The New EPA Regulatory Strategy – An Update

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PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Washington State Department of Health

Mission

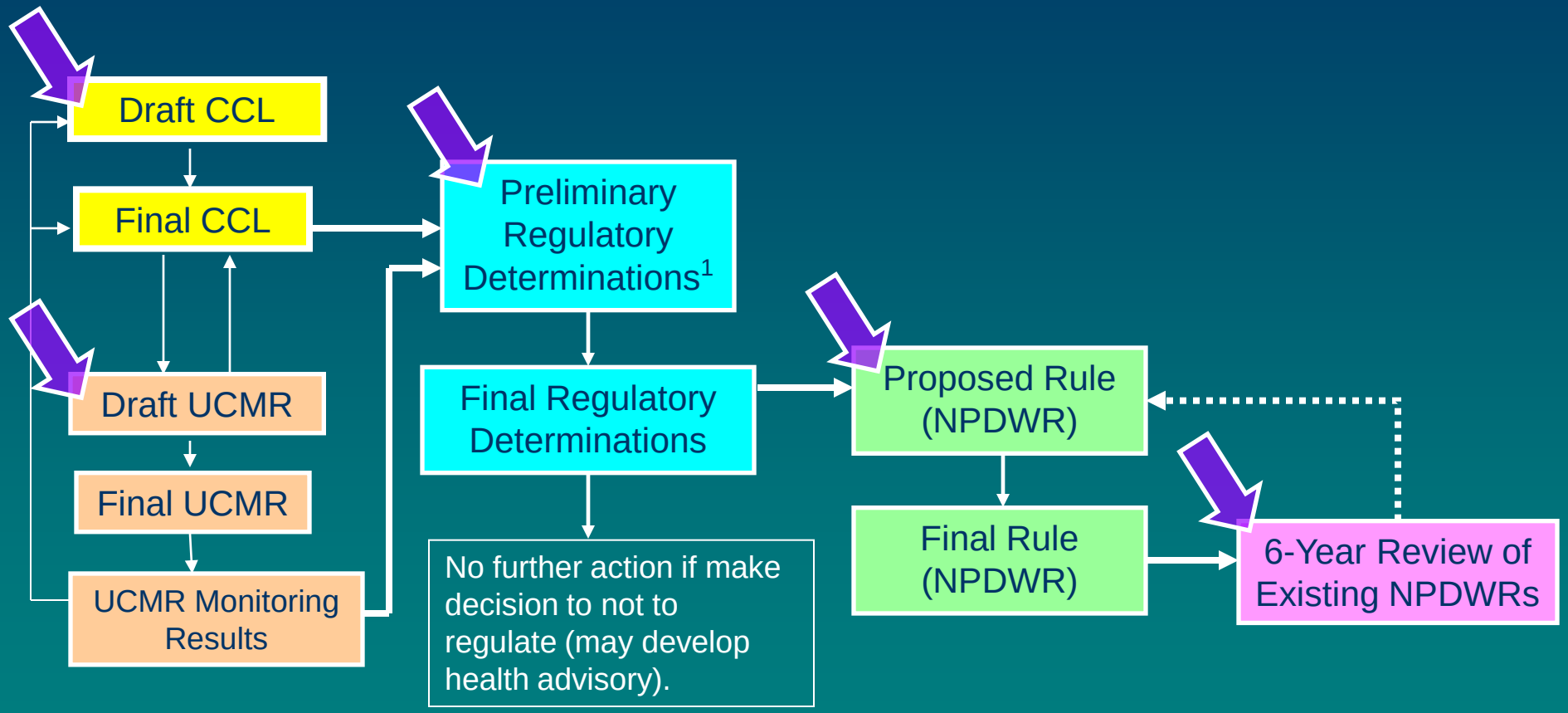
To protect the health of the people of Washington State by ensuring safe and reliable drinking water.

EPA's New Drinking Water Strategy

March 22, 2010 – EPA Administrator Lisa Jackson outlines new approach for protecting drinking water and public health at AMWA meeting:

1. **Address contaminants as groups rather than one at a time**
2. **Foster development of new drinking water technologies**
3. **Use the authority of multiple statutes to help protect drinking water**
4. **Partner with states to share more complete data from monitoring at public water systems**

SDWA Regulatory Process



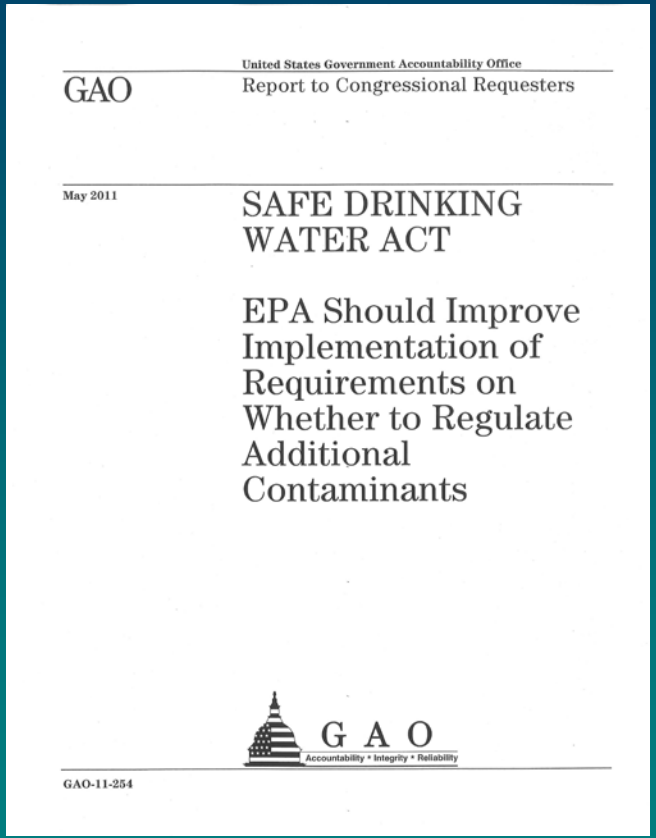
Three Criteria Used to Determine Whether or Not to Regulate

EPA is required to develop an MCLG and MCL for a contaminant if the Administrator determines that:

1. The contaminant may have an adverse human health effect
2. The contaminant occurs or is likely to occur in drinking water at a level of public health concern
3. Regulation of the contaminant presents a meaningful opportunity for health risk reduction

EPA Process – Audited by GAO

- GAO report released May 2011
- GAO had 17 recommendations including:
  - Development of specific criteria to identify contaminants with greatest health risk
  - Improvements to the unregulated contaminant testing program
  - Development of guidelines to interpret broad statutory criteria
- Broadly critical of Bush political appointees involvement in the scientific process


United States Government Accountability Office

GAO

Report to Congressional Requesters

May 2011

SAFE DRINKING WATER ACT

EPA Should Improve Implementation of Requirements on Whether to Regulate Additional Contaminants

GAO

Accountability • Integrity • Reliability

GAO-11-254

#1 - CONTAMINANTS AS GROUPS

Address Contaminants as Groups

- Evaluating and addressing contaminants as groups during the regulatory process may:
  - Be less time consuming and resource intensive
  - Account for risks from multiple contaminants
  - Deal more effectively with an increasing number of emerging contaminants
  - Provide water systems with an opportunity to make best long-term decisions on capital investments

Groups Initially Identified

- Volatile Organic Compounds (VOCs)
- Synthetic Organic Compounds (SOCs)
- Inorganic Compounds (IOCs)
- Carcinogenic VOCs
- Non-carcinogenic VOCs
- Pesticides
- Carbamates
- Organophosphates
- Chloroacetanilides
- Triazines
- Conazoles
- Disinfection Byproducts
- Nitrosamines
- Perfluorinated compounds (PFOS/PFOA/PFCs)
- Estrogenic Compounds
- Androgenic Compounds
- Pharmaceuticals
- Antibiotics
- Cholinesterase Inhibitors
- Thyroid Inhibitors

Ref. U.S. EPA 2010

Groups for Potential Regulatory Development

Near Term

- Carcinogenic VOCs
- Nitrosamines
- DBPs from Chlorination

Future Consideration

- Perfluorinated compounds (7)
- Organophosphate pesticides (31)
- Carbamate pesticides (11)
- Triazine pesticides (6)
- Chloroacetanilides (9)
- Cyanotoxins (3)

Carcinogenic VOCs (cVOCs)

