

The Safe Drinking Water Act and the National Primary Drinking Water Regulations

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The Safe Drinking Water Act

US Public Health Service standards 1946 and 1968 established standard for coliforms, inorganic and radiological contaminants as well as aesthetic standard in public water supplies.

Safe Drinking Water Act (SDWA) established in 1974 to protect the quality of drinking water.

Authorizes EPA to establish minimum standards for drinking water.

Established federal definition of a public water system and requires owners/operators to comply with primary (health-related) standards.

The Safe Drinking Water Act

Established secondary (not health related) standards.

SDWA Amendments - Surface Water Treatment, Phase II/V, Lead and Copper Rule Groundwater Rule, Stage 1 and 2 Disinfection By Products, Public Notice, Consumer Confidence Reports.

1996 amendments requires a detailed risk and cost assessment and use of the best available peer-reviewed science.

Consider the risk-risk trade off between microbial contaminants and disinfection-byproducts.

The Safe Drinking Water Act

SDWA also includes

- State primacy enforcement responsibility
- Enforcement authorities for drinking water regulations (also PN requirements and CCR)
- Variances
- Exemptions
- Prohibits use of lead pipe, solder and flux
- Monitoring of contaminants-source water assessments
- Operator certification
- Capacity development program

SDWA Regulatory Framework



Safe Drinking Water Act requires EPA to publish the Candidate Contaminant List (CCL) every five years.



Based on health effects and occurrence of contaminants that present the greatest public health concerns related to exposure to drinking water.



CCL is used to identify priority contaminants for regulatory decision making and information collection.



Unregulated Contaminant Monitoring Rule (UCMR)- required monitoring for unregulated contaminants, including those on CCL, by all large and representative sample of small PWSs.

