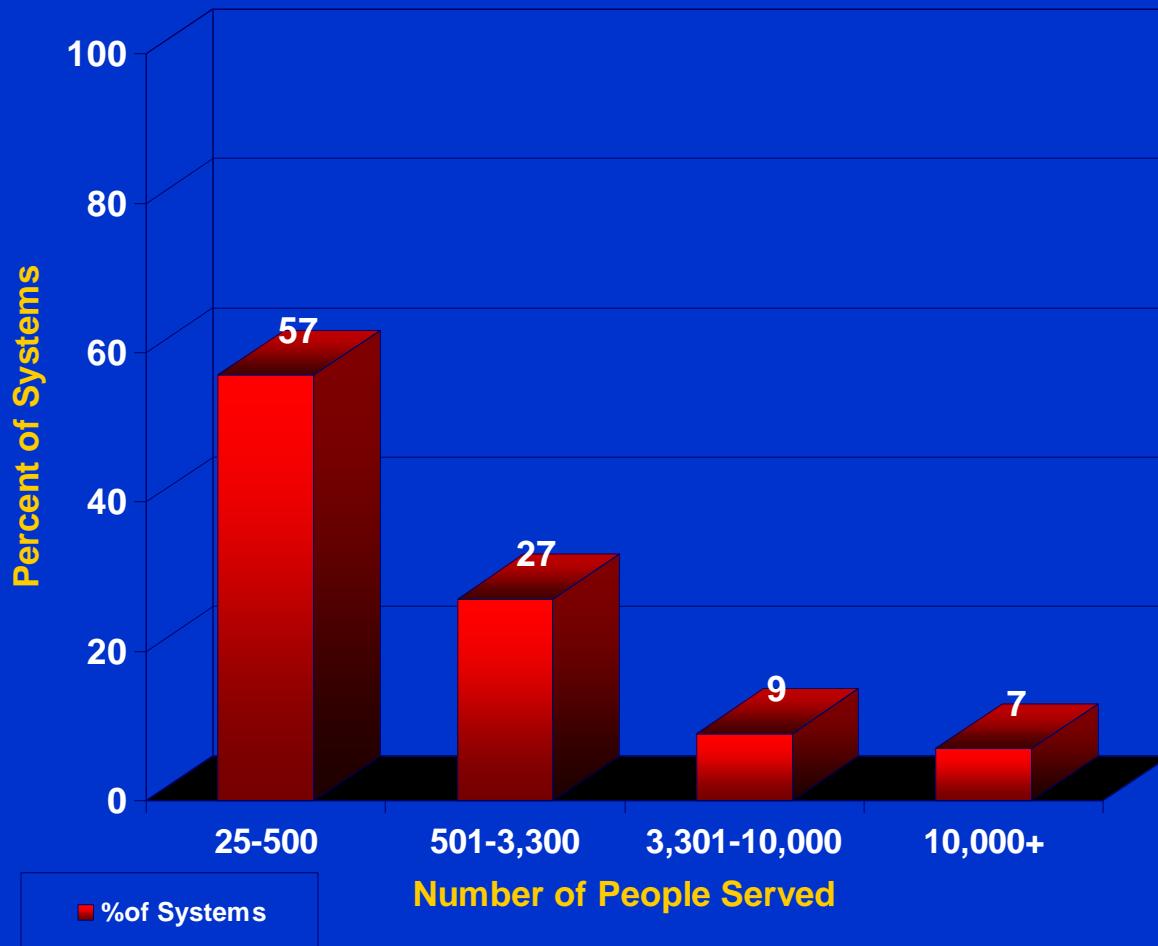
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- Sorted by **size**:
  - Serving 25 - 500 people
  - Serving 501 - 3,300 people
  - Serving 3,301 - 10,000 people
  - Serving more than 10,000 people
- Sorted by **source**:
  - Ground water
  - Surface water
  - Ground water under the direct influence of surface water (GWUDI)

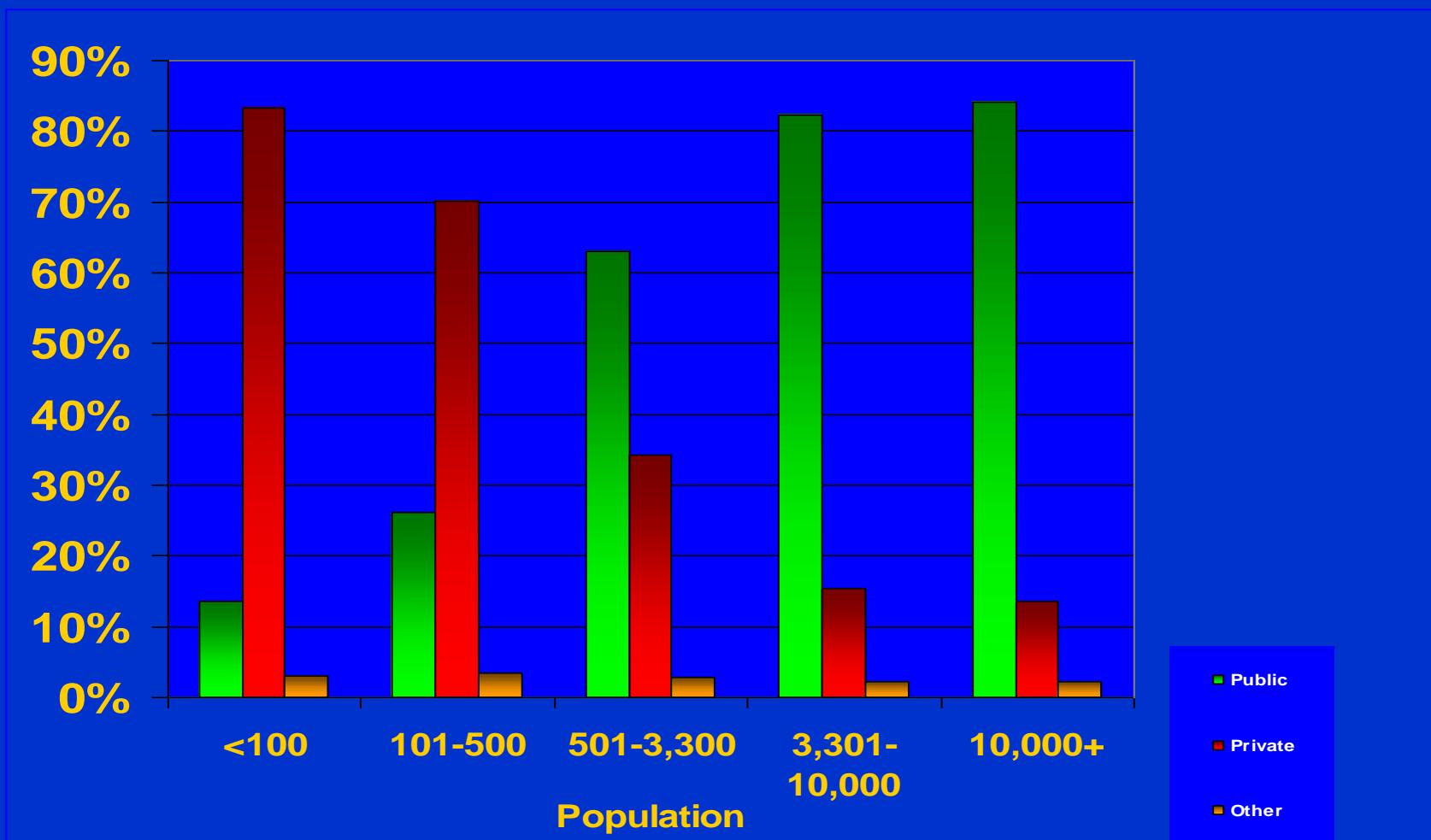
# CWSs by System Size



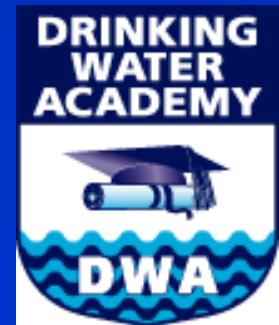
# Community Water Systems by Size



# Ownership of Public Water Systems



# Sources of Drinking Water for Public Water Systems



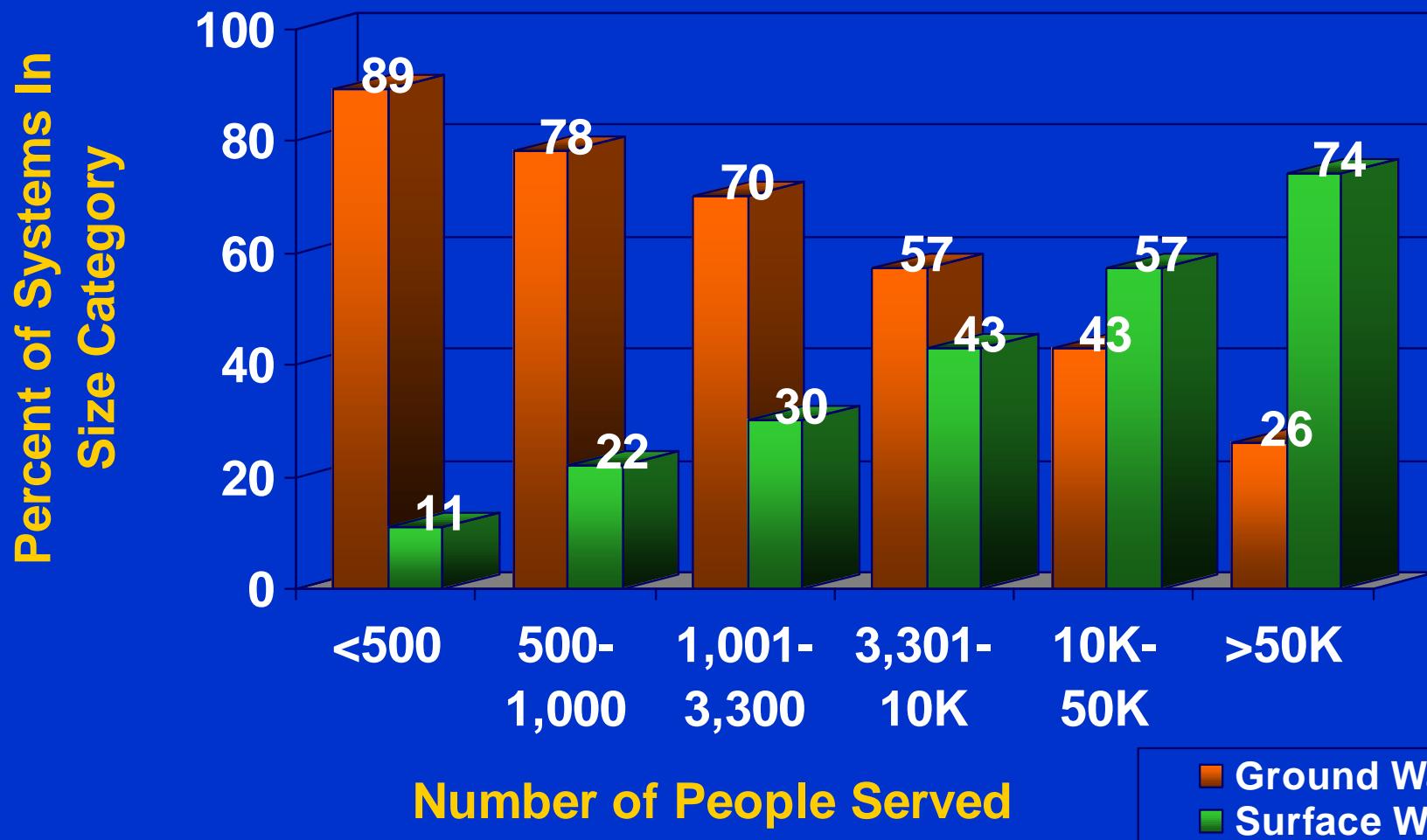
# Sources of Drinking Water

---

- Surface water
- Ground water
- Ground water under the direct influence of surface water



