



Water Quality Standards: Current Contaminants, and Identifying New Contaminants

**Blue Ribbon Panel on Water Sustainability
Public Perceptions and Acceptance Working Group
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Topics Covered Include

- How and under what authority contaminants are regulated
- Applicability of regulations
- What is regulated
- Regulatory process/flow
- Identifying new & unregulated

Safe Drinking Water Act (SDWA)

- Originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply "At the tap"
- Amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells.
- EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards.

1986 SDWA Reauthorization

- Increased monitoring
 - 20 new contaminants every 3 years
 - No research on occurrence or treatment technologies
 - No cost/benefit analysis
- Protection of wellhead areas, portions of aquifers
 - Rules Lead and Copper
 - Tribal authority
- Criticisms
 - Little opportunity for public comment
 - No flexibility for states
 - Unfunded mandate

1996 SDWA Reauthorization

- \$\$\$\$ to implement programs
- Established Drinking Water Revolving Fund (WIFA)
- Source Water Assessment Program
- Certified Operator Program standards and guidelines
- Microbial Contaminants and Disinfection By-Products Rule

SDWA Applicability

- Applies to every US public water system (PWS)
 - Not private wells
 - PWS = 15 service connections or serving 25 or more persons
- US > 160,000 PWSs
- AZ has > 1600 active PWSs



What is a “Public Water System” and what is ADEQ’s scope of regulatory coverage?

- Definition of a Public Water System:
49-352(B)(1) – A water system that provides water for human consumption...and has at least 15 service connections or regularly serves at least 25 people for at least 60 days per year

3 Types of Public Water Systems:

- **Community**

- 15 or more connections used by same people year round, or
- Serves the same 25 or more people year round.

- **Nontransient Noncommunity**

- 15 or more connections used by same people for more than 6 months/yr, or
- Serves the same 25 or more people for at least 6 months/yr.

- **Transient Noncommunity**

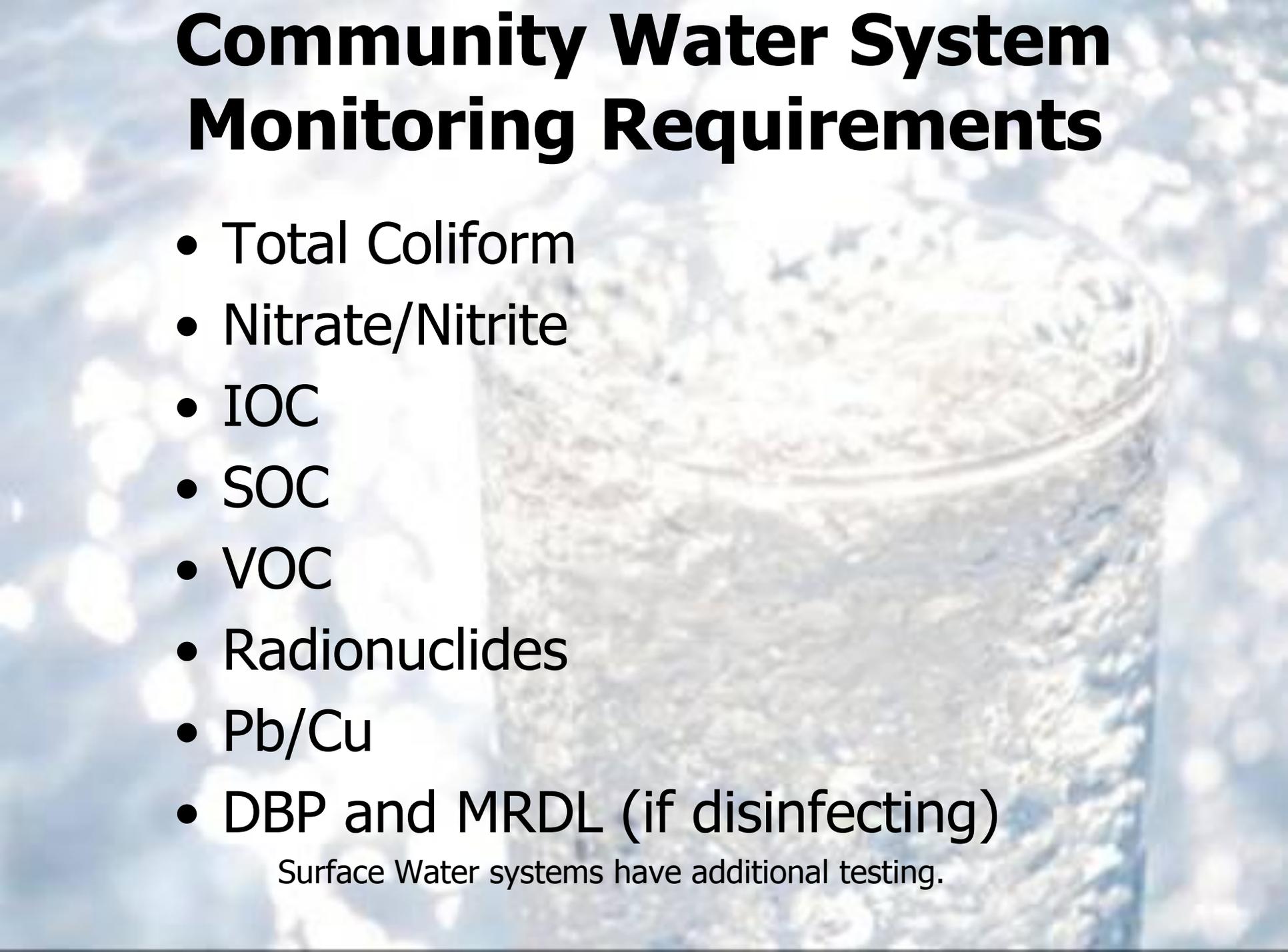
- 15 or more connections not by same people for more than 6 months/yr, or
- An average of at least 25/day for at least **60 days/yr**, but not the same 25 for more than 6 months/yr.