Currently Regulated (8)

- Benzene
- Carbon tetrachloride
- 1,2 dichloroethane
- 1,2 dichloropropane
- Dichloromethane
- Tertrachloroethylene
- Trichloroethylene
- Vinyl chloride

Unregulated – CCL3 (8)

- Aniline
- Benzyl chloride
- 1,3 butadiene*
- 1,1 dichloroethane*
- Nitrobenzene
- Oxirane methyl
- 1,2,3-trichloropropane*
- Urethane

*On proposed & final UCMR3

#2 - DEVELOP NEW DRINKING WATER TECHNOLOGIES

Water Technology Innovation Cluster

- Builds on concept of “clusters” for economic development
  Examples:
  - Silicon Valley – Computing
  - Seattle – Aerospace
- Water cluster focused around Cincinnati - Dayton, Northern Kentucky, SE Indiana
- Early 2010 – EPA ORD, local utilities, researchers, manufacturers meet
- January 18, 2011 – EPA and Small Business Administration announce support for WTIC (See watercluster.org)

Existing Technical Resources

- Operations
  - AWWA Manuals – "G-Series"
  - Area Wide Optimization Program
  - Partnership for Safe Water
  - And many other resources for operators
- Engineering/Management
  - Water Treatability Database
    - Summarizes more than 2000 peer reviewed articles on more than 50 known and potential drinking water contaminants
  - Water Research Foundation (WaterRF)
    - Hundreds of reports on drinking water professional topics (from Asset Management to Zebra Mussels)

#3 - USING OTHER EPA AUTHORITY TO PROTECT DRINKING WATER

EPA Regulatory Authority

- EPA Office of Chemical Safety and Pollution Prevention (OCSPP):
  - Toxics Substances Control Act (TSCA)
    - Screens new chemicals that are pending introduction into commerce
  - Federal Insecticide, Fungicide, and Rotenticide Act (FIFRA)
    - Requires environmental health, human health, and safety screening as part of the pesticide registration process
- EPA could require more screening upfront by chemical manufacturers
- Utilities and states also suggested improved linkages with the Clean Water Act

#4 - IMPROVE EPA-STATE DATA SHARING

Sharing Water System Data

- Safe Drinking Water Information System (SDWIS)
  - Covers 155,000 public water systems
  - SDWIS-Fed
    - Limited to basic water system information, compliance
  - State Data Systems
    - SDWIS-State, Others
    - Much more extensive water quality data

Federal Data System

SDWIS

<< Return

Safe Drinking Water Search for the State of Washington

This search allows you to retrieve Safe Drinking Water data from the SDWIS database in Envirofacts. You may select among four possible search options: water system name, county name, population served, and/or system status.

Disclaimer: Some data may have been entered into SDWIS without a "county served" designation. In those cases, you will either need to search by "Water System Name" (check your water bill for that information), or create a STATE search (click on "Search" button without any other entries), and select your water system from that list.

Other Links

- Overview
- Search
- Model
- Law
- SDWIS Search User Guide
- Contact Us
- Office of Ground Water and Drinking Water

Report an Error

Water System Search

Enter a complete or partial Water System Name. If a partial name is entered, select the "Beginning With" or "Containing" criteria.

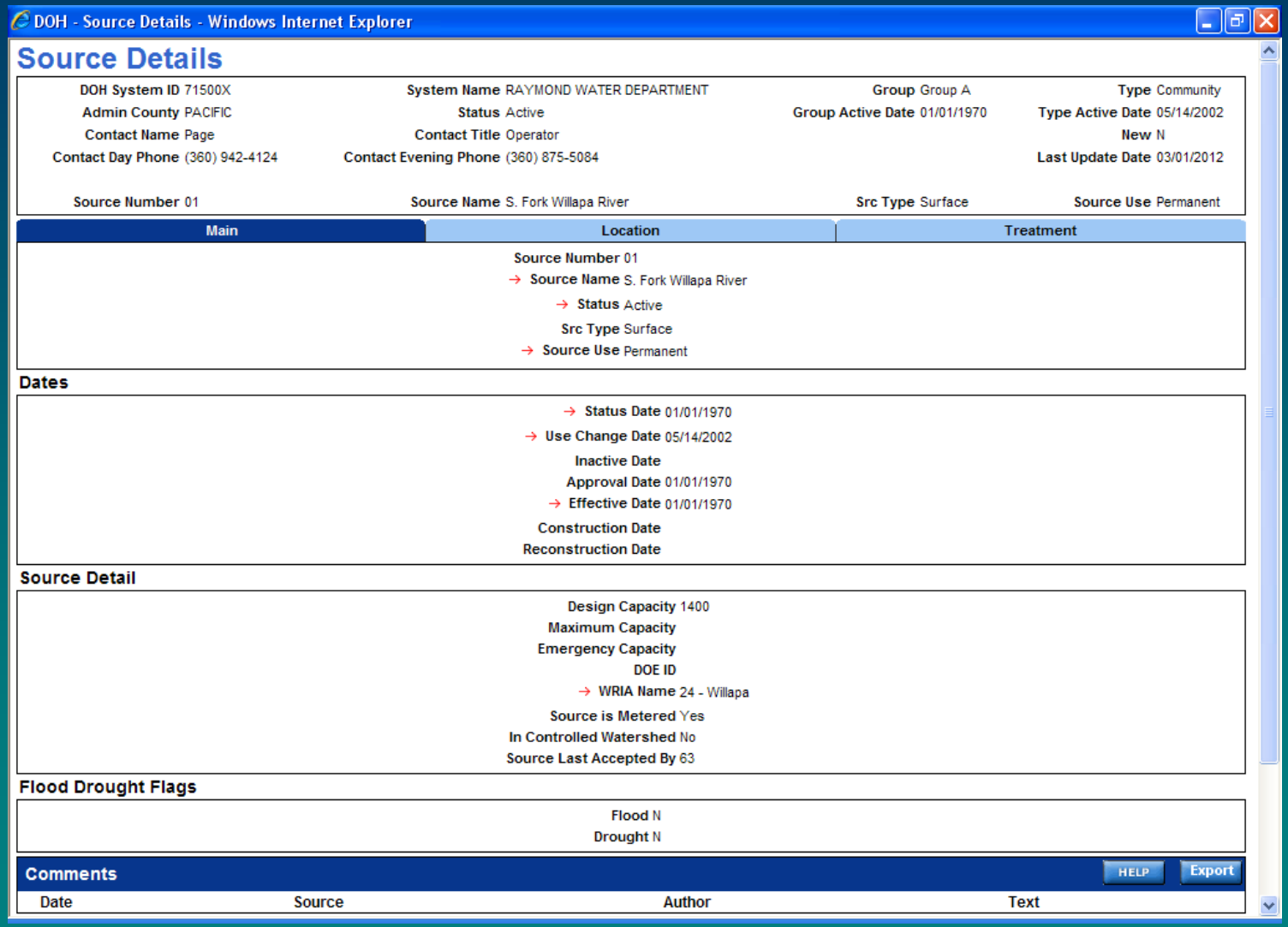
Water System Name:

◉ Beginning With ○ Exact Match ○ Containing

County Search

Use the pull-down menu to select the name of the county. EPA does not have county information for all water systems and a search by county may not produce all systems within that county. Only counties with at least one associated water system are listed.