SDWA Regulatory Framework

Regulatory (draft and final) determination based on



Contaminant may have an adverse health effect

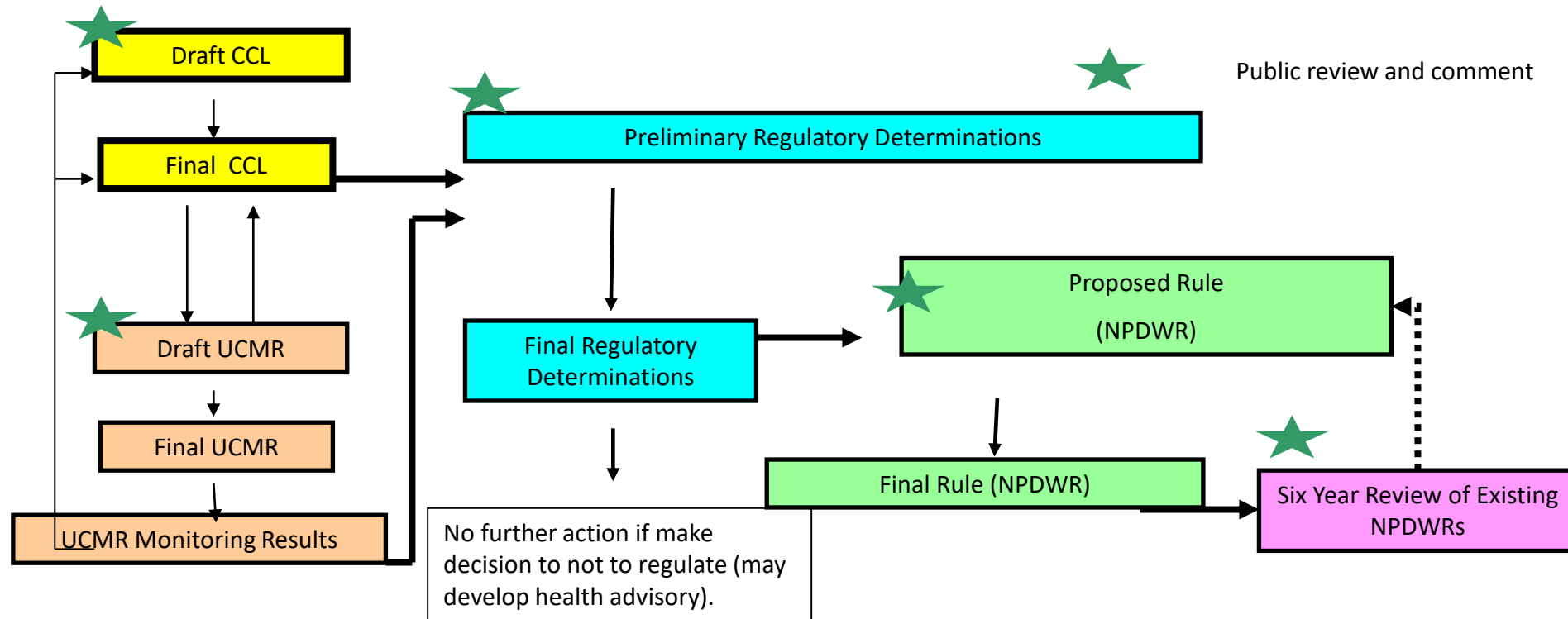


Contaminant is known to occur or is likely to occur in PWSs with a frequency and level of public health concern



Administrator determines that regulation of the contaminant presents a meaningful opportunity for health risk reduction for persons served by a PWS

SDWA Regulatory Framework



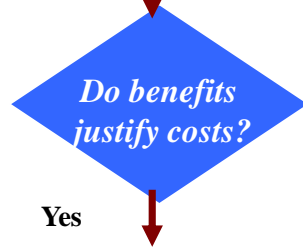
At each stage, need increased specificity and confidence in the type of supporting data used (e.g., health and occurrence).



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”)



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

Sound Science:
Health Effects
Occurrence Data

Affordability
Cost/Benefit Analysis
Acceptable Risk Range

Reliable & Accurate Methods
Monitoring Burden

Meeting the Definition of a PWS

Title 40 CFR Section 141.2:

"A public water system (PWS) is a system for the provision to the public of water for human consumption through pipes ... if such system has at least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year. [The PWS] includes ... collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system; and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system."