# CWSs by Source



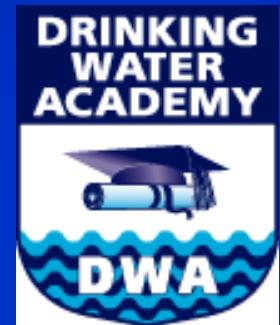
# Small Ground Water System



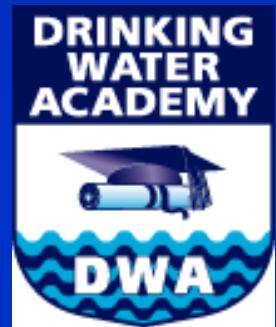
# Large Surface Water System



# Water Treatment, Storage and Distribution Systems



# Treatment



# Treatment Needs

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- Contaminants with acute health effects (microbiological contaminants, nitrate)
- Contaminants with chronic health effects (carcinogens, teratogens)
- Secondary contaminants

# Treatment Options

---

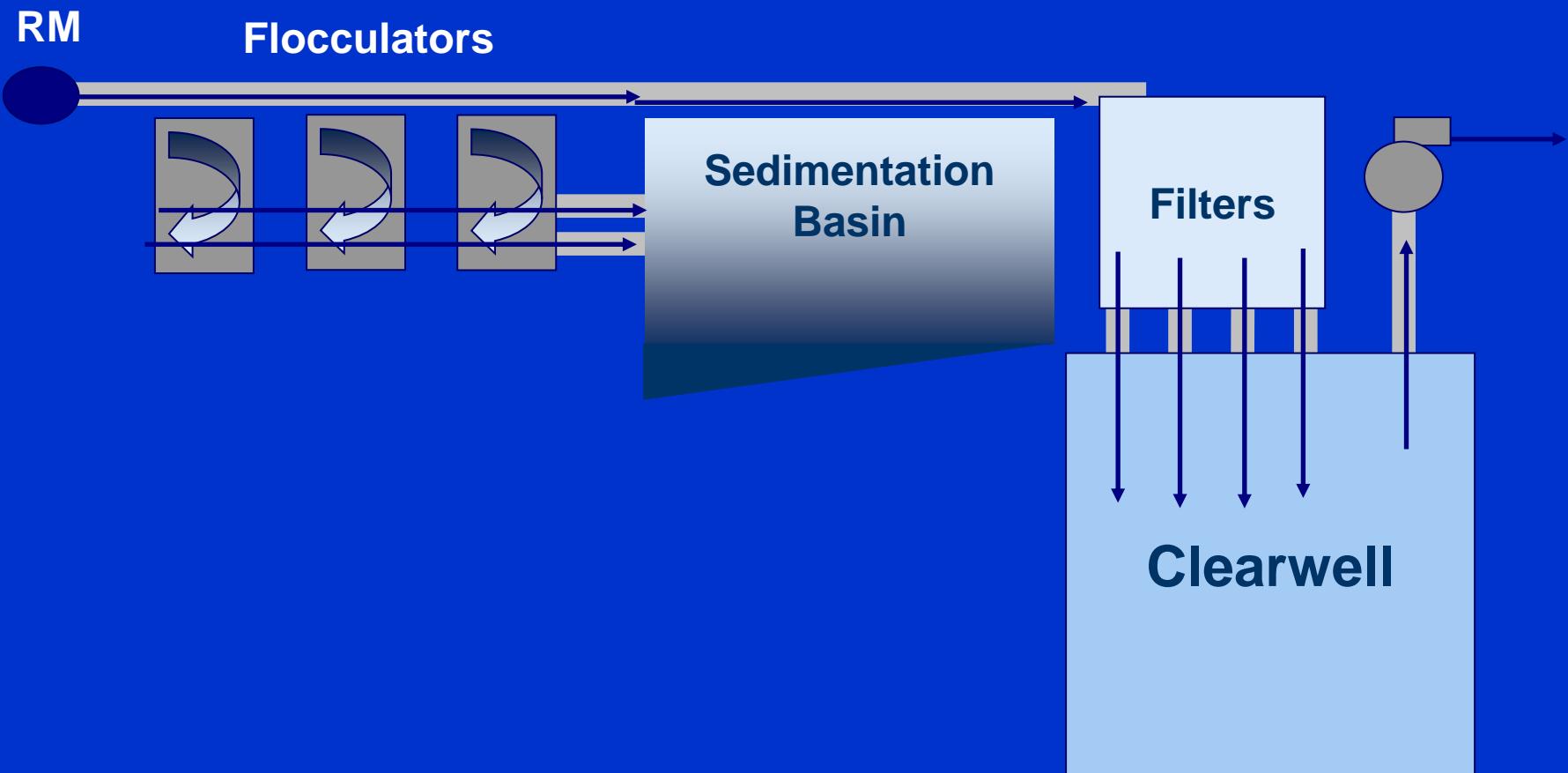
- Treatment selected depends on:
  - Source water quality
  - System size
  - State or Federal regulatory requirements
  - System experience with specific technologies

# Treatment Options (continued)

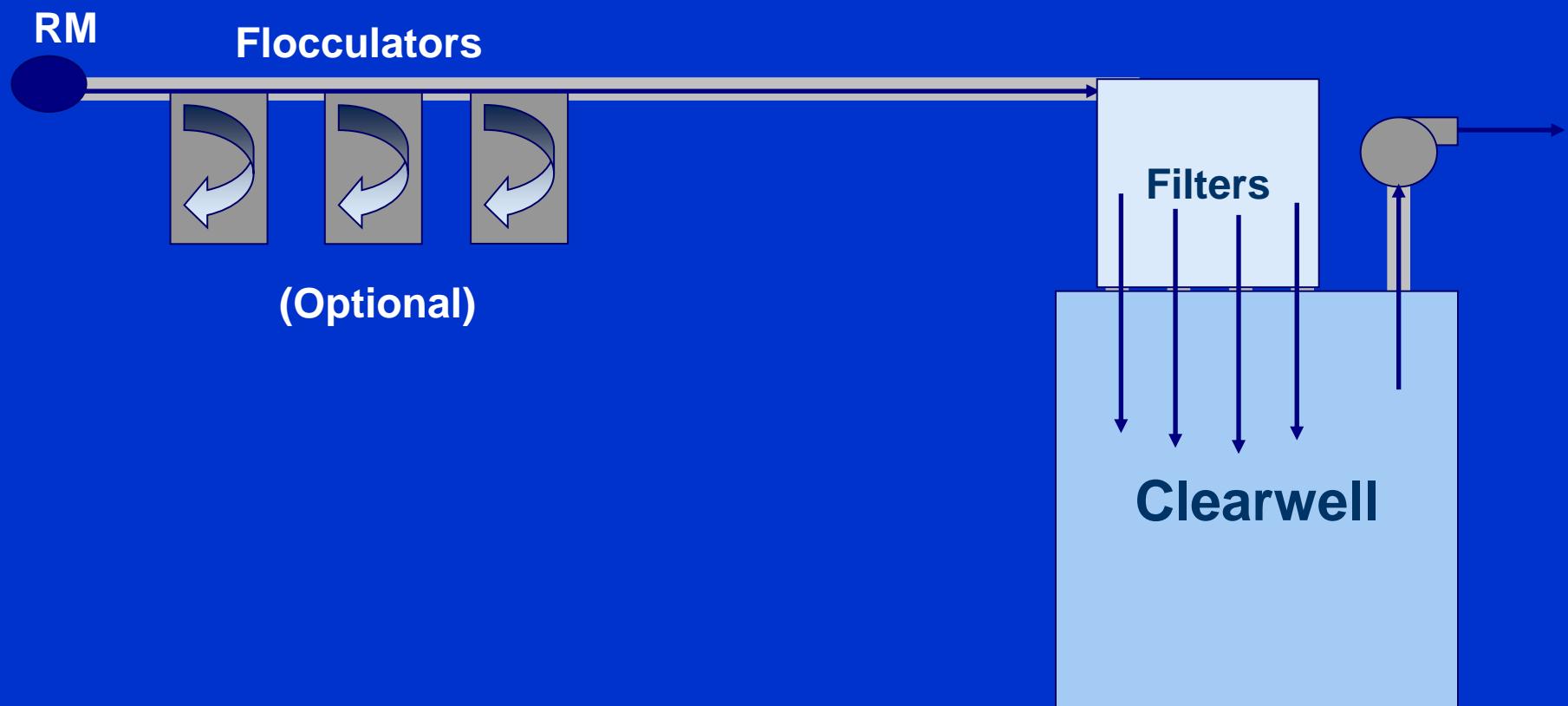
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- Filtration
  - Conventional
  - Direct
  - Slow sand
  - Diatomaceous earth

# Filtration: Conventional



# Filtration: Direct







# Filter cleaning

# Treatment Options (continued)

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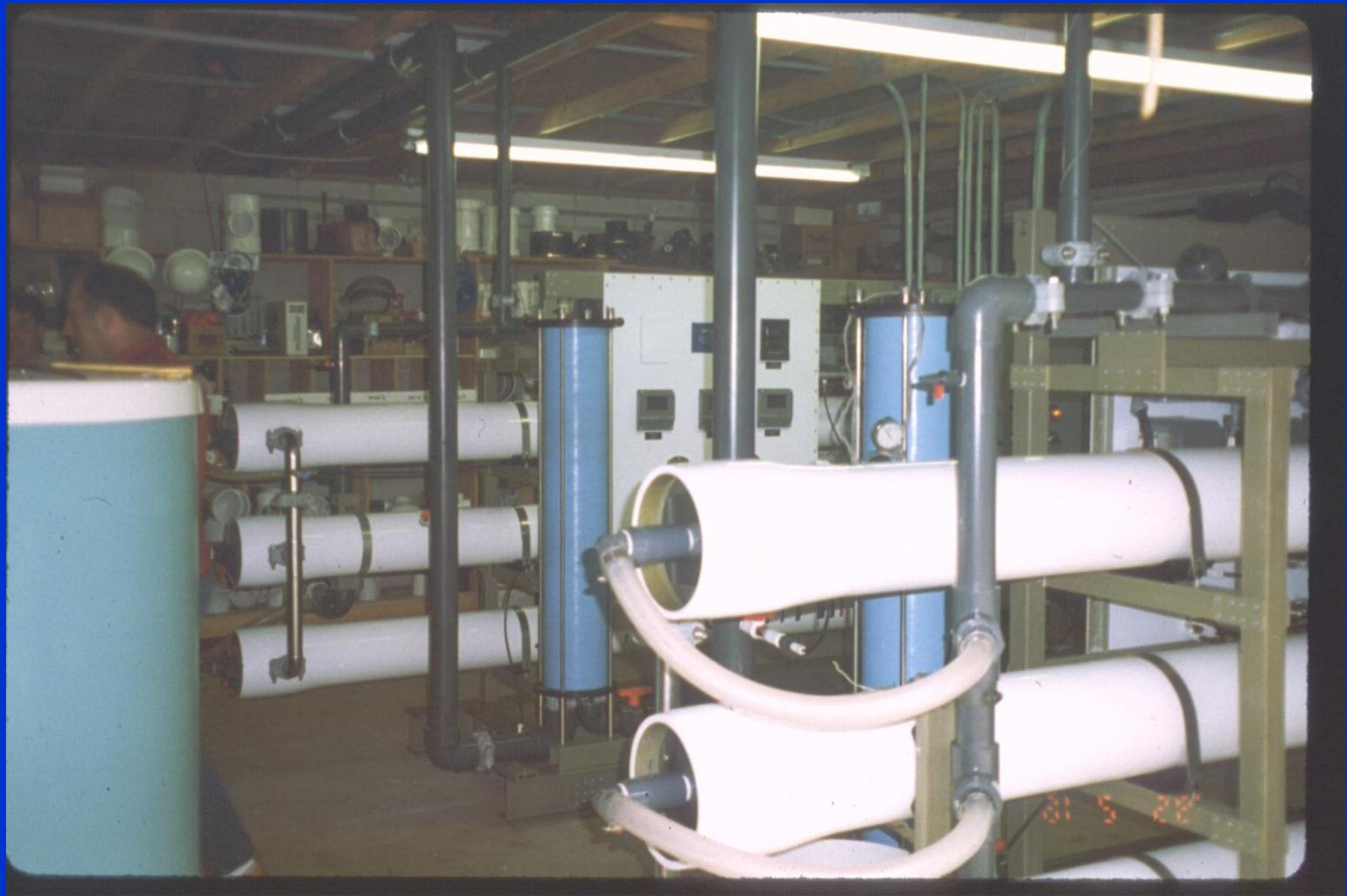
- Chemical addition
  - Corrosion
  - Iron and manganese
  - Fluoride
- Other treatment techniques
  - Aeration
  - Membrane technologies
  - Green sand filtration
  - Ion exchange
  - Adsorption