What *Is* Regulated?

Primary Drinking Water Stds

- Microorganisms – (e.g., bacteria)
- Disinfectants (e.g., chlorine)
- Disinfection Byproducts (e.g., TTHMs)
- Inorganic Chemicals (e.g., arsenic)
- Organic Chemicals (e.g., pesticides, herbicides, petroleum derivatives)
- Radionuclides (e.g., gross alpha, uranium)

Community Water System Monitoring Requirements

A glass of water is shown in the foreground, slightly out of focus, against a background of a blue sky with white clouds. The glass is filled with clear water and has a thin layer of white foam or bubbles on top. The background is a soft-focus landscape of a blue sky and white clouds.

- Total Coliform
- Nitrate/Nitrite
- IOC
- SOC
- VOC
- Radionuclides
- Pb/Cu
- DBP and MRDL (if disinfecting)

Surface Water systems have additional testing.

Non-Transient Non-Community Water System Monitoring Requirements

- Total Coliform
- Nitrate/Nitrite
- IOC (fluoride MCL does not apply)
- SOC
- VOC
- Pb/Cu
- DBP and MRDL (if disinfecting)

Surface Water systems have additional testing.

Transient, Non-Community Water System Monitoring Requirements

- Total coliform
 - GWR if applicable and triggered
- Nitrate/nitrite

All contaminants would have been sampled for the New Source Approval testing, before the source was allowed to begin serving water.

After that, only test for these.

Surface Water systems have additional testing.

A glass of water is the central focus of the image, positioned on the right side. The water is clear and fills the glass. The background is a soft, out-of-focus blue with white bokeh light spots, suggesting a bright, airy environment. The text is overlaid on the left and top portions of the image.

Under What Authority are These Contaminants Regulated?

The Safe Drinking Water Act

EPA sets primary drinking water standards w/3-step process

- Identifies contaminants that may adversely affect public health and occur in drinking water with a frequency and at levels that pose a threat to public health.
- Determines a maximum contaminant level goal for the contaminants it decides to regulate (the goal is the level of a contaminant below which there is no known or expected risk to human health).
- Specifies a maximum contaminant level (MCL)

Maximum Contaminant Levels MCLs

- Maximum permissible level of a contaminant in drinking water which is delivered to any user of a public water system
- MCLs are enforceable
- Set as close to the maximum contaminant level goals as possible
 - Arsenic MCL = 10 ppb
 - Arsenic MCLG = zero