State Data Systems



WSDOH public website: Sentry Internet

Data Sharing-A Work in Progress

- **Mid-2010 : EPA and other stakeholders established a Data Sharing Memorandum of Understanding (MOU) that included**
  - **facilitating data sharing between states and EPA**
  - **enabling consumers access to more timely information**
- **December 2010: State-EPA work group was formed to implement the MOU**
- **2011-2012: EPA begins to redesign SDWIS**

Ref. USEPA 2012

Conclusions

- "Contaminants as Groups" process most widely applicable change to utilities
- A water technology cluster under development
- FIFRA, TSCA, and the CWA may be used to protect water supplies
- State-EPA data sharing a work in progress

Questions & Comments

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Washington State Department of Health

For More Information

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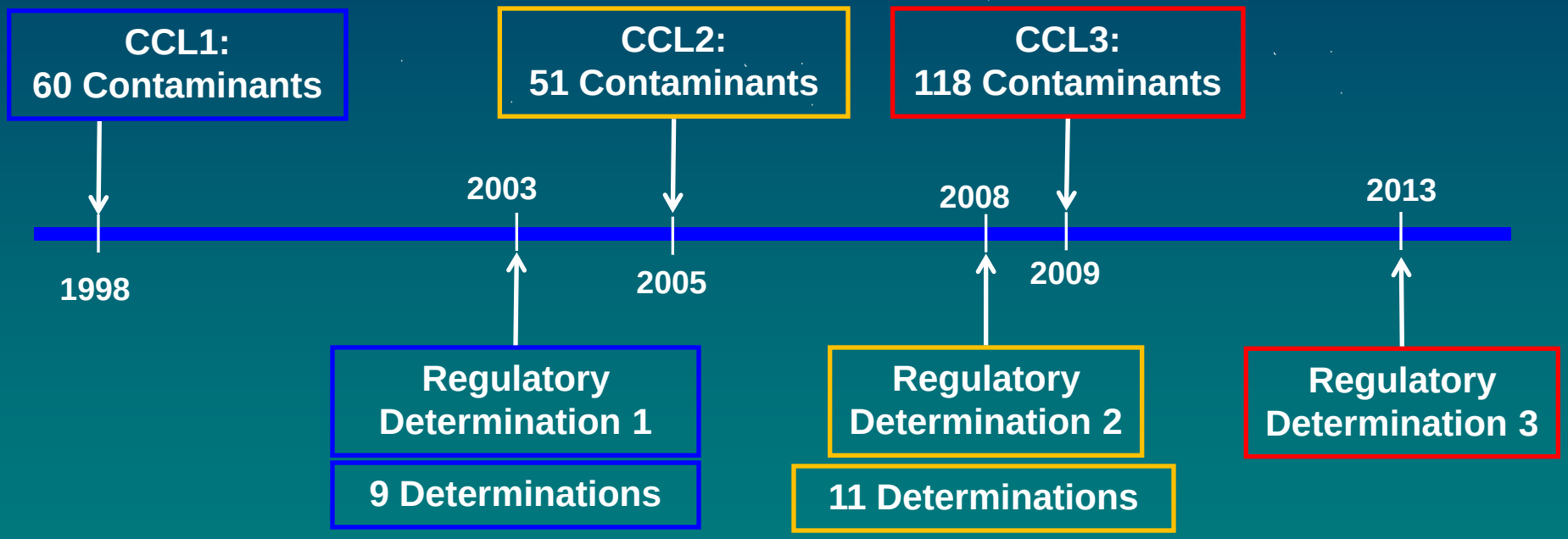
Timeline of CCL and Regulatory Determinations



Statutory Requirements for the Various Drinking Water Regulatory Processes

1. Contaminant Candidate List (CCL) – A list of contaminants that are known or anticipated to occur in drinking water; Published every 5 years
2. Regulatory Determination for CCL – Decide whether or not to regulate at least 5 CCL contaminants; Published every 5 years
3. Unregulated Contaminant Monitoring (UCMR) – Establish criteria for a program to monitor unregulated contaminants; Identify no more than 30 contaminants to be monitored, every 5 years
4. Regulation Development - If EPA decides to regulate a contaminant, the Agency has 24 months to propose and 18 months to the regulation
5. Six Year Review – Once a contaminant is regulated, EPA is required to review and, if appropriate, revise existing regulatory standards every 6 years

Considerations for Group Regulation of Carcinogenic VOCs

2012 PNWS-AWWA Annual Conference

Damon K. Roth, P.E. — EE&T, Inc.
David A. Cornwell, Ph.D., P.E., BCEE — EE&T, Inc.
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CVOCs as a Group Regulation

- Carcinogenic VOCs are proposed to be regulated as a group under the new DW initiative
- Group initially proposed as
  - 8 currently regulated VOCs, (e.g. PCE/TCE)
  - 8 from CCL3 list (TCP)
- The group approach has brought about challenges in treatment, methods, and health endpoints

Factors for Group Development

- USEPA has identified potential factors to consider when developing groups for regulation:
  - Similar health effect endpoints
  - Capacity for removal by common treatment or control process
  - Detectable by common analytical method(s) directly or indirectly, under full scan
  - Known or likely co-occurrence
- Ideally, groups will have many of these factors in common

Lowering MCLs + New Compounds = Analytical Challenge

8 Regulated Carcinogenic VOCs

All measured by 524.3 – but not normal method (SIM)

CCl3

DCA
Butadiene
TCP

All measured by 524.3 TCP low level method

Nitrobenzene

526

Analine
Benzyle Chloride
Oxirane, Methyl
Urethane

No known DW method

Do compounds need an analytical method? -- Occurrence / Treatment

Developing the Group

- By definition, cVOCs will be carcinogenic (similar health effect endpoints)
- VOCs should be treatable via aeration
  - Depends on definition of volatility
  - Other treatment methods may also be applicable (GAC, membrane stripping, AOP)
  - EPA Method 524.3 capable of analyzing all currently regulated VOCs and three CCL3 VOCs
  - Co-occurrence data is limited

What are VOCs?

- ***Volatile Organic Compounds (VOCs)*** – "VOCs are ground-water contaminants of concern because of very large environmental releases, human toxicity, and a tendency for some compounds to persist in and migrate with ground-water to drinking-water supply wells….In general, VOCs have **high vapor pressures**, **low-to-medium water solubilities**, and **low molecular weights**. Some VOCs may **occur naturally in the environment**, other compounds **occur only as a result of manmade activities**, and some compounds have both origins." - Zogorski and others, 2006
- ***Volatile Organic Compounds (VOCs)*** – "Volatile organic compounds **released into the atmosphere by anthropogenic and natural emissions** which are important because of their involvement in **photochemical pollution**." - Lincoln and others, 1998
- ***Volatile Organic Compounds (VOCs)*** – "**Hydrocarbon compounds** that have **low boiling points**, usually less than 100ºC, and therefore evaporate readily. Some are gases at room temperature. **Propane, benzene, and other components of gasoline are all volatile organic compounds**." - Art, 1993
- ***Volatile Organic Compounds (VOCs)*** – "VOCs are **organic compounds that can be isolated from the water phase of a sample by purging the water sample with inert gas**, such as helium, and, subsequently, analyzed by gas chromatography. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, adhesives, petroleum products, pharmaceuticals, and refrigerants. They often are compounds of fuels, solvents, hydraulic fluids, paint thinners, and dry-cleaning agents commonly used in urban settings. VOC contamination of drinking water supplies is a human-health concern because many are toxic and are known or suspected human carcinogens." - U.S. Geological Survey, 2005

No Common Definition of VOC

- Wide range of definitions in literature
- Two basic categories of definition:
  - Effect-oriented definitions
    - Includes EPA definition (through Office of Air and Radition) focusing organic compounds that react photochemically to form ozone
  - Property-oriented definitions
    - Includes European EC Directive 1999/13/EC (Solvent Emissions Directive) that defines VOCs as organic compounds having a vapor pressure of 0.01 kPa or more at 20°C

Potential VOC Definition

- For water treatment purposes, organic compounds strippable in a packed tower aerator (PTA) may be considered VOCs
- PTAs create high water interfacial area per water volume
  - Therefore, the PTA should be liquid phase controlled
- Two methods to determine appropriate threshold to determine what is a VOC
  - Two-Phase Resistance
  - Stripping Approach