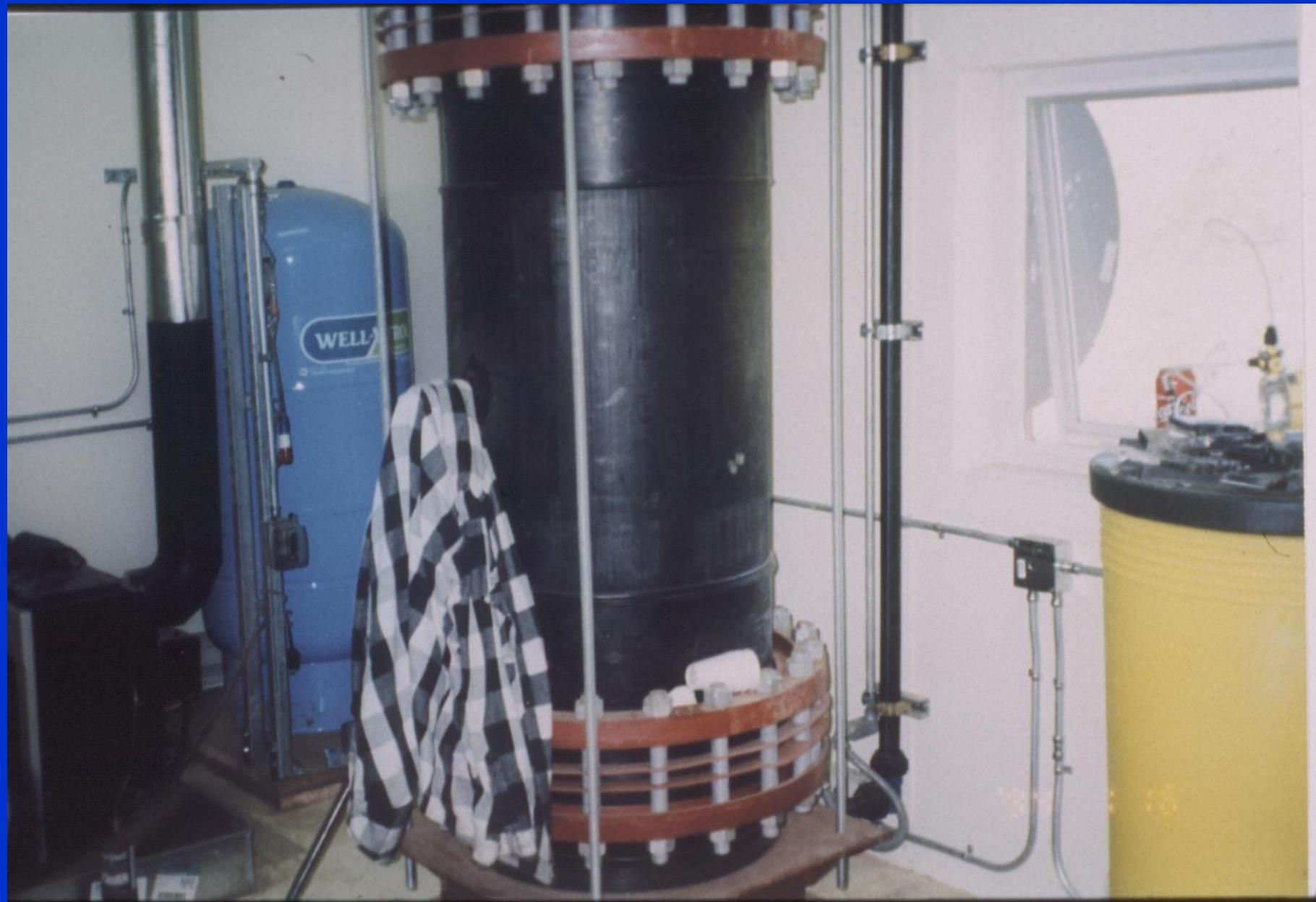


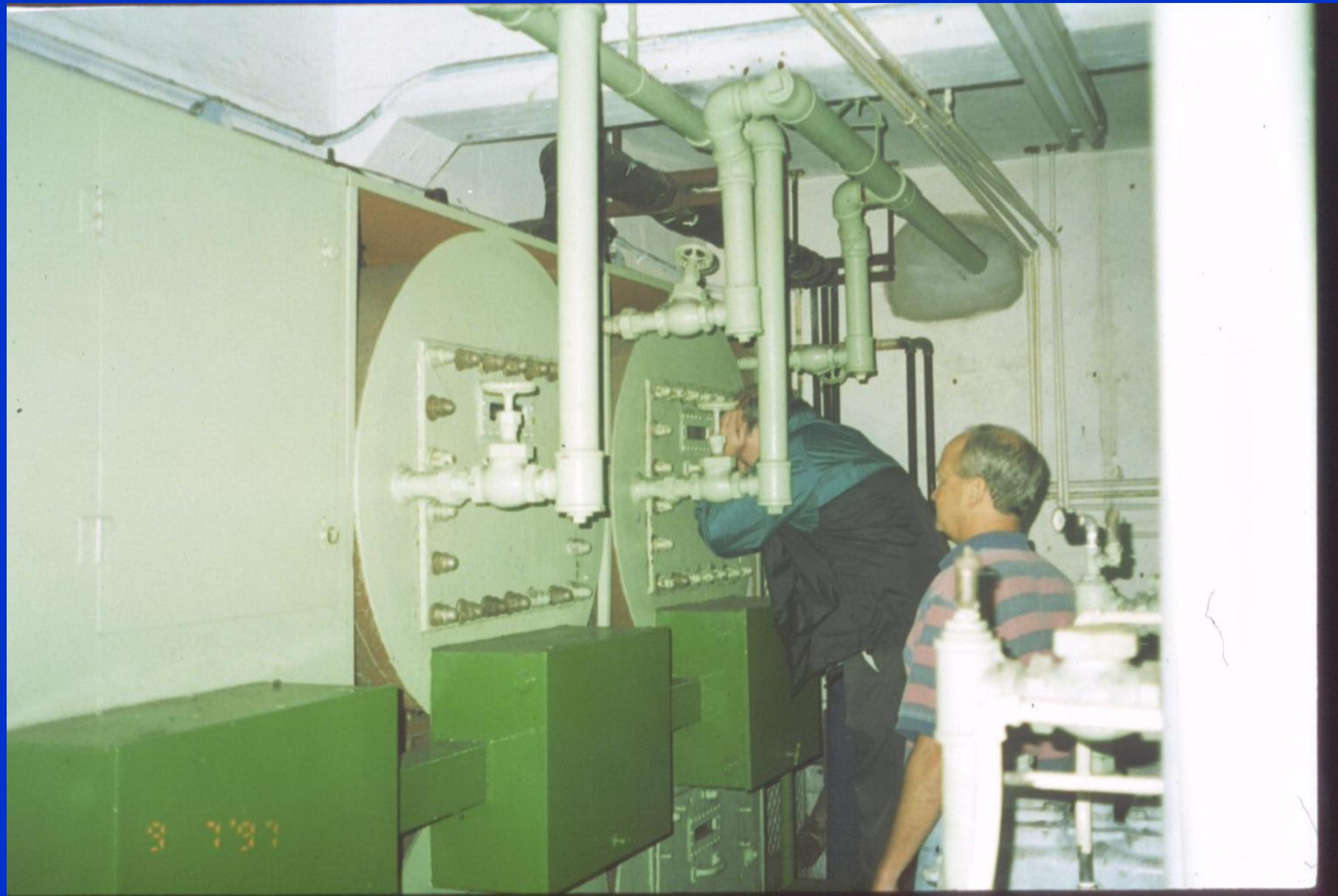


# Treatment Options (continued)

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- Disinfection
  - Chlorine
  - Ozone
  - Ultraviolet light