Types of Public Water Systems

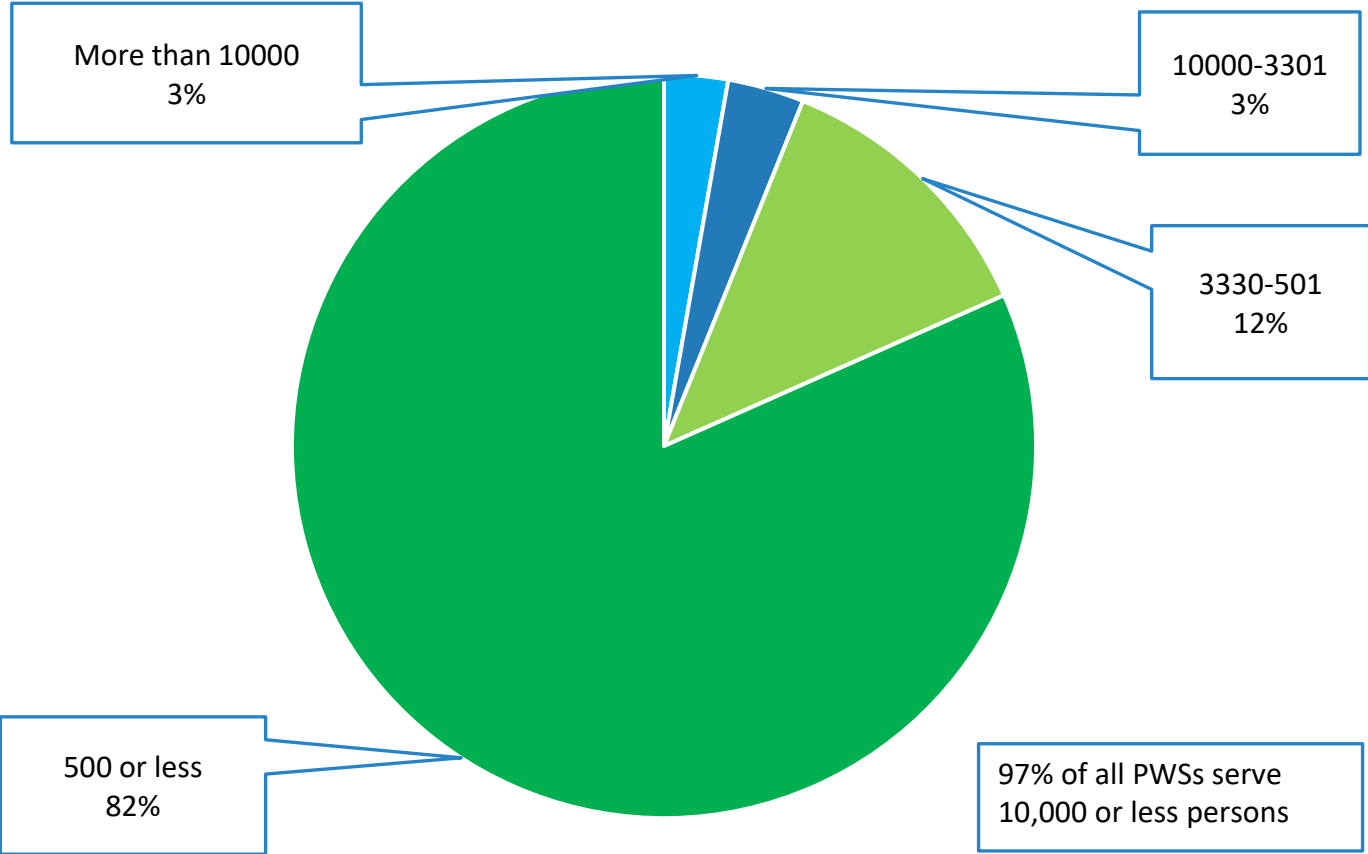


Community Water System (CWS): serve residential populations of at least 25 people or 15 service connections year-round

Non-transient non-community water systems (NTNCWS): serve on a regular basis at least 25 of the same persons at least 6 months per year (e.g., factories, schools)

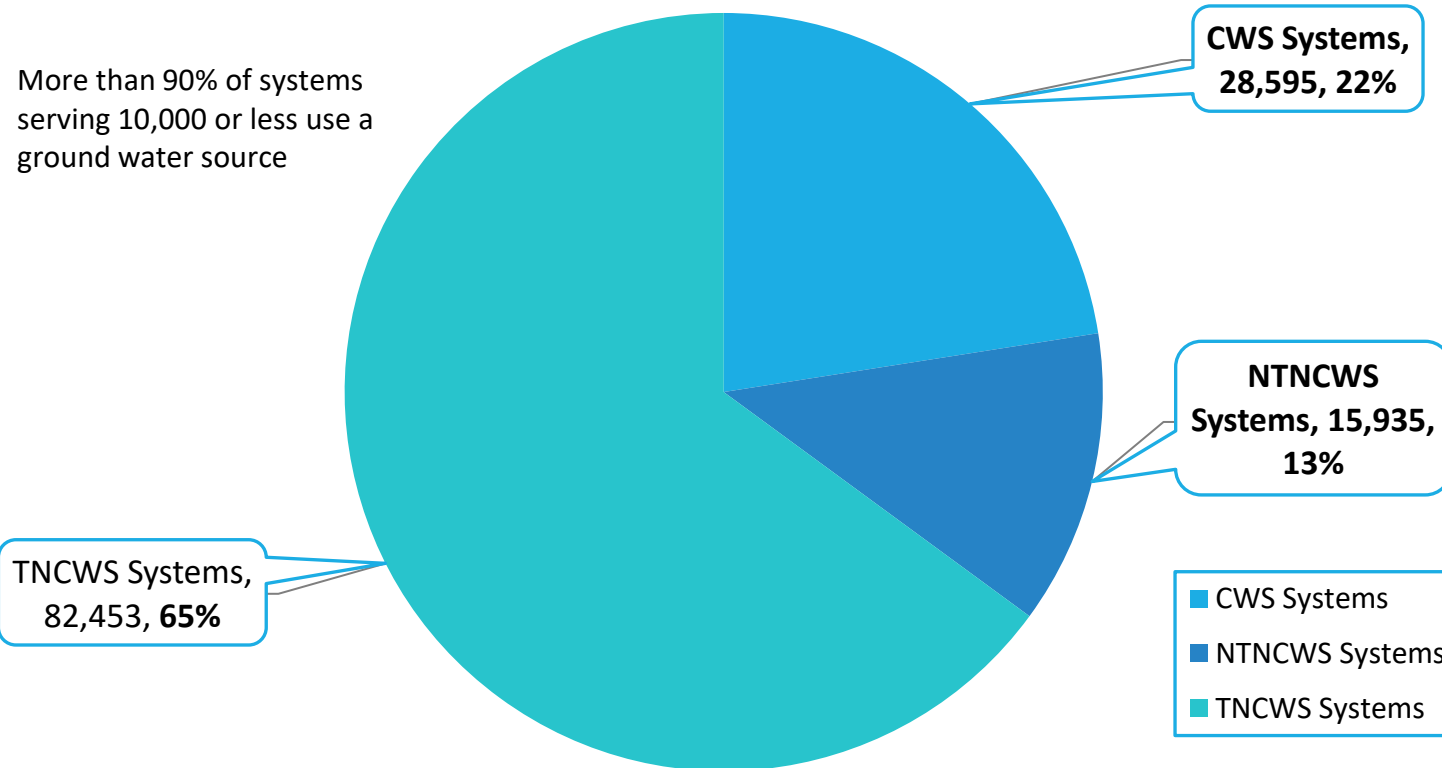
Transient non-community water system (TNCWS): does not regularly serve at least 25 of the same people over 6 months per year (e.g., rest stop, camp ground)