Two-Phase Resistance

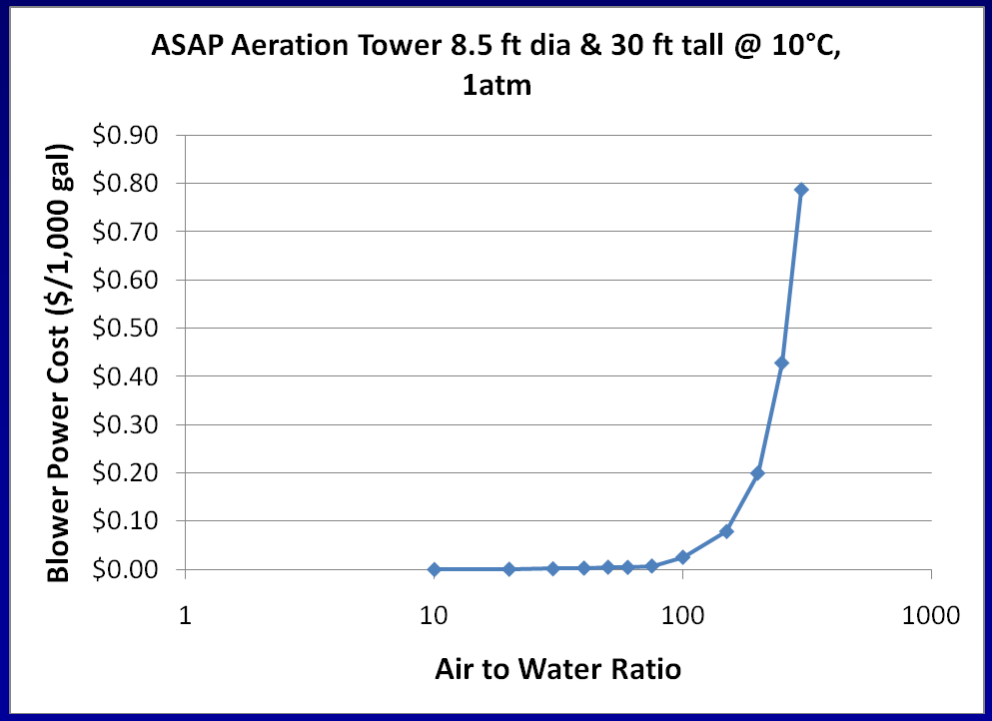
- Percent of transfer that is liquid phase controlled is given by:

$$\%R_L = \frac{100}{1 + \frac{1}{\left(\frac{k_G}{k_L}\right)H}}$$

- Assuming R_L = 70 and k_G/k_L =50, compounds with a dimensionless Henry's Constant (H) of 0.05 are considered to be strippable

Stripping Approach

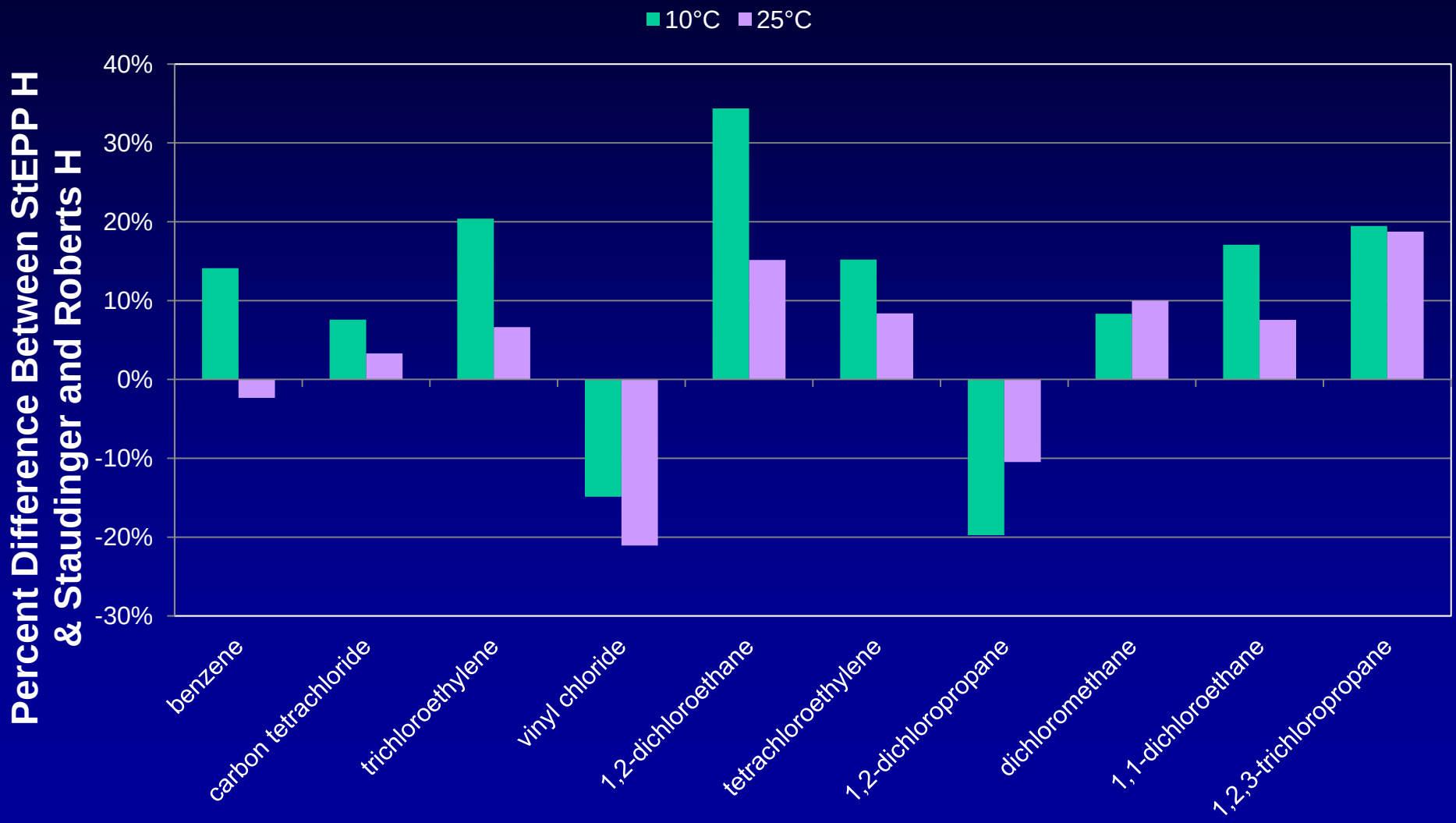
- PTA performance limited by tower height and air-to-water ratio (A:W)
  - In practice, maximum tower height is 30 feet
  - As (A:W) increases, cost increases
- With tower height of 30 feet and A:W of 100, H of 0.05 is required to achieve significant (>90%) removal



Defining Henry's Constant

- Reported values for H depend on source
- Staudinger and Roberts (2001) identified H for 204 organic compounds based on review of literature
  - 55 investigations were reviewed
  - Of 204 compounds studied, 57 were studied in more than one investigation
- Results of different investigations varied 20 to 30%
- Change in H at different temperature is non-linear