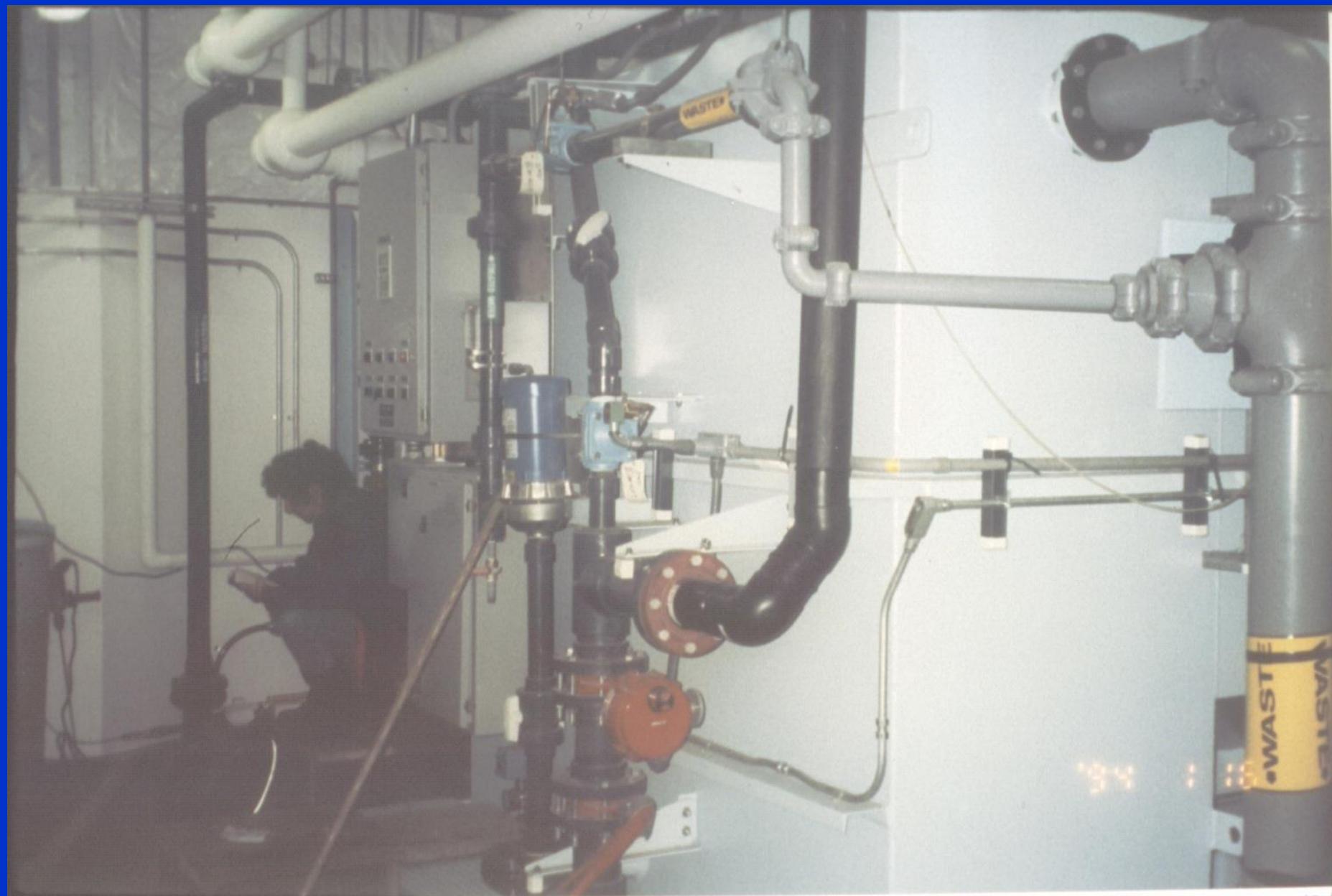


# Treatment at Smaller Systems

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- Package plants
- Point-of-use and point-of-entry technologies





Pump  
Station

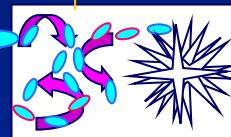
Rapid Mix

Flocculation

Sedimentation

Chemical  
Addition

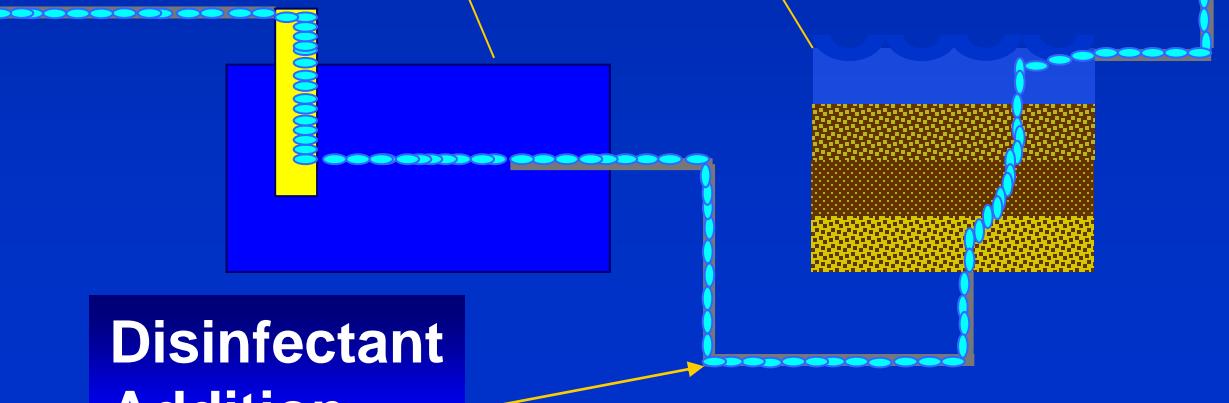
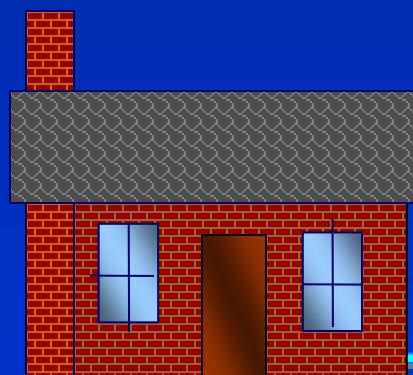
Source



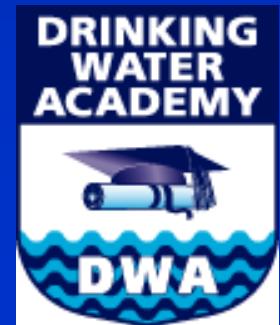
Clear Well/Detention

Filters

Disinfectant  
Addition



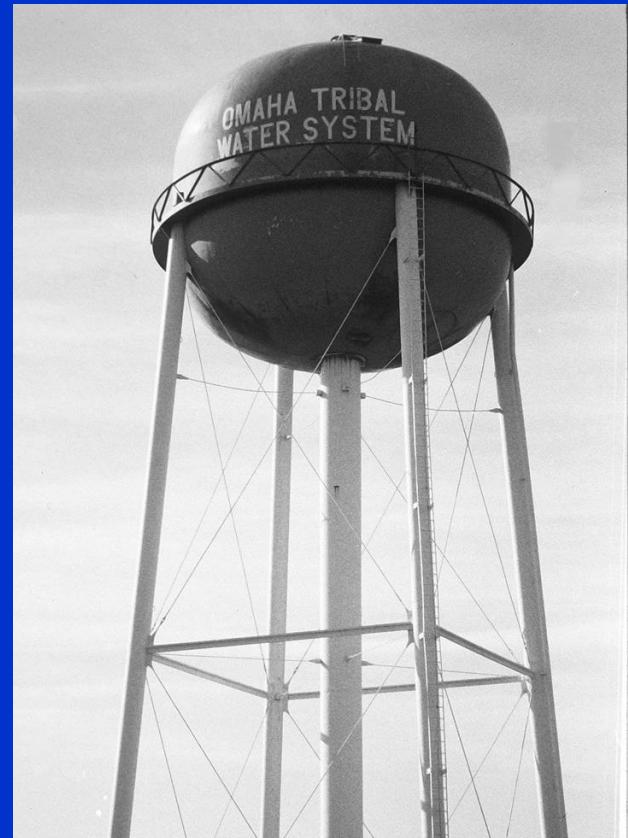
# Storage



# Storage

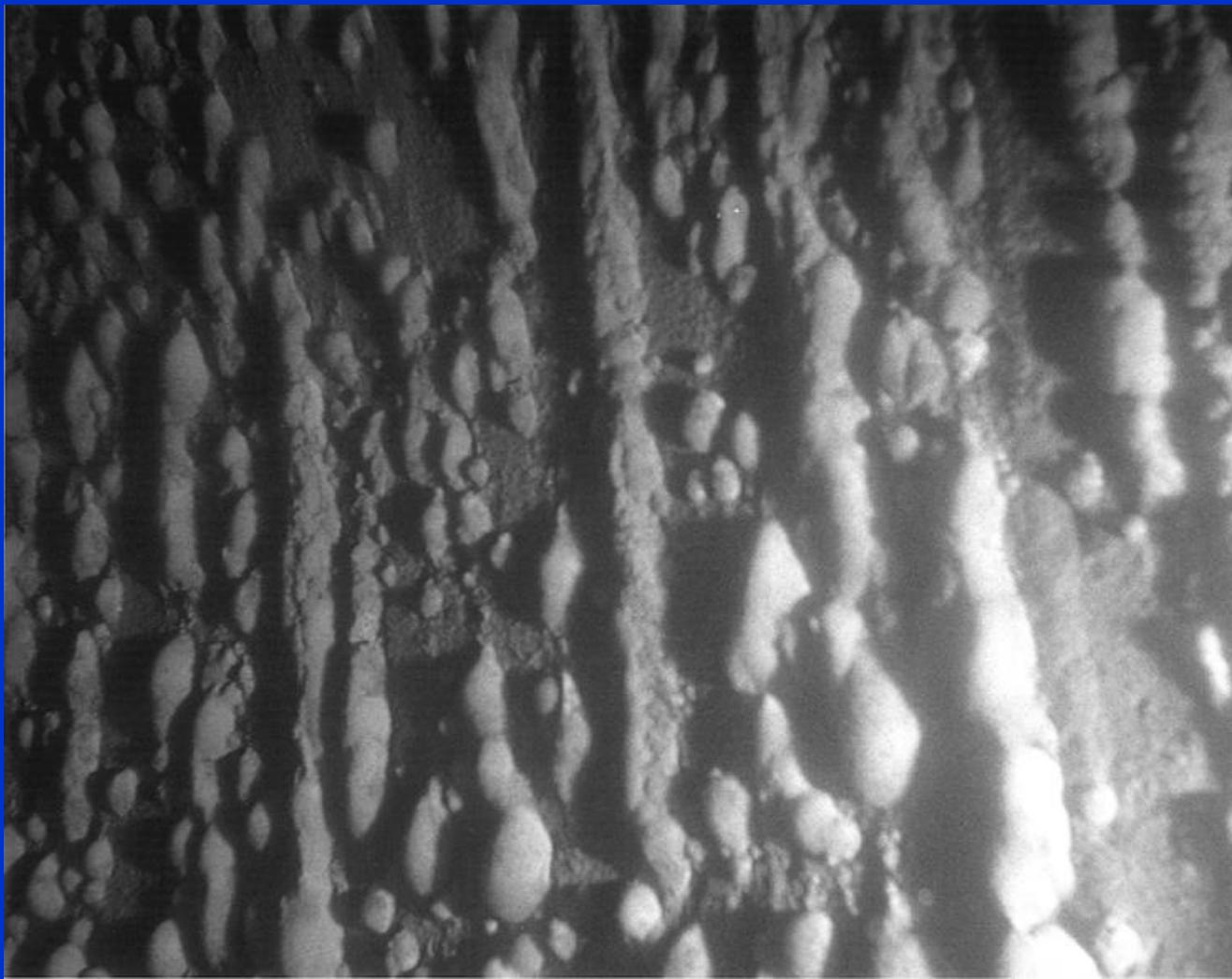
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- Pressurizes the distribution system which keeps contaminants out
- Allows system to meet peak demands
- Protects pumps