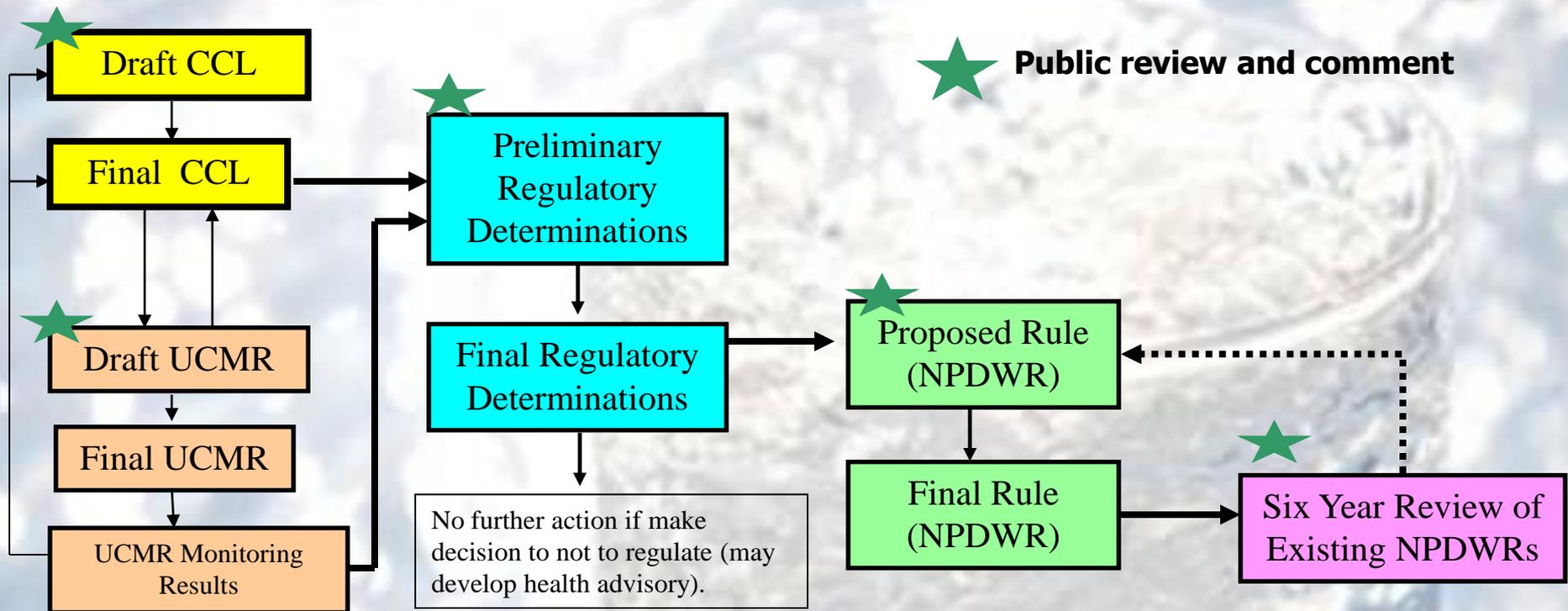
The SDWA Regulatory Process

- Includes a process that EPA must follow to identify and list unregulated contaminants, which may require a national drinking water regulation in the future.
- EPA must periodically publish this list of contaminants (called the Contaminant Candidate List or CCL) and decide whether to regulate at least five or more contaminants on the list (i.e., make regulatory determinations).

How does EPA Make Regulatory Determinations?

- **The Safe Drinking Water Act requires consideration of three criteria:**
 - the potential adverse effects of the contaminant on the health of humans,
 - the frequency and level of contaminant occurrence in public drinking water systems, and
 - whether regulation of the contaminant presents a meaningful opportunity for reducing public health risks