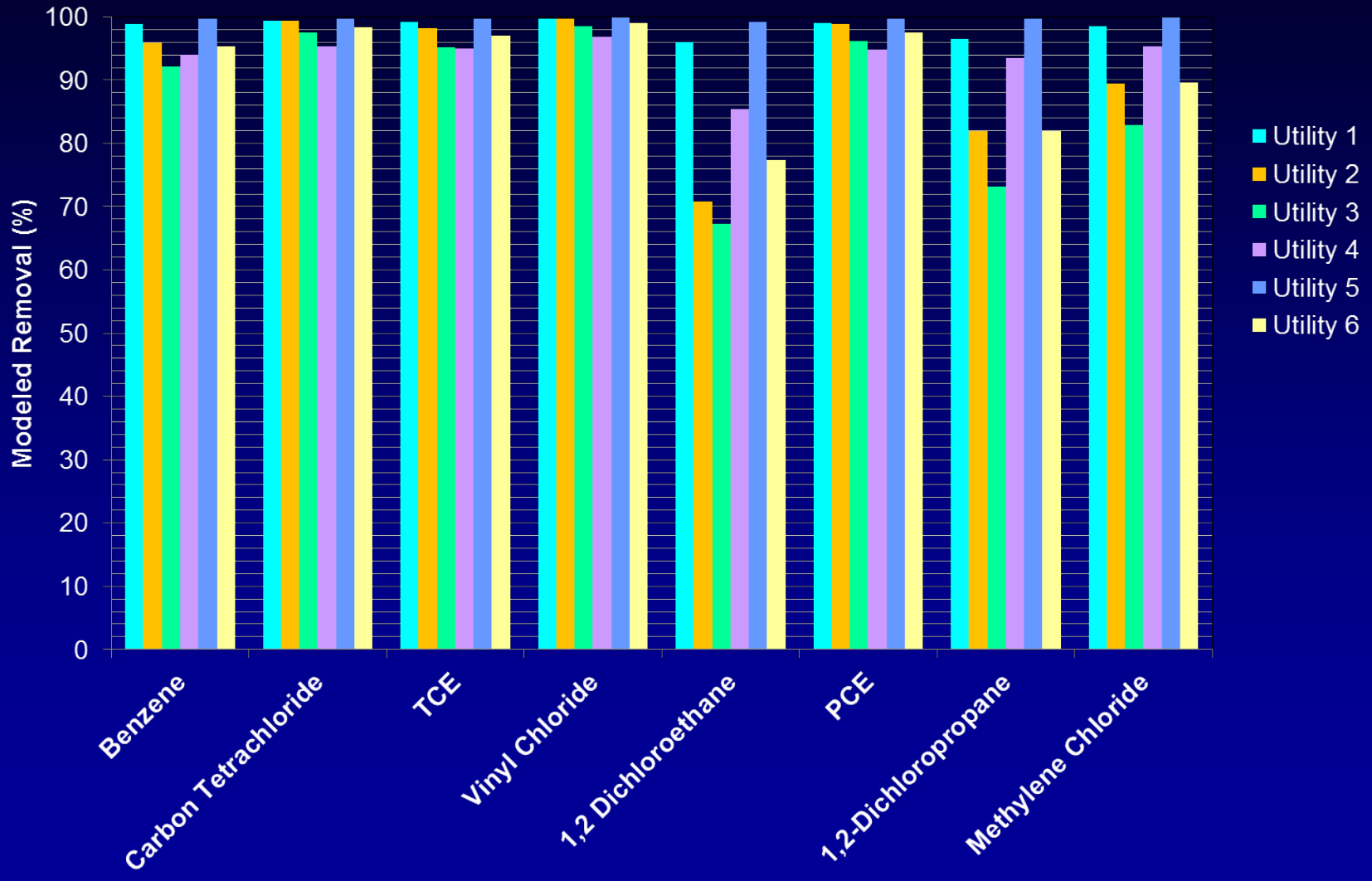
Variance in Reported H



Case Studies of PTAs

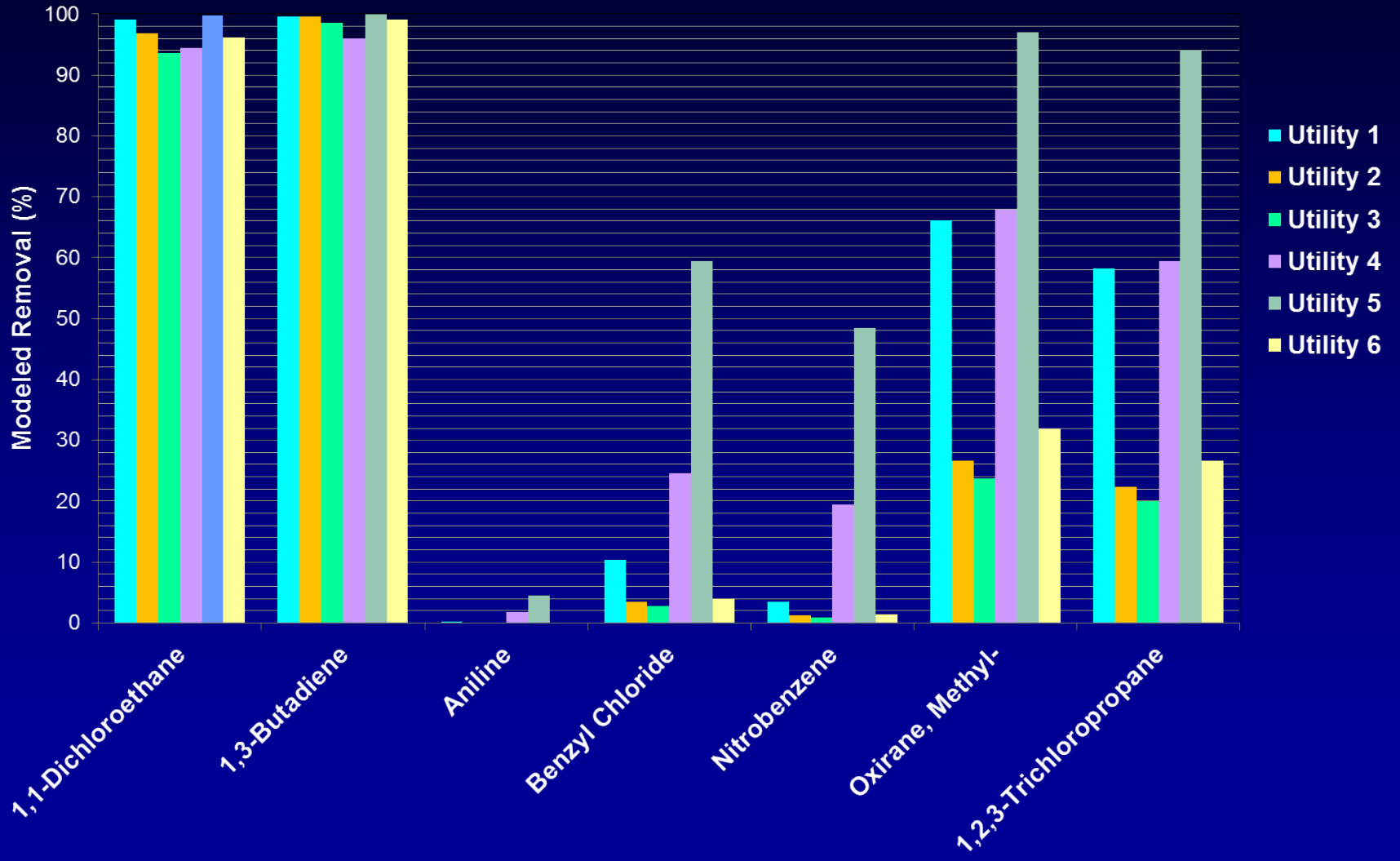
- Obtain performance data
- Data on Tower design-diameter, height, packing material, A:W
- Model existing performance and extrapolate to other compounds

8 Regulated VOCs



What happens at low levels—another log removal?