# Storage Tank With Rust Deposits

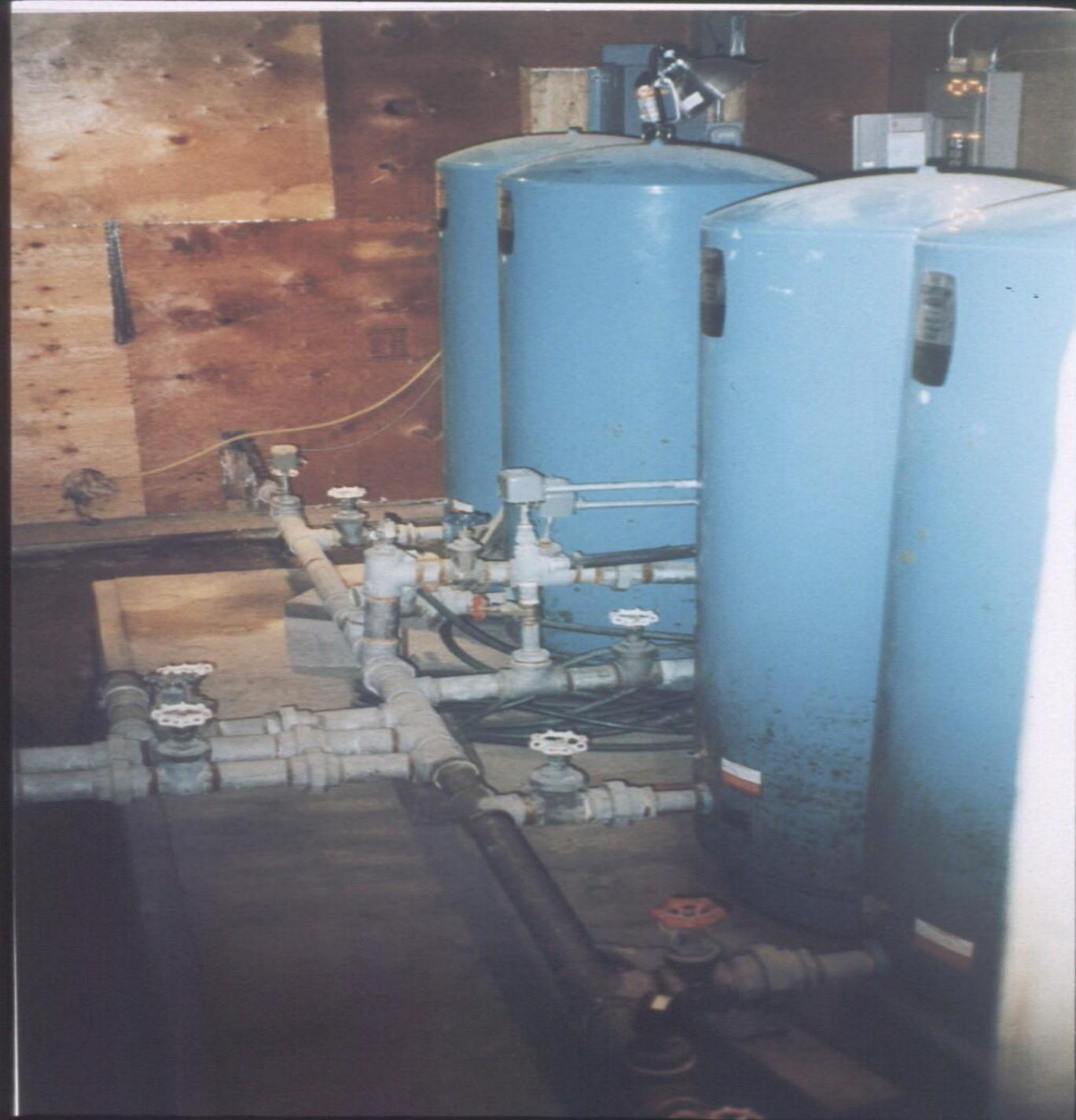
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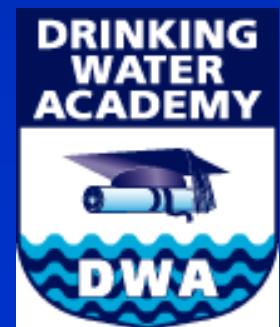




CE 2511



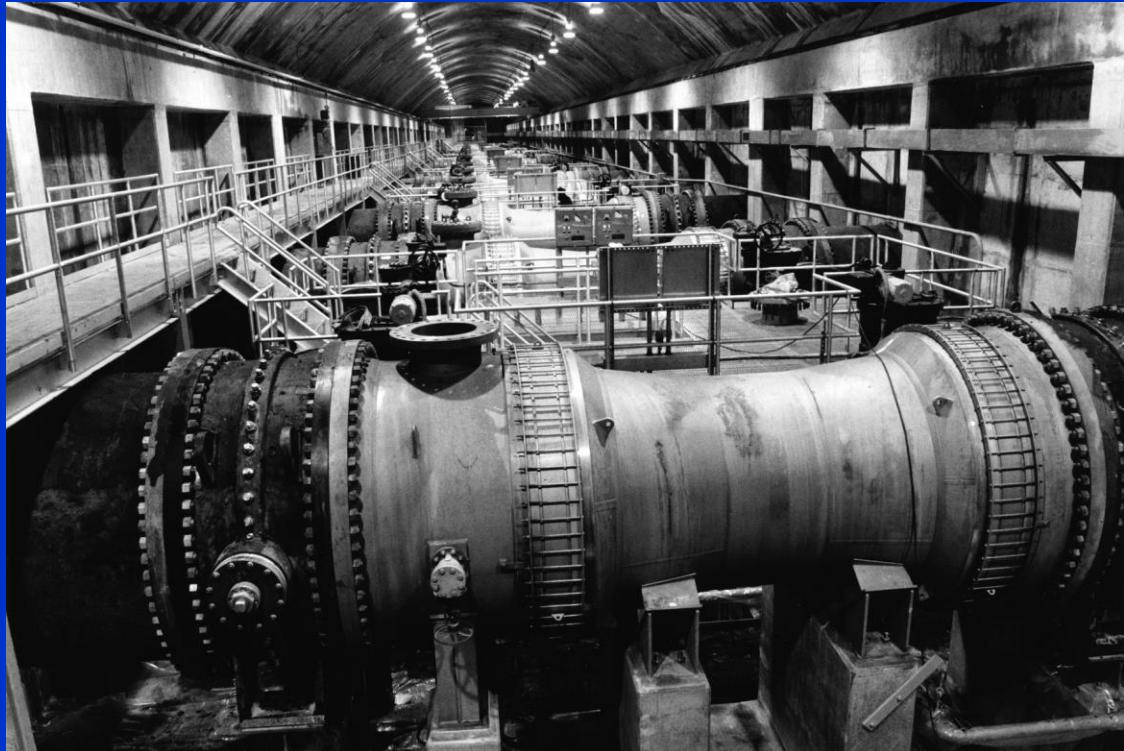
# Transmission, Distribution, and Pumping Facilities



# Transmission, Distribution, and Pumping Facilities

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- Water mains
- Pumping facilities
- Appurtenances
  - Hydrants
  - Water meters
  - Valves and backflow prevention devices



Source: Carl Ambrose: New York City DEP



Source: Carl Ambrose, New York City DEP









# Pumping Facilities

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- Pump applications move fluids from one point to another
  - Transport water through the system
  - Remove sludge or feed chemicals
- Types of pumps
  - Positive displacement
  - Centrifugal
  - Ejector





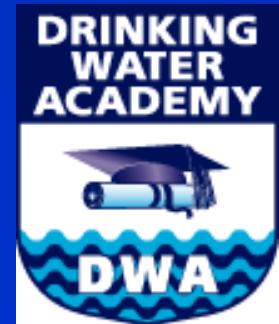
9 8'37



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# History of the PWSS Program



# Origins of the PWSS Program

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- Early 1900s: State and local efforts to control water-borne disease (acute health effects)
- 1914: First Federal standards, voluntarily adopted by many States
- 1925: Filtration and chlorination used in large cities

# Multiple Barrier Approach

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- Multiple barrier approach
  - Focus on prevention
  - Comprehensive approach
- Source selection
- Source protection
- Treatment

# Multiple Barrier Approach

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- Sound and properly-designed distribution systems
  - Design and construction standards
  - Review of plans and specifications for water systems
- Sanitary surveys
- Operator training, technical assistance and certification

# Multiple Barrier Approach

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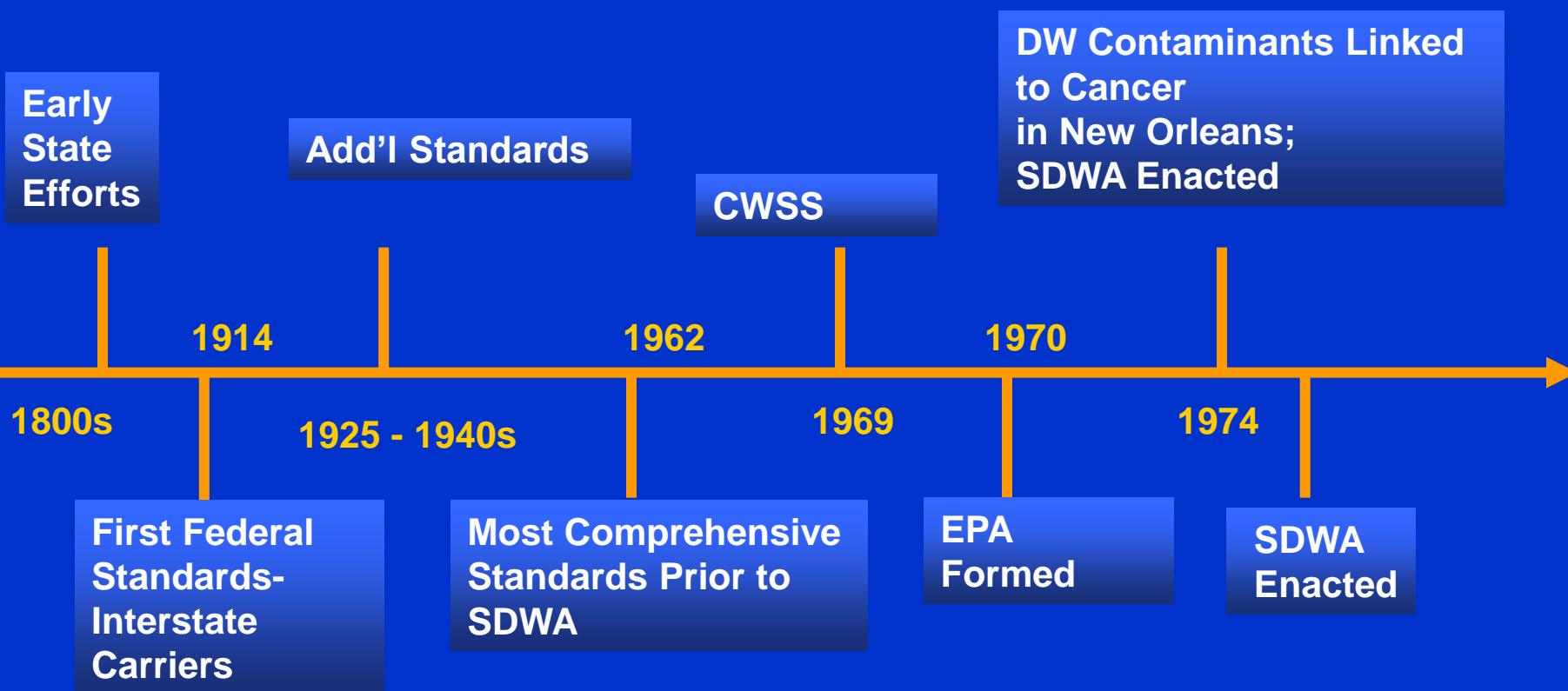
- Discharge permits
- Professional licensing
- Building codes
- Enforcement

# State Drinking Water Programs

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- Mid 1900s brought increased chemical use
  - Increased understanding of health effects
  - Source water testing
  - Addressed through treatment or alternative sources

# Origin of Federal Involvement



# 1974 Safe Drinking Water Act

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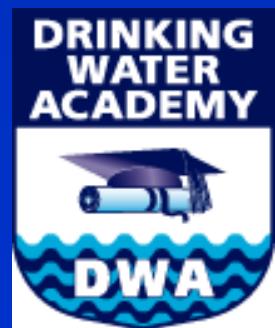
- Required establishment of National Primary Drinking Water Regulations
- Established roles
  - EPA
  - States
  - Public water suppliers