Public Water Systems Population Served



Small Public Water Systems

Water systems serving 10,000 or less



Public Water System Size

- The majority (97%) of Public Water Systems serve less than 10,000 people. These are Small Water Systems by definition.
- The majority of Small Water Systems serve less than 500 people.
- Large Water Systems serve 10,000 or more people.
- The majority of the US population is served water from Large Public Water Systems.
- 90% of the US population receives their drinking water from a public water system regulated under SDWA.

Quiz

A truck stop and a restaurant use a well on the property to supply water to the facilities. No one lives on the property. What type of water system is this?

- A. Community Water System.
- B. Non-Transient Noncommunity Water System.
- C. Transient Noncommunity Water System.
- D. If there is no Starbucks I would not stop there anyway.

What if there are 30 employees?

What is SDWA Primacy?

- EPA may delegate SDWA primary enforcement authority (primacy) to states, US territories and Indian Tribes if they meet certain requirements.
- Primacy agencies must adopt and have the authority to enforce drinking water regulations no less stringent than the National Primary Drinking Water Regulations (NPDWRs).
- Primacy agencies must apply for primacy for each NPDWR.
- Primacy agencies must meet recordkeeping and reporting (to EPA) requirements.
- Currently, 49 state, the US territories and the Navajo Nation have primacy for SDWA.
- EPA retains primacy in Wyoming, the District of Columbia and the remaining federally recognized tribes.

The National Primary Drinking Water Regulations (NPDWRs)40 CFR Part 141

Maximum Contaminant Level Goal (MCLG)-Maximum level of drinking water contaminant at which no known or anticipated adverse health effect would occur allowing for an adequate margin of safety. Set as close to zero as possible. Not enforceable,

Maximum Contaminant Level (MCL)-Maximum permissible level of a contaminant allowed in water delivered to the public. Set as close to the MCLG as possible. Costs of implementing the MCL are considered with the benefits of avoided negative health effects. Enforceable.

Treatment Technique Requirement-Required treatment for a contaminant in lieu of an MCL. Example-Filtration and disinfection for microbial contaminants. Enforceable.

The National Primary Drinking Water Regulations (NPDWRs)40 CFR Part 141

If the water supply exceeds the Maximum Contaminant Level or does not meet the Treatment Requirements it has violated the National Primary Drinking Water Regulations and the water supply must be removed, replaced or receive treatment to meet the regulations.

The public must be notified of all violation of the National Primary Drinking Water Regulations until the violation is corrected.

For 2022, there were 154,106 public water systems in the US required to comply with the National Primary Drinking Water Regulations.

96% of those did not exceed any Maximum Contaminant Level and provided all required treatment.