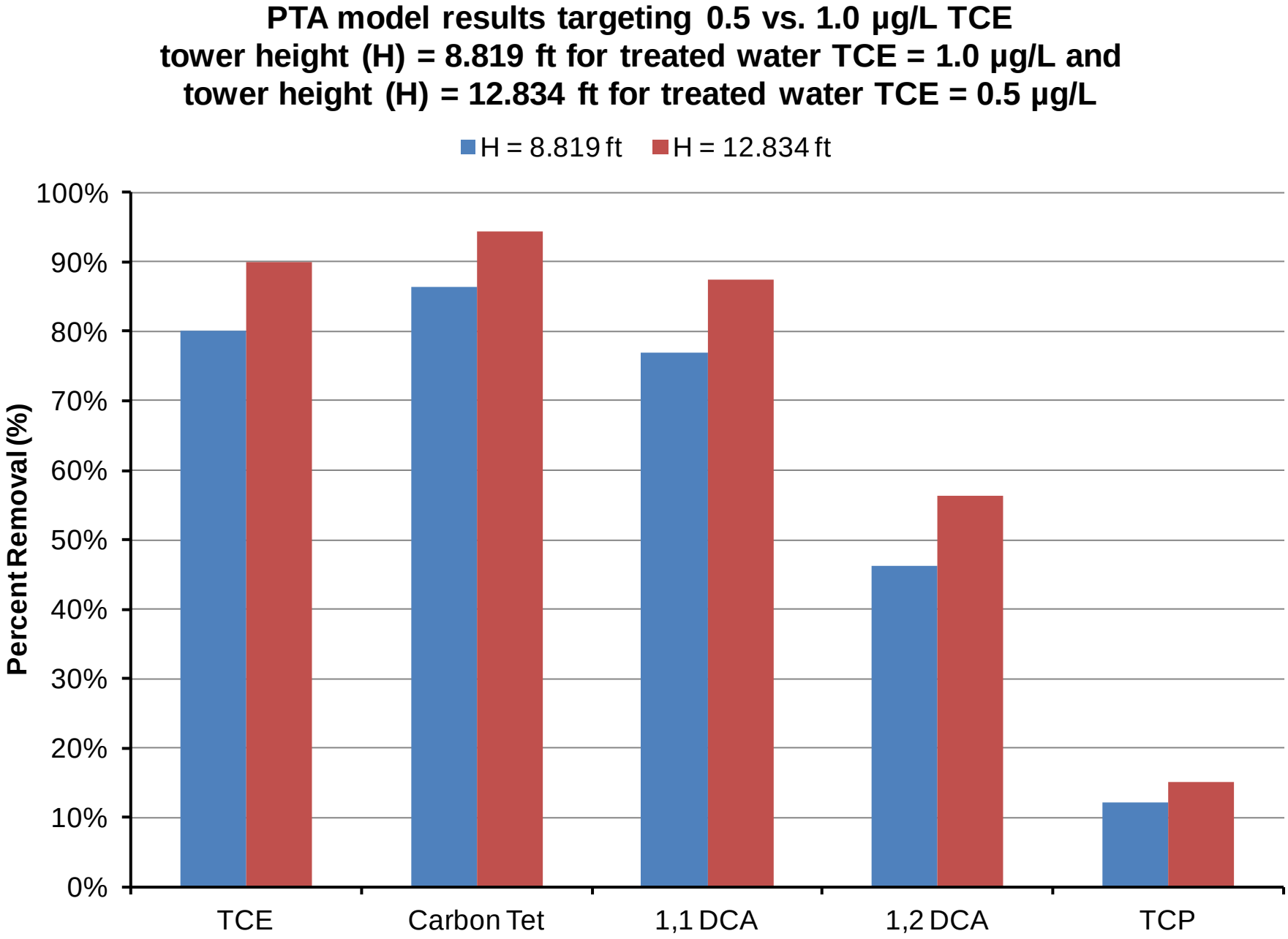
8 CCl3 VOCs

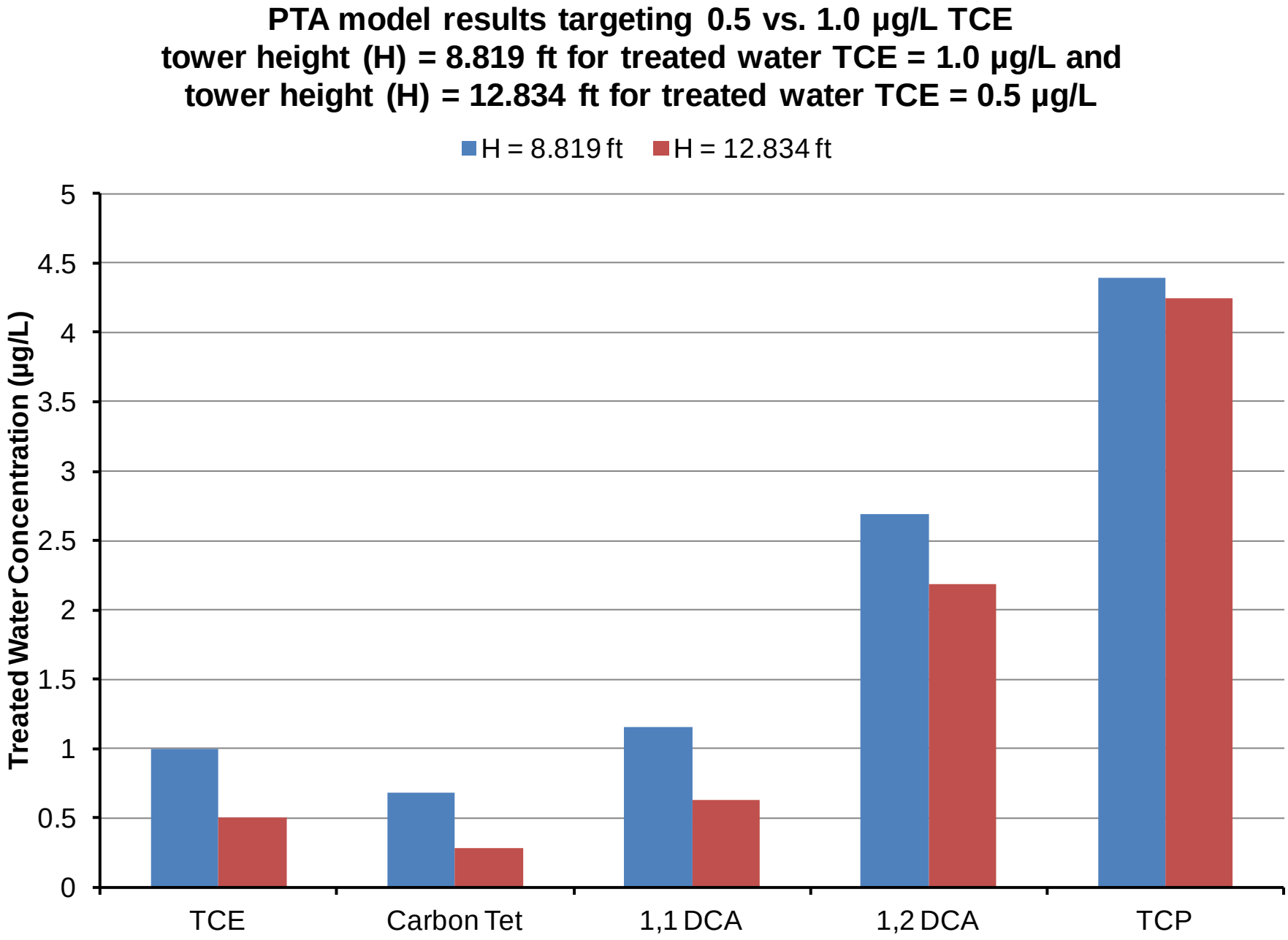


What is ‘Feasible” vs. “Possible’ especially at low levels

PTA Model Results

- Assumptions
  - Diameter = 5.128 ft,
  - Water Temperature = 10 °C,
  - A:W ratio= 30,
  - KLa safety factor = 1,
  - pressure drop = 0.00221 psi/ft
  - initial conc = 5 µg/L for each contaminant
- Model objective
  - Determine tower height (H) needed to get modeled results of 0.5 and 1.0 µg/L for TCE using above assumptions
    - For TCE = 0.5 µg/L, H = 8.819 ft
    - For TCE = 1.0 µg/L, H = 12.834 ft
  - Results for other constituents were calculated using these two tower heights


PTA model results targeting 0.5 vs. 1.0 µg/L TCE
tower height (H) = 8.819 ft for treated water TCE = 1.0 µg/L and
tower height (H) = 12.834 ft for treated water TCE = 0.5 µg/L
H = 8.819 ft
H = 12.834 ft
Percent Removal (%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
TCE
Carbon Tet
1,1 DCA
1,2 DCA
TCP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H = 8.819 ft
H = 12.834 ft
Treated Water Concentration (µg/L)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
TCE
Carbon Tet
1,1 DCA
1,2 DCA
TCP