# PWSS Program: Changing Focus

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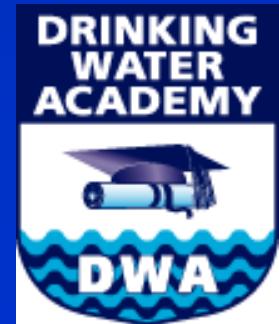
- 1974 SDWA required first national standards; defined roles for EPA, States, and PWSs
- 1986 SDWA amendments emphasized standards, monitoring, and enforcement
- 1996 SDWA amendments emphasized prevention
- Today's PWSS program mirrors States' multiple barrier approach

# Today's PWSS Program: Roles of EPA, States, and Public Water Systems

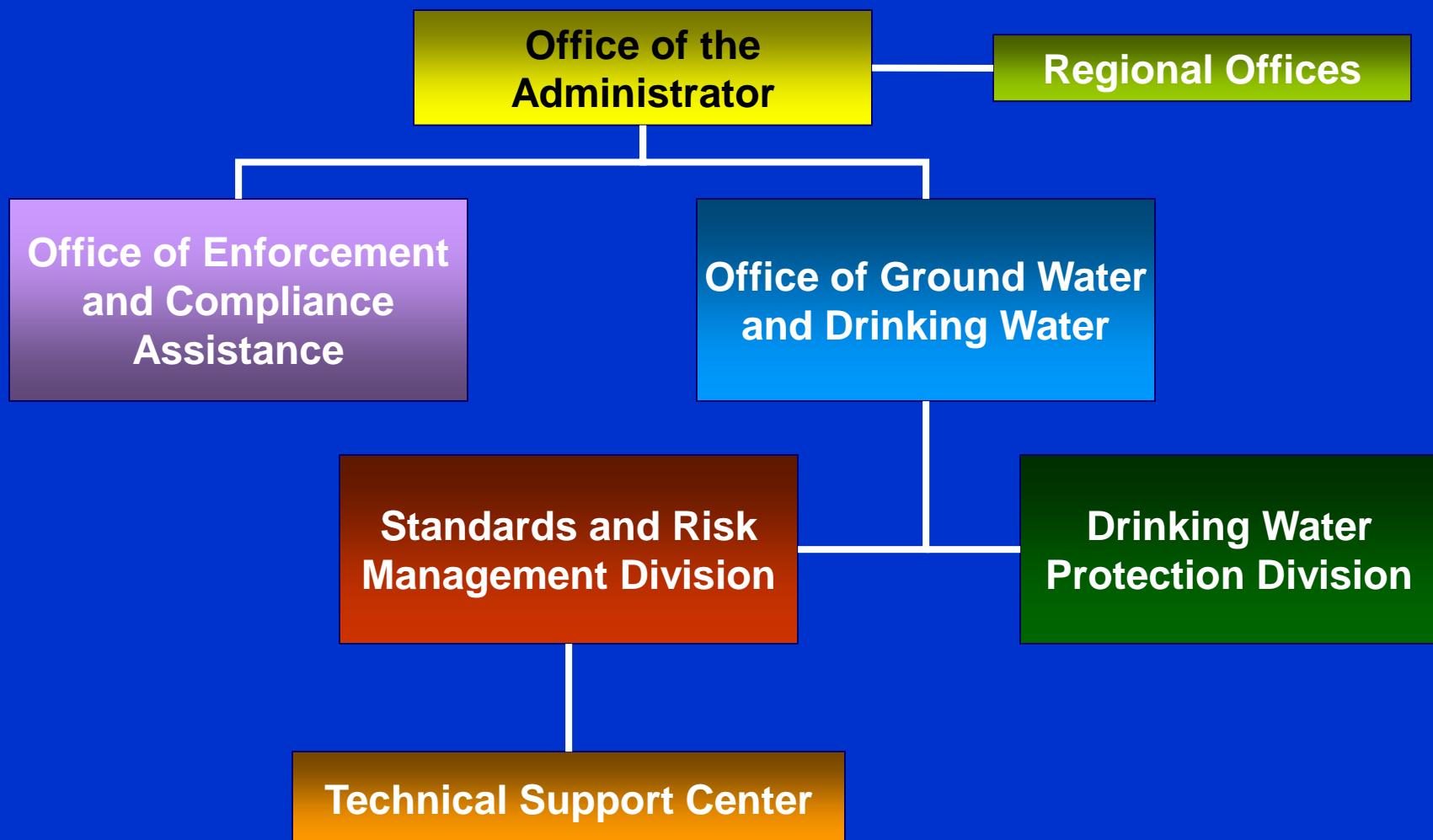


# Today's PWSS Program

## EPA's Role



# EPA's Role



# Establishing and Implementing Standards

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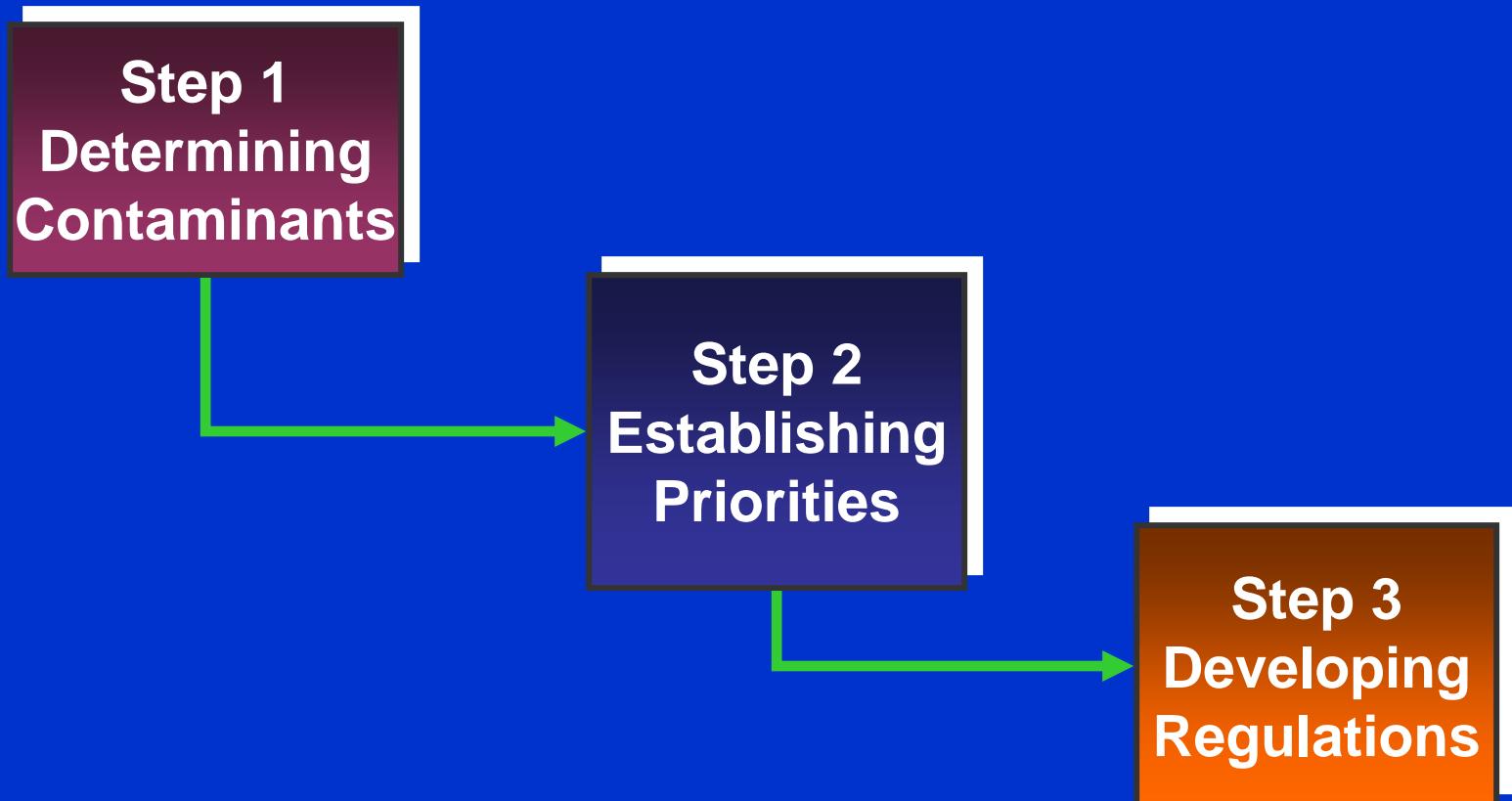
- National Primary Drinking Water Regulations
- National Secondary Drinking Water Regulations
- State primacy requirements

# Standards and Regulations Under SDWA

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- Regulations to control contaminants with acute health risks
  - Microbiological contaminants
- Regulations to control contaminants with chronic health risks

# Establishing Standards: Steps



# Determining Contaminants

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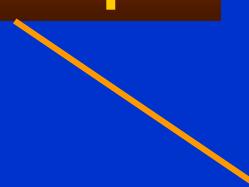
Public input

## Contaminant Candidate List

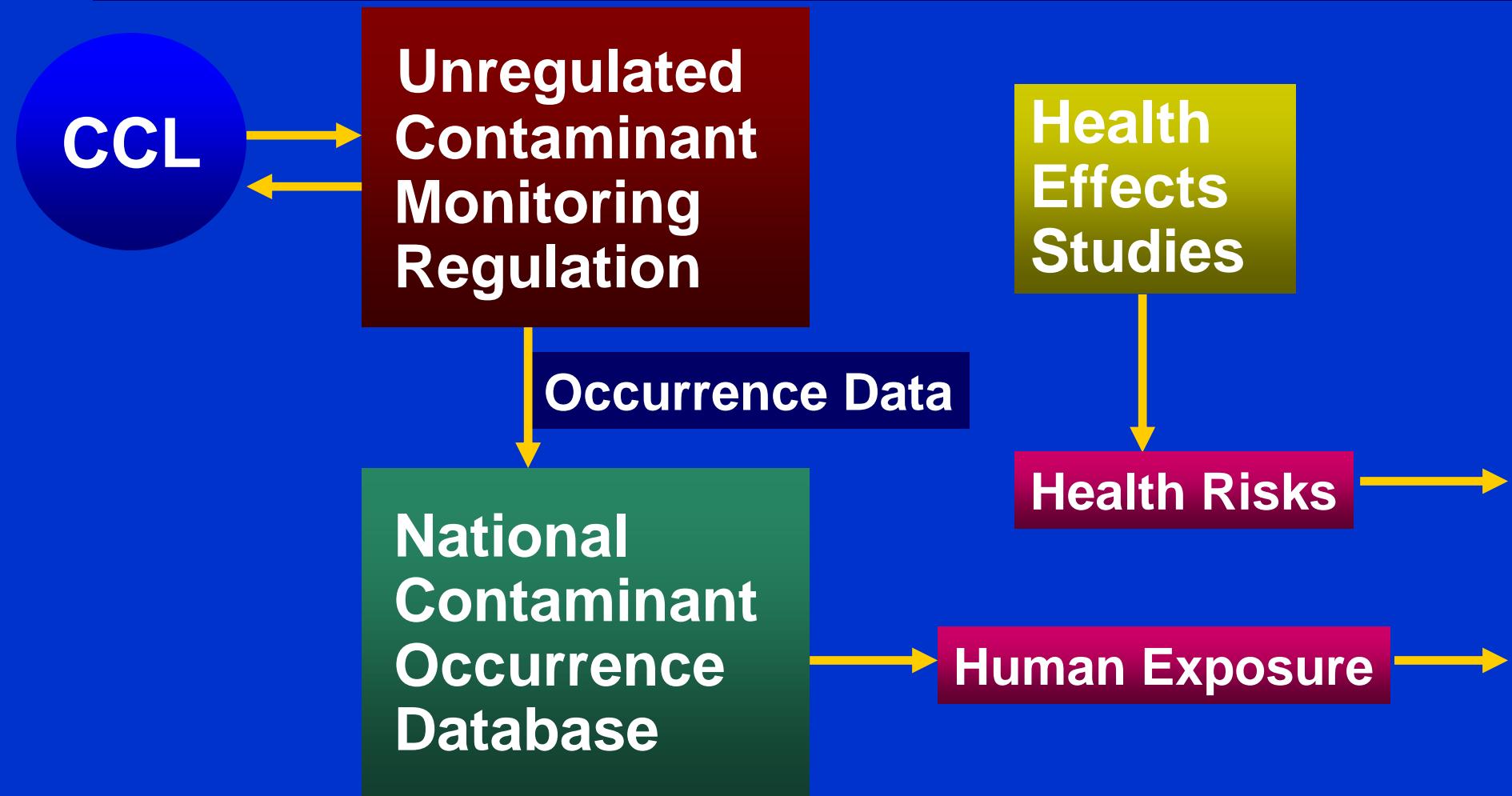
Updated every five years  
(currently 50 chemicals,  
10 microbials)