Generalized Flow of Regulatory Processes

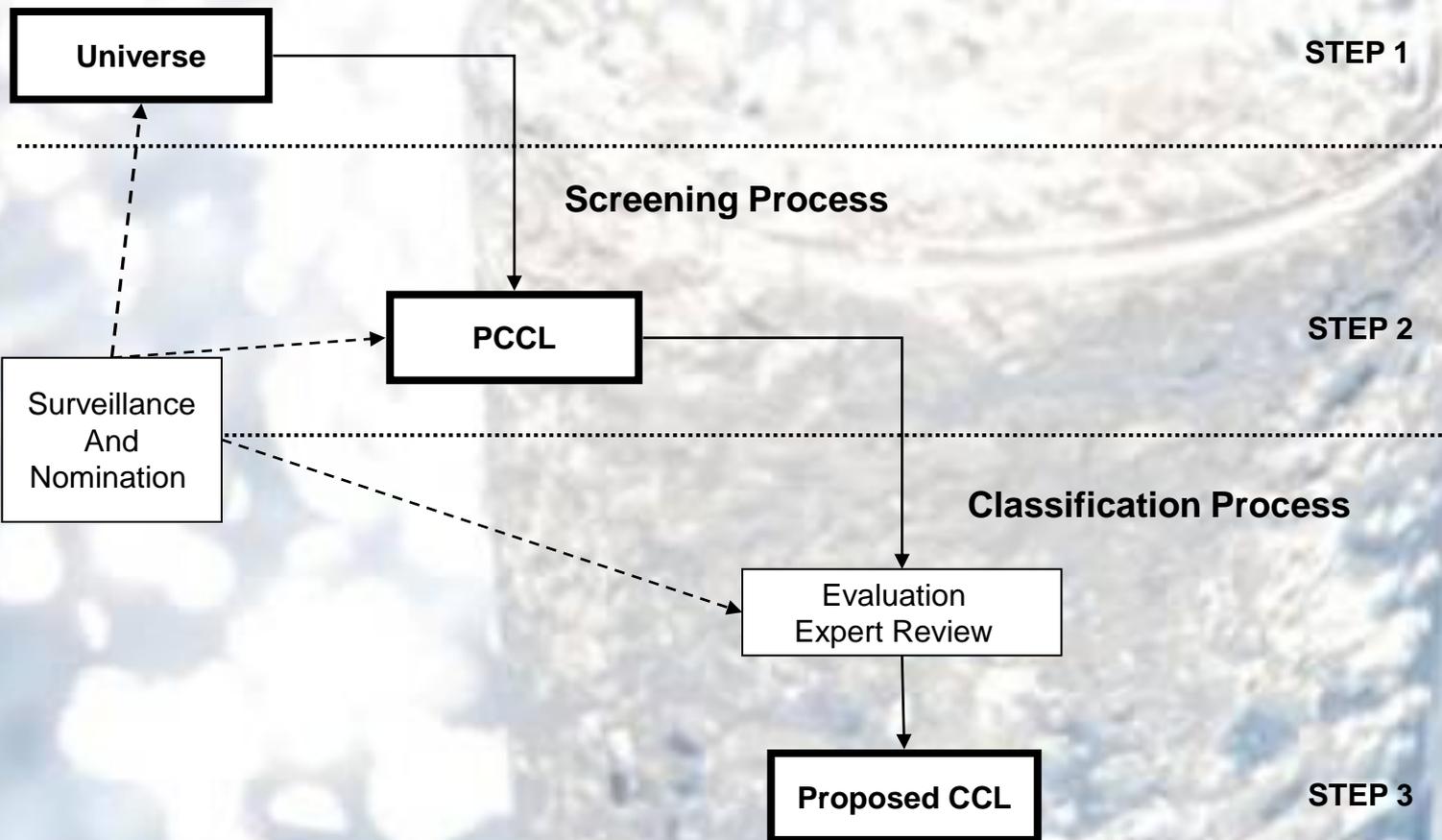


At each stage, need increased specificity and confidence in the type of supporting data used (e.g. health and occurrence).

(slide compliments of US EPA Office of Groundwater)

Contaminant Prioritization: CCL 3 Process

Identifying the CCL
Universe



(slide compliments of USEPA Office of Groundwater)

CCL History

- **CCL 1 – Finalized 1998**
 - **Nine contaminants selected for regulatory determinations**
 - **In 2003 EPA published its final determination that no regulatory action is appropriate or necessary for all nine contaminants**
- **CCL 2 Finalized 2005**
 - **Eleven contaminants selected for regulatory determination**
 - **In 2005 EPA published its final determination that no regulatory action is appropriate or necessary for all eleven contaminants**
- **CCL 3 Finalized 2009**
 - **Final contaminant review is ongoing**

UCMR

- EPA uses the Unregulated Contaminant Monitoring (UCM) program to collect data for contaminants suspected to be present in drinking water, but that do not have health-based standards set under the Safe Drinking Water Act (SDWA).
- Every five years EPA reviews the list of contaminants, largely based on the Contaminant Candidate List.