The National Primary Drinking Water Regulations (NPDWRs) 40 CFR Part 141

- Maximum Contaminant Levels and Treatment Technique Requirements for 90 contaminants
 - Inorganic Contaminants (Arsenic, Lead)
 - Organic Contaminants (pesticides, solvents)
 - Radiological Contaminants (radium, uranium)
 - Disinfection By Products
 - Microbial Contaminants (bacteria, viruses *Cryptosporidium*)
- Monitoring (testing) requirements for the water supplied by public water systems
- Recordkeeping and reporting requirements for monitoring results
- Public right to know requirements

Acute Contaminants vs Chronic Contaminants

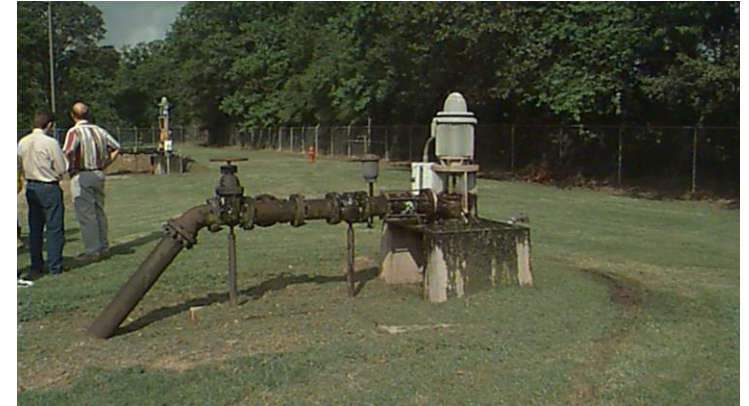
Acute Contaminants will cause a serious negative health effect with a single exposure. Examples are the microbial contaminants and nitrate.

Chronic Contaminants can cause health effects (e.g. carcinogenic, mutagenic) with a long-term exposure. Examples are pesticides, solvents, petrochemicals, arsenic and lead.

Any chronic contaminant may cause acute health effects if the concentration exposed to is extremely high.

Source Water

- **Types:**
 - Ground water (wells)
 - Surface water (lakes, rivers) “open to the atmosphere and subject to surface runoff” 40 CFR 142
 - One system may have multiple sources and types
- **Purchased water:**
 - Systems may purchase water from another PWS.
- Source water type determines monitoring requirements for the NPDWRs.
- Source water quality and vulnerability to contamination determine if any treatment is needed and the type of treatment needed.



Microbial Contaminants

Revised Total Coliform Rule

Applies to all PWSs

Total coliform samples must be collected at sites that are representative of water quality throughout the distribution system according to a written sample siting plan subject to state review and revision.

Each total coliform-positive (TC+) routine sample must be tested for the presence of E. coli.

If any routine sample is (TC+), repeat samples are required to help identify possible causes or locations of contamination.

If any TC+ sample is also E. coli-positive (EC+), then the EC+ sample result must be reported to the state by the end of the day that the PWS is notified.

Rule uses “find and fix” approach to address fecal contamination that could enter the distribution system. It requires PWSs to perform assessments after TC+ triggers to identify sanitary defects that may be the cause.

Ground Water Rule

Applies to all ground water systems

Sanitary Surveys required with minimum frequency and scope.

Triggered source monitoring required -triggered by Total coliform – positive sample from RTCR monitoring for systems that do not provide 4- log virus treatment.

Triggered source water samples are analyzed for at least one fecal indicator- *E.Coli*, enterococci, coliphage.

Assessment source water monitoring (if required by the state)to determine vulnerability of source to fecal contamination.

Ground Water Rule

Corrective action is required for a fecal indicator-positive source water sample or for significant deficiencies found:

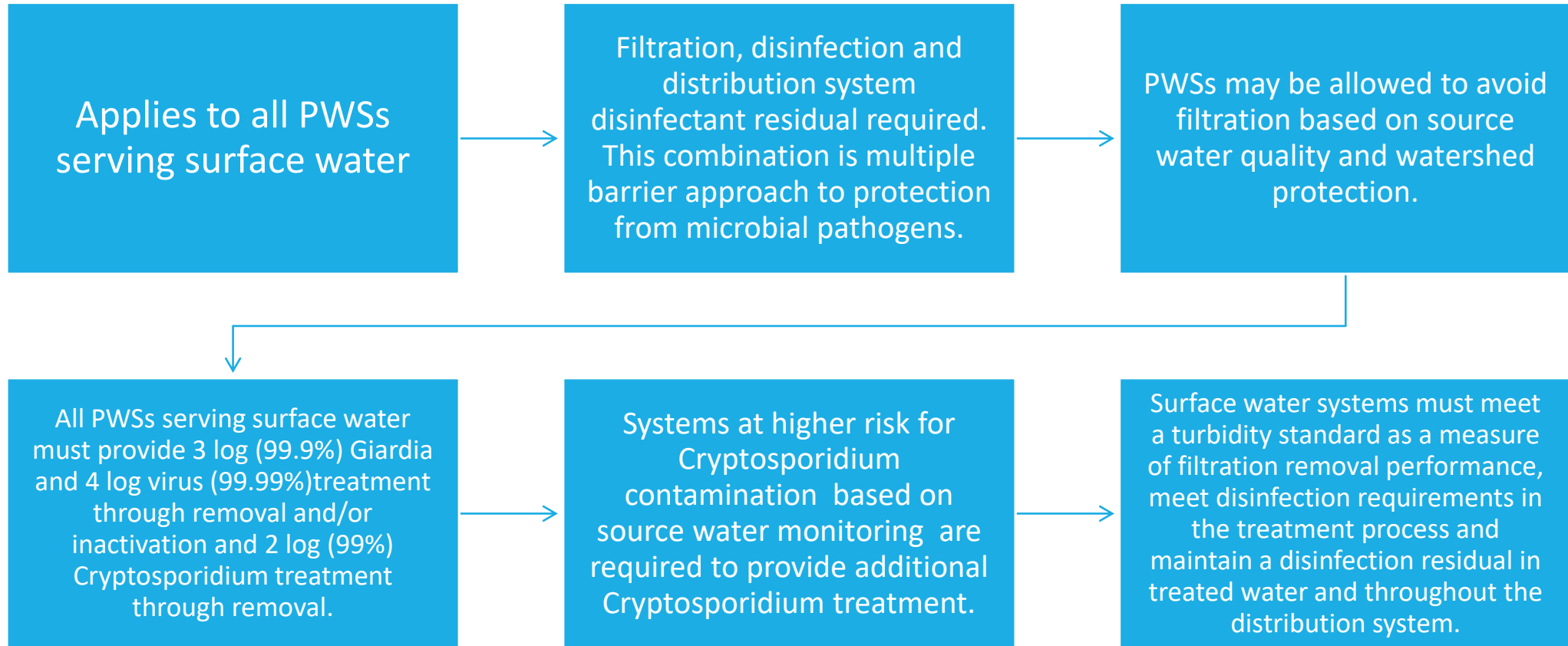
Correct all significant deficiencies

Provide an alternate source of water

Eliminate the source of contamination or

Provide 4-log treatment of viruses.

Surface Water Treatment Rules



Stage 1 and 2 Disinfection and Disinfection Byproducts Rules

- Apply to
 - CWS & NTNCWS that use disinfected water
 - TNCWS that add chlorine dioxide
- MCLs for TTHMs and HAA5 to be met in the distribution system.
- Establishes monitoring requirements in distribution systems.
- Compliance is based on a Locational (each sample point) Running Annual Average
- Locations, number of samples are based on system type and system size
- Also establishes Maximum Residual Disinfect Levels for
 - Chlorine
 - Chloramines
 - Chlorine dioxide

Quiz

Disinfection By Products are formed by?

- A. The use of any disinfectant.
- B. Chemical disinfectants reacting with organic matter in the source water.
- C. Too many quad shots
- D. If there is no Starbucks I would not stop there anyway.

What drinking water disinfectant does not result in DPB formation?

Chemical Contaminants

Lead and Copper Rule

- Tap water sampling required for all CWS and NTNCWS
- Tap samples are collected based on location and age ,Tier 1-Tier 3
- Tier 1-Single family homes with lead pipes or solder or with lead service lines
 - Establishes “action levels”
 - 0.015 mg/L for lead
 - 1.3 mg/L for copper

Lead and Copper Rule

- Treatment Techniques:
- Triggered when 90th percentile exceeds action level
- Includes:
 - Corrosion control of finished water
 - Source water treatment if the source of lead
 - Lead service line replacement
 - Public education

Arsenic Rule

Applies to all CWS and NTNCWS

- Maximum Contaminant Level (MCL) = 0.010 µg/L
- Samples are collected at the Entry Point to the Distribution System (EPTDS)
- Monitoring frequency:
 - Surface water systems monitor annually - may increase to quarterly samples if >MCL
 - Groundwater systems monitor every 3 years – may increase to quarterly samples if >MCL

Quiz

Arsenic contamination in a water supply can be caused by?

- A. Agricultural practices.
- B. Geologic characteristics.
- C. The Wicked Witch of the West.