Regulatory action on five contaminants by 2001

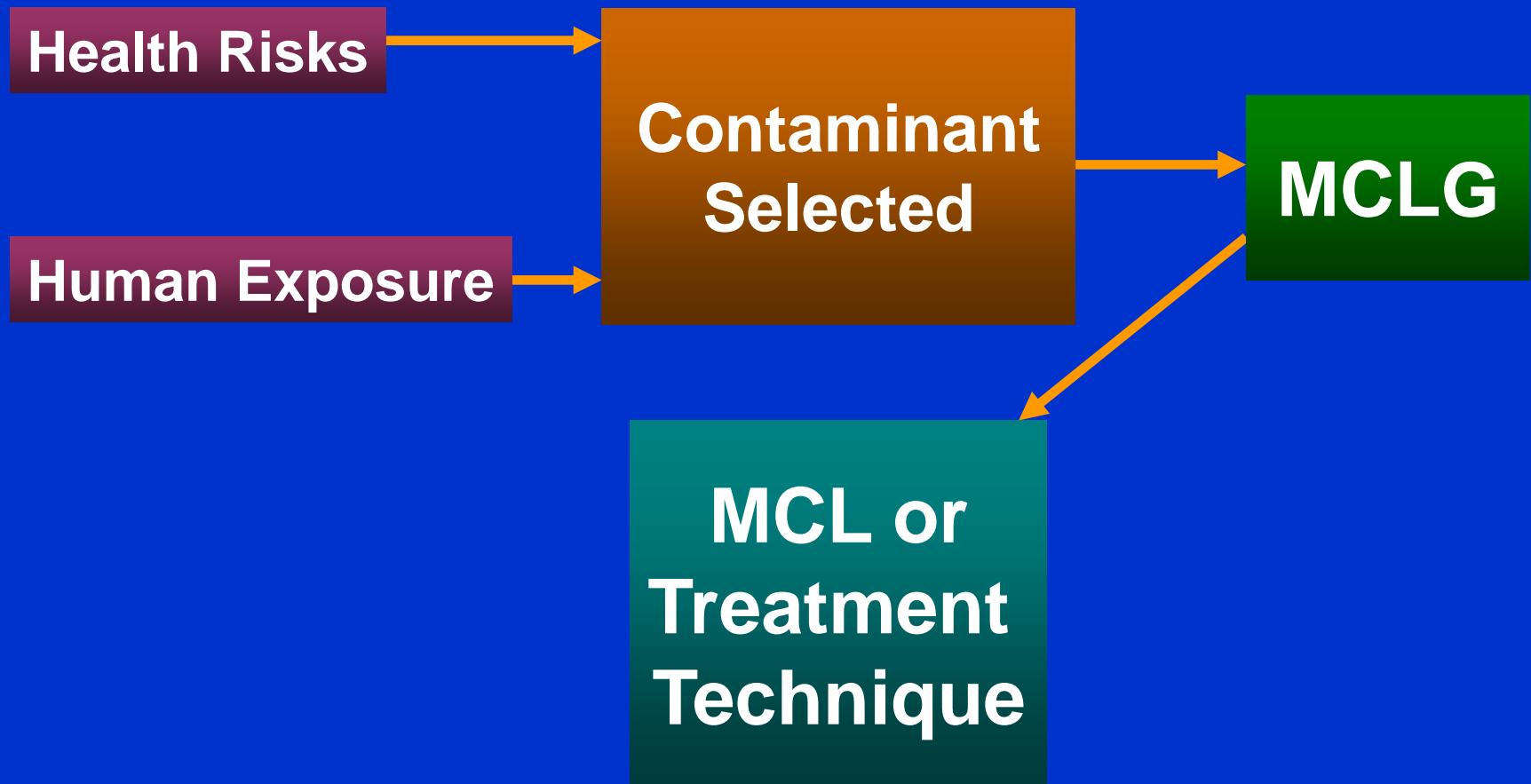
Sound science



# Establishing Priorities



# Developing National Primary Drinking Water Regulations



# Establishing Standards: Stakeholder Involvement

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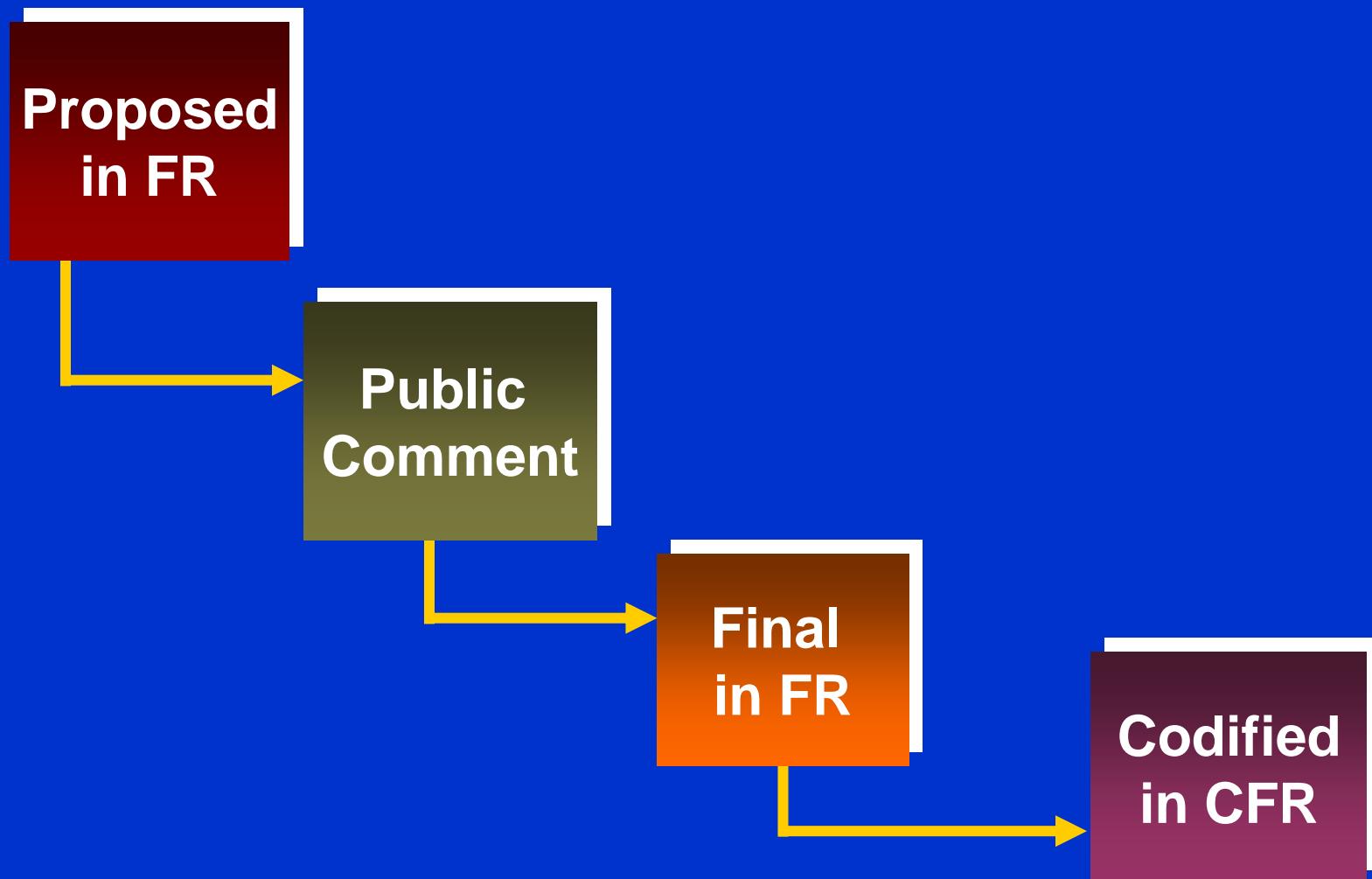
- National Drinking Water Advisory Council
- Regulatory negotiation process
- Public comments

# Determining Costs and Benefits of Drinking Water Standards

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- Regulatory Impact Analysis
- Small Business Regulatory Enforcement Fairness Act (SBREFA) Analysis
- Information Collection Request (ICR)

# Publishing Drinking Water Standards

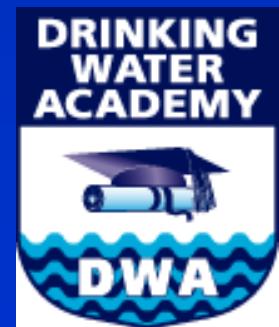


# Federal Implementation and Enforcement

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- EPA Regions implement and enforce regulations in non-primacy States
- OECA provides national enforcement leadership
- EPA prepares annual compliance report
- Priorities:
  - Regulations affecting microbials
  - Compliance assistance for small systems

# Today's PWSS Program - State and Tribal Roles



# What is Primacy?

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- **Primacy:** EPA may award States, Territories, and Indian Tribes **primary enforcement responsibility (primacy)** for public water systems if they meet certain requirements
- Primacy must be maintained