UCMR

- The SDWA Amendments of 1996 provide for:
 - Monitoring no more than 30 contaminants per 5-year cycle
 - Monitoring only a representative sample of public water systems serving less than 10,000 people
 - Storing analytical results in a National Contaminant Occurrence Database (NCOD)

The history of the UCM program:

- **UCM Rounds 1 & 2 (1988-1997):** State drinking water programs managed the original program and required public water systems (PWSs) serving more than 500 people to monitor contaminants.
- **UCMR 1 (2001-2005):** the SDWA Amendments of 1996 redesigned the UCM program to incorporate a tiered monitoring approach. The rule required all large PWS and a nationally representative sample of small PWSs serving less than 10,000 people to monitor the contaminants.
- **UCMR 2 (2007-2010):** EPA manages the second monitoring cycle. This monitoring cycle establishes a new set of unregulated contaminants.

Review of Established Standards

- The Safe Drinking Water Act requires EPA to review each national primary drinking water regulation at least once every six years and revise, as appropriate.
- SDWA specifies that any revision must maintain or increase public health protection.

What is unregulated...

Virtually everything else



National Secondary Drinking Water Regulations

- National Secondary Drinking Water Regulations (NSDWRs or secondary standards) are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water.
- EPA recommends secondary standards to water systems but does not require systems to comply.
- However, states may choose to adopt them as enforceable standards

National Secondary Drinking Water Regulations Include:

- **Aluminum** - 0.05 to 0.2 mg/L, colored water
- **Manganese** - 0.05 mg/L, black to brown color; black staining; bitter metallic taste
- **Odor** - 3 threshold odor number, "rotten-egg", musty or chemical smell
- **Total Dissolved Solids** - 500 mg/L, hardness; deposits; colored water; staining; salty taste
- **Silver** 0.10 mg/L, skin discoloration; graying of the white part of the eye

Impacts of Serving Water with Elevated Levels Secondary Contaminants

- Water System Operational Concerns
- Increased Water System Operational Costs
- Shortened Lifespan of Household Appliances (e.g., hot water heaters, evaporative coolers, washing machines, etc,
- Staining of plumbing fixtures, appliances and clothing
- Dissatisfied customer base

How Does ADEQ “Regulate” the Unregulated?

- Only if/when needed...
 - Lower detection limits & improved analytical instruments/methods result in greater detection
 - Just because you can detect it doesn't mean there is an associated adverse health impact
 - Resolution usually occurs as it is in the best interest of the water system to mitigate in full or in part

Detection \neq Risk

Risk = Exposure x Toxicity



=



x



Some Common Unregulated Contaminants

- Pharmaceuticals
 - Steroids
 - Hormones
 - Antibiotics
 - Pain Killers
 - Tranquilizers
 - Cholesterol Medication
- Cosmetics
- Caffeine
- MTBE
- Perchlorate



So where do we get our authority?

- 49-351. Designation of responsible state agency
 - A. The department of environmental quality is designated as the responsible agency for this state to take all actions necessary or appropriate to ensure that all potable water distributed or sold to the public through public water systems is free from unwholesome, poisonous, deleterious or other foreign substances and filth or disease causing substances or organisms. All such actions shall be taken at the direction of the director of the department.

- **49-141. Environmental nuisances**

A. The director may take action under this section to abate environmental nuisances. As used in this section, an environmental nuisance is the creation or maintenance of a condition in the soil, air or water that causes or threatens to cause harm to the public health or the environment and that is not otherwise subject to regulation under this title. Subject to this limitation, the following conditions may constitute environmental nuisances:

9. Water, other than that used by irrigation, industrial or similar systems for nonpotable purposes, which is sold to the public...

Arizona Department of Health Services Health Assessment

- Perchlorate Example
 - 1999 Provisional HBGL set at 31 ppb
 - 1999 Occurrence Study (ADEQ, ADHS, ASUA)
 - 2000 ADHS finalized HBGL set at 14 ppb
 - 2004 Occurrence Study (ADEQ, ADWR, ADHS, ADA)
 - 2005 ADHS revised HBGL down to 11 ppb

Questions???



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