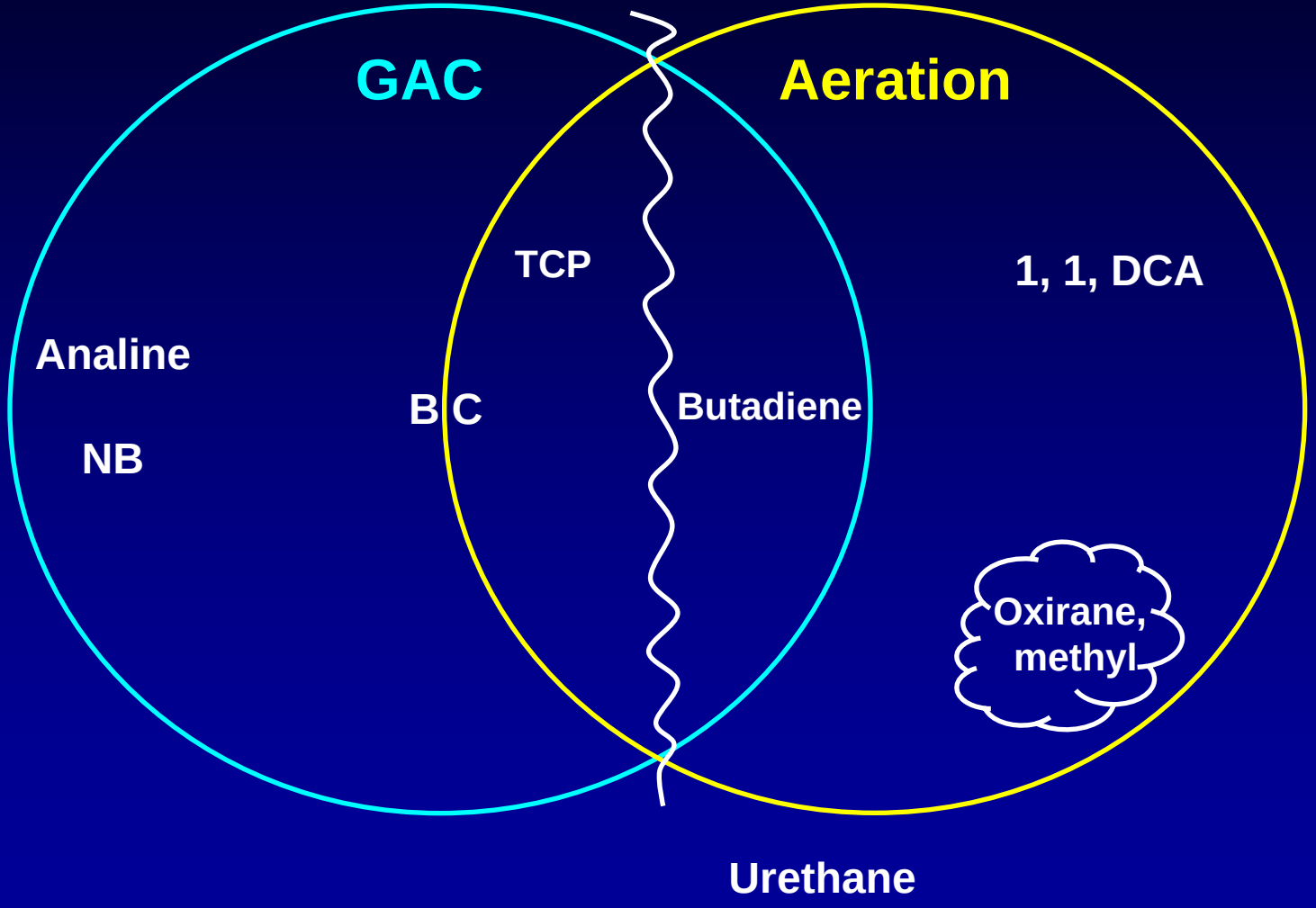
Additional Case Studies of PTA/GAC

- Obtain performance data
- Sample for detectable compounds in proposed CVOC group using Method 524.3, SIM procedure (TCP using California TCP method)
- Model existing performance and extrapolate to other compounds

Example PTA Performance

- Tower designed for TCE removal
  - Measured Influent TCP of 21 ng/L
  - Measured TCP in PTA Effluent of 14 ng/L
  - Modeled TCP in PTA Effluent of 14.94 ng/L
- PTA was followed by GAC, TCP not detected in GAC effluent

GAC vs PTA Treatment Options



Do we need defined treatment method with known performance

Health Approach

- How do we address or comply with Health Risk in a Group approach?

Cancer Risk Approach

	Cancer Slope Factor	MRL Concentration (Ppb)		Risk
Benzene	0.01	0.03		8.57E-09
Carbon tetrachloride	0.07	0.08		1.60E-07
1,2-dichloroethane	0.091	0.02		5.20E-08
1,2-dichloropropane	0.068	0.05		9.71E-08
Dichloromethane	0.0075	0.25		5.36E-08
Tetrachloroethylene	0.051	0.05		7.29E-08
Trichloroethylene	0.011	0.02		6.29E-09
Vinyl chloride	1	0.04		1.14E-06
Aniline,	0.0057	N/A		
Benzyl chloride,	0.17	N/A		
1,3-butadiene,	3.4	0.09		8.74E-06
1,1-dichloroethane,	0.0057	0.05		8.14E-09
Oxirane methyl-,	0.15	N/A		
1,2,3-trichloropropane	7	0.005		1.00E-06
Urethane	1	N/A		
Nitrobenzene,	not reported	N/A		
TOTAL RISK		0.685		1.13E-05
RISK in 1 per			1/	88,150

Summed MCL Approach

	Cancer Slope Factor	Concentration (mg/L)		Concentration (ppb)
Benzene	0.01	0.003500		3.500
Carbon tetrachloride	0.07	0.000500		0.500
1,2-dichloroethane	0.091	0.000385		0.385
1,2-dichloropropane	0.068	0.000515		0.515
Dichloromethane	0.0075	0.004667		4.667
Tetrachloroethylene	0.051	0.000686		0.686
Trichloroethylene	0.011	0.003182		3.182
Vinyl chloride	1	0.000035		0.035
Aniline,	0.0057	0.006140		6.140
Benzyl chloride,	0.17	0.000206		0.206
1,3-butadiene,	3.4	0.000010		0.010
1,1-dichloroethane,	0.0057	0.006140		6.140
Oxirane methyl-,	0.15	0.000233		0.233
1,2,3-trichloropropane	7	0.000005		0.005
Urethane	1	0.000035		0.035
Nitrobenzene,	not reported			
TOTAL RISK				1.60E-05
RISK in 1 per			1/	62,500
Summed Concentration				26.239

Questions?

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Ground Water Rule Compliance Options:

Pros and Cons to Consider

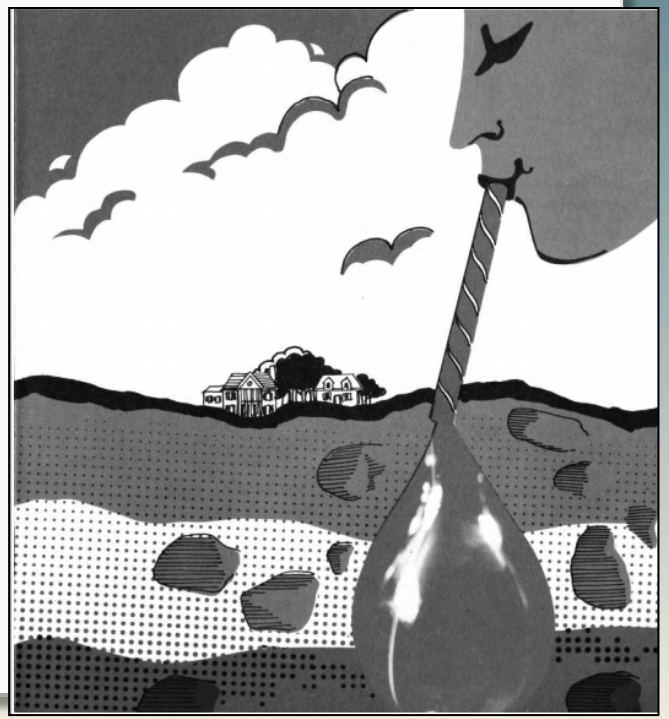
PNWS AWWA
Yakima, WA 2012

Presented By:
Melinda Friedman, PE

confluence
ENGINEERING GROUP LLC

Ground Water Rule Basics

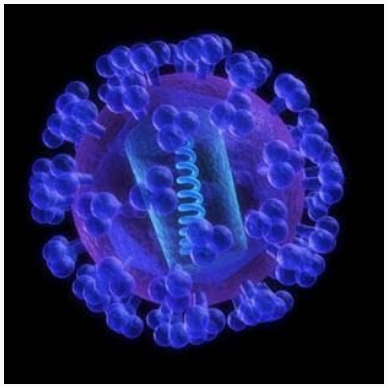
- **Why Regulate Groundwater?**
- **Groundwater Rule Objectives**
- **Groundwater Rule Strategy**
- **Groundwater Rule Compliance**
  - Sanitary Surveys
  - Compliance Monitoring
  - Triggered Monitoring
  - Corrective Actions
- **Other Issues**



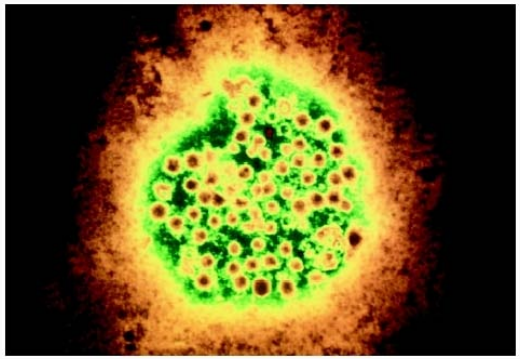
Why Regulate Groundwater?

Between 1991 – 2000 in Groundwater (GW) systems:

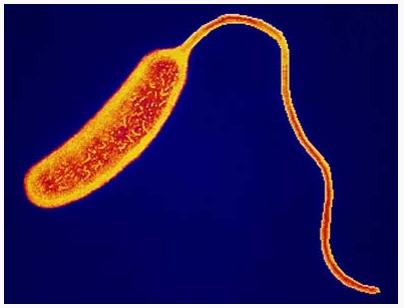
- 68 outbreaks caused 10,926 illnesses
- 51% of waterborne disease outbreaks in the US
- 79% of these outbreaks were caused by contaminated source water



Coxsackie Virus



Hepatitis A Virus



Vibrio cholerae

Source: USEPA Final Ground Water Rule, November 8, 2006

GWR Public Health Benefits

- **Targeted protection for over 70 million people served by groundwater sources that are either not disinfected or receive less than 4-log treatment.**
- **Avoidance of 42,000 viral illnesses and 1 related death annually.**

At a cost estimated to be less than $1 per household for 96% of affected households.