# Primacy Requirements

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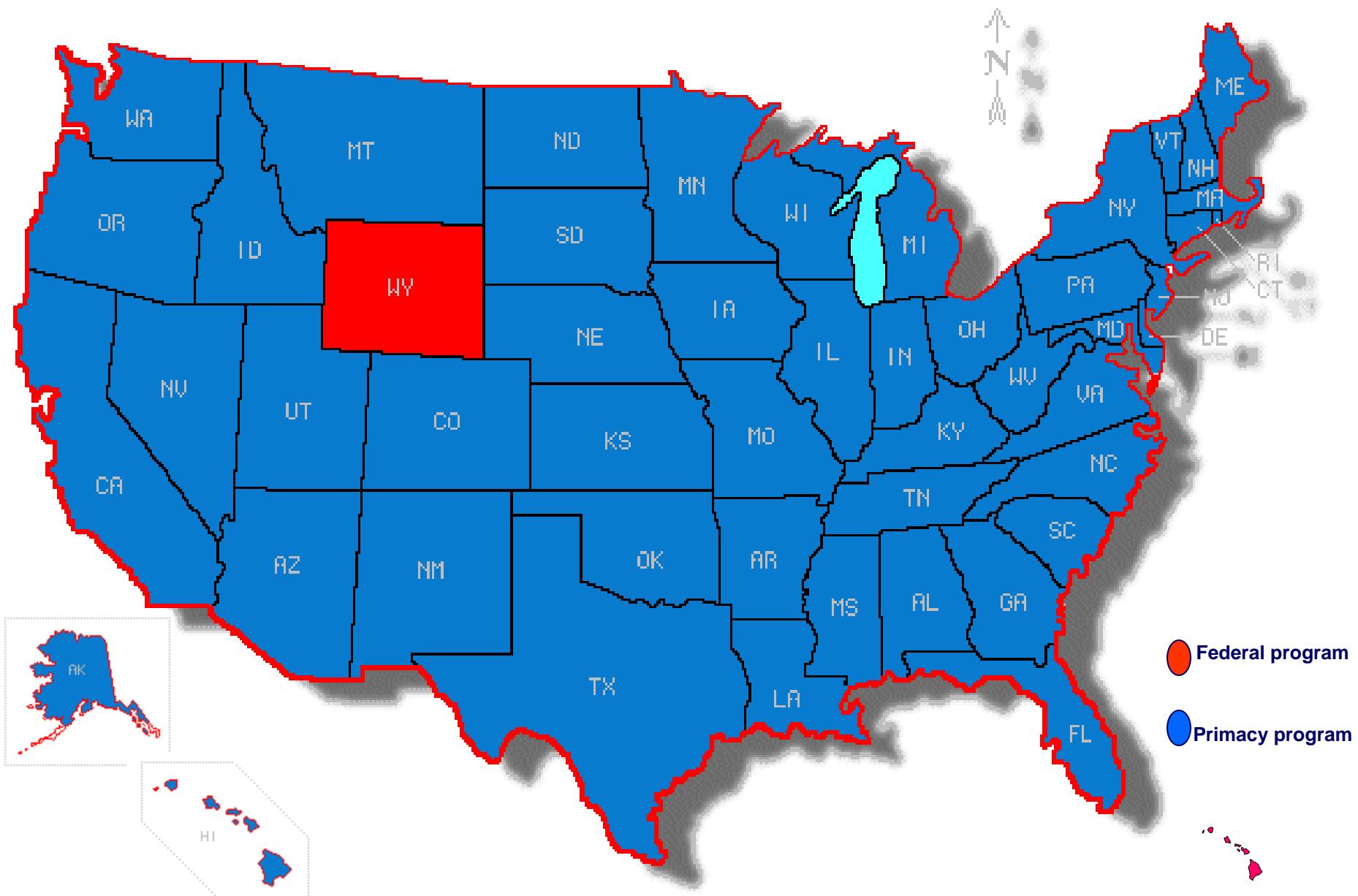
- States must enact laws and promulgate regulations at least as stringent as EPA's
- States must have procedures in place for implementing and enforcing regulations:
  - Inventory
  - Sanitary surveys
  - State certified laboratory
  - Plan review
  - Enforcement authority

# Primacy Requirements (continued)

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- Recordkeeping and reporting
- Variances and exemptions
- Emergency plan
- Consistent definition of public water system

# Status of PWSS Primacy



# Implement Standards

---

- Adopt new regulations
- Apply to maintain primacy and implement and enforce regulations under interim primacy
- Receive primacy for new regulations

# Enforce Standards

---

- States have discretion in enforcement
  - Actions depend on risk to public health
- Preventive actions come first

# Enforce Standards

---

- Informal actions are less resource-intensive, often effective in achieving compliance
- Formality of actions escalates with continued noncompliance

# Enforce Standards

---

- Formal enforcement actions
  - Administrative orders and penalties
  - Judicial decrees
- Referral to EPA for enforcement
- Joint EPA-State enforcement actions
- Independent EPA enforcement actions

# Enforce Standards

---

- Focus on Significant Noncompliers (SNCs)
- Track violations in Safe Drinking Water Information System (SDWIS)
  - Contains information on PWSs
  - EPA uses SDWIS for oversight and evaluation
- States use SDWIS/State to run their drinking water programs

# Sanitary Surveys

---

- On-site evaluation
  - Source
  - Treatment
  - Distribution system
  - Finished water storage
  - Pumps, pump facilities, and controls
  - Monitoring and reporting and data verification
  - System management and operation
  - Operator compliance with State requirements
- Re-emphasized in IESWTR

# Capacity Development

---

- Small systems face special challenges
- States must have programs to ensure capacity of new CWSs and NTNCWSs
  - Financial
  - Managerial
  - Technical

# Resources for Capacity Development

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- Technical Assistance Centers
- Environmental Finance Centers
- See <http://mtac.sws.uiuc.edu/about.asp> for lists of TAC and EFC contacts
- See <http://www.epa.gov/safewater/smallsys.html> for EPA's small systems and capacity development home page

# Operator Certification

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- EPA establishes minimum standards for State programs and reimburses training expenses for very small systems
- States determine appropriate experience, education and training requirements and certify operators



# Public Involvement

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- Source Water Protection Plans
- Intended Use Plans for DWSRF
- Consumer Confidence Reports
- Public notification requirements
- Administrative procedures for rulemaking

# Issue Variances

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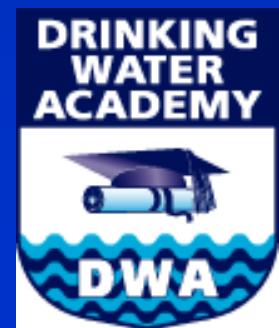
- Variances are for systems that cannot comply because of source water characteristics
- Include a compliance schedule
- Issued for up to three years, with possible two-year extension
- May not allow an unreasonable risk to public health

# Issue Exemptions

---

- Exemptions are for facilities that cannot comply for reasons including economic factors
- Include compliance schedule
- May not allow an unreasonable risk to public health

# Today's PWSS Program - Public Water Systems' Role



# Monitoring

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- Ensure that systems are meeting drinking water standards
- Monitoring varies based on:
  - Contaminant
  - System size
  - Previous detections or exceedances

# Reporting and Record-keeping Requirements

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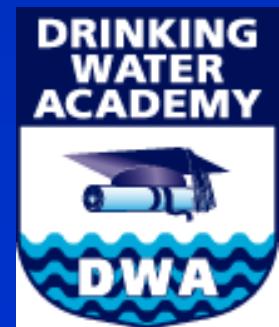
- Reporting
  - Frequency
  - Content
- Recordkeeping

# Consumer Confidence Reports and Public Notification

---

- Easy-to-understand explanations of drinking water standards and health effects
- Information on the quality of the water system's source and monitoring results
- Health effects information on any contaminant in violation of an EPA health standard
- Hotline number to address questions

# Funding for PWSS Programs



# Funding for State PWSS Programs

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## EPA Sources

- Public Water System Supervision grant (SDWA § 1443)
- Drinking Water State Revolving Fund (SDWA § 1452)

## State Sources

- State-legislated appropriations
- Water usage fees and other fees
- Other State-specific funding

# Drinking Water State Revolving Fund

---

## EPA

- Provide grants to States to set up DWSRFs
- Loan terms from 0 percent to market rate with maximum term of 20 years

## State

- Meet minimum requirements to receive DWSRF grants, including State contribution
- Provide lower interest loans to eligible drinking water systems
- Develop intended use plans
- May use portion of DWSRF funds for other eligible activities

# Drinking Water State Revolving Fund Set-Asides

---

- States may set-aside up to:
  - 4 percent for administration and technical assistance
  - 10 percent for PWSS programs, source water protection, operator certification, and capacity development
  - 15 percent for other prevention programs
  - 2 percent for technical assistance for systems serving under 10,000 population

# **Small Group Exercise:**

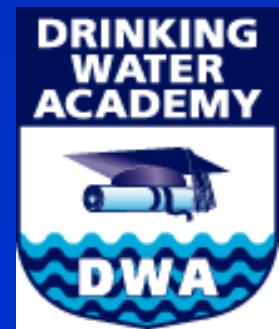
## **Prioritizing Tasks**

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- Provide operator training and technical assistance
- Enforce NPDWR requirements (MCLs and TTs)
- Conduct sanitary surveys
- Develop IUPs for DWSRF funding
- Adopt new NPDWRs for primacy
- Issue variances
- Report to SDWIS
- Enforce monitoring requirements



# Specific Rules and Regulations



# Current SDWA Regulations

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- Total Trihalomethanes
- Chemical Rules (Phases I, II, IIb, and V)
- Surface Water Treatment Rule
- Total Coliform Rule
- Lead and Copper Rule
- Stage 1 D/DBP Rule
- Interim Enhanced SWTR
- Radionuclides
- Consumer Confidence Report Rule
- Arsenic
- Filter Backwash Recycling Rule
- Long Term 1 Enhanced Surface Water Treatment Rule

# Total Trihalomethanes

## Standard

---

- Trihalomethanes are by-products of chlorine
- Standard applies to CWSs that serve 10,000 or more people and use a disinfectant
- Standard is for total trihalomethanes

# **Chemical Rules (Phase I, II, IIb, and V)**

---

- Regulations cover 69 drinking water contaminants, most of which are carcinogens
- Generally apply to CWSs and NTNCWSs
- Contaminants cover three types:
  - Volatile organic chemicals
  - Synthetic organic chemicals
  - Inorganic chemicals

# Surface Water Treatment Rule

---

- Applies to systems that use surface water (including GWUDI)
- Establishes treatment techniques for *Giardia*, viruses, Legionella, and turbidity
  - Requires disinfection and usually filtration
- Establishes monitoring requirements for turbidity and disinfectant residual

# Total Coliform Rule

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- To control microbiological contaminants
- Applies to all PWSs
- Requires systems to sample for coliform in the distribution system
- Presence of coliform can indicate treatment failures or deterioration of the distribution system

# Lead and Copper Rule

---

- Applies to CWSs and NTNCWSSs
- Requires monitoring at customers' taps
- If lead or copper levels exceed the action level, systems may need to:
  - Treat source water
  - Add corrosion control
  - Establish a public education program
  - Replace lead service lines

# Stage 1 Disinfectants and Disinfection Byproducts

---

- Applies to CWSs that disinfect and TNCWSs that use chlorine dioxide
- Includes standards for disinfectants and the byproducts of disinfection
- Includes provisions to help prevent the formation of disinfection byproducts

# Interim Enhanced Surface Water Treatment Rule

---

- Most provisions apply to surface water and GWUDI systems serving 10,000+ people
- Strengthens surface water treatment to prevent microbial contamination
  - MCLG of zero for *cryptosporidium*
  - More stringent turbidity standards
  - Other measures to prevent contamination

# Radionuclides

---

- December 2000 rule replaces 1976 rule
  - Applies to CWSs
  - Sets new standard for uranium
  - Retains existing standards for other radionuclides
  - Increases monitoring to every entry point in distribution system

# Arsenic

---

- 1975 standard replaced in January 2001
- New standard is 10 ppb
- EPA weighed costs and benefits in setting standard

# Filter Backwash Recycling Rule

---

Applies to surface water and GWUDI systems that meet **all** of the following:

- Use surface water or GWUDI
- Use conventional or direct filtration
- Recycle one or more of the following:
  - Spent filter backwash
  - Sludge thickener supernatant
  - Liquids from dewatering processes

# Long Term 1 ESWTR

---

- Applies to surface water and GWUDI systems serving less than 10,000 people
- Similar provisions to IESWTR with some allowances for small systems
  - MCLG of zero for *Cryptosporidium*
  - More stringent turbidity standards
  - Other measures to prevent contamination

# SDWA Regulatory Schedule