Radionuclides Rule

- Applies to CWSs
- Sample at Entry Point to Distribution System (EPTDS) for
- Gross Alpha, Combined Radium-226/228, and Uranium
 - 4 quarters of initial monitoring
 - Reduced monitoring every 3, 6 or 9 years depending on average of initial results
 - Any result above MCL leads to quarterly sampling until 4 consecutive quarters are below MCL

Radionuclides Rule

- Applies to CWSs
- Sample at Entry Point to Distribution System (EPTDS) for
- Beta particle and Photon Radioactivity
 - Initial quarterly or annual samples for vulnerable CWS only
 - Reduced sampling every 3 years
 - Increased monitoring at initial monitoring frequency

Chemical Contaminants Continued

- Inorganic Contaminants (IOCs)-Nitrate, Arsenic, heavy metals.
- Organic chemical contaminants
 - Volatile Organic Contaminants (VOCs)-solvents, “BTEX”
 - Synthetic Organic Contaminants(SOCSs)-pesticides, herbicides ,PCBs
- MCLs and monitoring frequency vary with the source type, contaminant and PWS type.
- Monitoring frequency can be reduced, or monitoring can be waived depending on the contaminant and historical monitoring results and vulnerability to contamination.
- Nitrate (acute contaminant) -cannot be reduced to less than annually, no waivers allowed.
- SOCs (chronic contaminant)- can be reduced or waived.
- IOCs (except nitrate),VOCs, SOCs monitoring is on a 3,6-, or 9-year cycle determined by the SDWA primacy agency based on historical monitoring and vulnerability to contamination.

Right-to-Know Rules

Public Notification Rule

Requires all PWSs to notify their consumers any time a PWS violates a national primary drinking water regulation or has a situation posing a risk to public health. Notices must be provided to persons served (not just billing customers).

Tier 1-Situation with potential to immediately impact human health (acute risk) PWS has 24 hours to notify public. State has discretion to require Tier 1 for “other violations and situations.”

Tier 2-No immediate risk to public health, contaminant levels exceed MCLs or failure to provide adequate treatment. PWS notifies ASAP or within 30 days

Tier 3-No direct impact on public health, e.g. monitoring and reporting violations. Notify within 1 year or in Consumer Confidence Report

Applies to all Community water systems



Requires all community water systems to prepare and distribute a brief annual water quality report (a.k.a “Consumer Confidence Report”) summarizing information regarding source water, detected contaminants, compliance, as well as educational information.

Consumer Confidence Report Rule (CCR)

Consumer Confidence Reports

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- CWSs must provide to consumers annually by July 1st
 - Wholesalers must provide information to consecutive systems by April 1st
 - Systems must send certification of delivery to the state within three months, or by October 1st
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- Reports must include:
 - Water System Information
 - Source(s) of Water
 - Definitions
 - Detected Contaminant Table
 - Information on Cryptosporidium, Radon and Other Contaminants
 - Compliance with the NPDWRs (any violations)
 - Variances and/or Exemptions
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Upcoming Regulations

Upcoming Regulations

Lead and Copper Rule Improvements-Proposed November 2023

- 100% Removal of Lead Service Lines
- Locate Legacy Lead Service Lines
- Improve Tap Sampling
- Lower the Lead Action Level

Per-and Polyfluoroalkyl Substances (PFAS)-Proposed March 2023

- Establish MCLs for six PFAS
- Monitoring Requirements
- Public Notice
- Treatment if MCLs exceeded

Microbial and Disinfection By Products Rules

- SDWA required Six Year Review in progress
- May or may not be revisions to the rules based on any new health or occurrence information

Other Applicable CFR Requirements

CFR Part 142 –Primacy Requirements

Establishes Primacy
Enforcement
Responsibilities

Authorities to enforce
NPWDRs.

Review of new or modified
PWS facilities to assure
compliance.

Drinking Water Laboratory
Certification Program.

Variance and Exemption
Authorities.

Recordkeeping and
Reporting (to EPA)
requirements.

Special Primacy
Requirements specific to
each rule.

Primacy agencies are also
required to have a water
treatment operator
certification program as part
of other SDWA
requirements.

CFR Part 143 –Secondary Standards

- Aesthetic (not health-based) standards
- Not enforceable under SDWA

Examples:

Chloride

Color

Odor

pH

Iron

Manganese