GWR Strategy

- **The EPA is particularly concerned with reducing risk of fecal contamination.**
- **The GWR establishes a risk-based approach to identifying GW sources susceptible to fecal contamination.**
- **As a risk-based regulation, the path to compliance will be unique to each utility.**

Risk-based approach = increased complexity for utilities and States!

The GWR Applies to:

All Public Water Systems that use a GW source.

- Includes consecutive systems.
- Includes systems that use GW and surface water and add the GW directly to the distribution system.
- Does not apply to public water systems that mix all groundwater with surface water prior to treatment or use groundwater under the influence of surface water.

GWR Basic Elements

- Sanitary Surveys (DOH)
- Treatment and Compliance Monitoring
- Triggered Source Water Monitoring
- Corrective Actions

Sanitary Survey - New Requirements

- **Conducted once every 3 years (instead of every 5 years) for community systems.**
- **Systems that provide 4-log treatment or meet State criteria may stay on the 5-year-schedule.**
- **Must include a review of, at minimum:**
  - Source
  - Treatment
  - Distribution system
  - Storage facilities
  - Pumps, pump facilities, and controls
  - Monitoring, reporting, and data verification
  - System management and operation
  - Operator compliance with state requirements

Sanitary Survey Outcome

- **If DOH discovers a significant deficiency during the survey, the system must take corrective action.**

A defect that the State determines to be causing, or has the potential for causing, the introduction of contamination into the water delivered to consumers

- **Example Significant deficiencies :**
  - Well located near source of fecal contamination
  - Improperly constructed well
  - Inadequate internal cleaning/maintenance of storage tanks

Groundwater Rule (GWR) Dates

- **2006: Final Rule**
- **December 1, 2009: Rule effective**
- **2010: Adopted by DOH**
- **December 31, 2012:**
  - DOH completes initial sanitary surveys of all community ground water systems (GWS) except those that meet performance criteria
- **December 31, 2014**
  - DOH completes initial sanitary surveys of all noncommunity GWS and all community GWS that meet performance criteria

GWR Compliance Options

Compliance Monitoring

or

Triggered Source Water Monitoring

Triggered by a Total Coliform Rule positive result in the distribution system!

GWR Compliance Options

Compliance Monitoring

GWR Compliance Monitoring

- **Provide 4-log treatment of viruses**
  - CT = 6 mg/L*min
  - Notify the State
  - Must conduct compliance monitoring to confirm treatment effectiveness and reliability.
- **If all sources meet 4-log, than no link to TCR results**

GWR Compliance Monitoring

- **Basic Requirements:**
  - 4-log virus treatment
    - inactivation, removal, or state-approved combination
    - CT = 6 mg/L*min before the first customer.
  - Conduct monitoring of each source at or near the first customer to ensure maintenance of required treatment.
    - >3,300 – continuous
    - **≤3,300** – daily or continuous
  - Record daily lowest disinfectant residual.
  - Maintain a disinfectant residual level as determined by DOH at or before the first customer every day the source is in service.
  - Develop and provide a report to DOH describing 4-log virus treatment in place.

GWR Compliance Monitoring - Violations

- **Treatment Technique Violation:**
  - Failure to meet the minimum disinfectant residual concentration for more than 4 hours
  - Must notify State as soon as possible, but no later than the end of the next business day.
  - Notify the public with a Tier 2 Public Notice within 30 days.

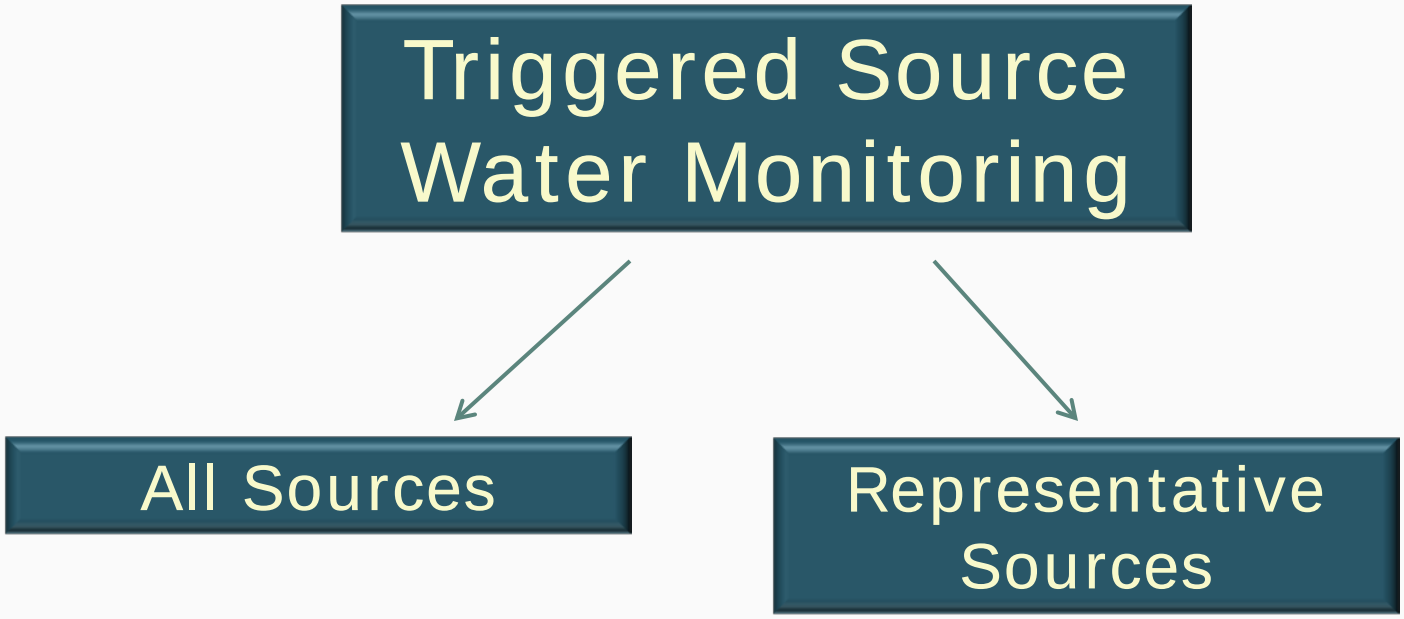
GWR Compliance Monitoring - Violations

- **Continuous Monitoring Failure:**
  - If monitoring equipment fails, the system must collect a grab sample every four hours.
  - Continuous residual disinfectant monitoring must be resumed within 14 days.

- **Follow-up in Case of Violation of Monitoring Requirements:**
  - Failure to monitor is a monitoring violation.
  - The system must notify the State within 48 hours of the violation.
  - Tier 3 Public Notice (possibly in the Consumer Confidence Report).

GWR Triggered Source Water Monitoring

- **For sources that do NOT meet 4-log treatment.**
- **Used to determine if fecal contamination (*E. coli*) is present in the groundwater source.**



GWR Triggered Monitoring

- **Basic Requirements:**
  - For each positive TCR sample, a source water sample must be collected at each source (which is not under compliance monitoring) within 24 hours of notification by the laboratory.
  - Each source in operation at the time the TCR sample was collected must be tested.
  - In WA, OR, ID source water triggered monitoring samples are collected to test for the presence of *E. coli*.
  - Must install a sample tap at each source prior to treatment to enable monitoring.

Representative Triggered Monitoring Plan

- **Objective: To reduce the number of source samples collected in response to a positive total coliform sample.**
- **A plan must be submitted and approved by the State prior to implementation.**
- **Two methods for reducing the number of sources to sample:**
  - Establish which groundwater source(s) reaches each coliform monitoring location
  - Groundwater sources representing wells in the same hydrogeological setting

Triggered Monitoring - Other Issues

- **Consecutive systems**
- **Wholesale systems**

This is where it gets complicated!

The Need for a Triggered Source Water Monitoring Plan

Issue	Benefit
Wholesale/Consecutive Systems	-Who should be notified -Which system should collect fecal indicator source water samples -Which sources should be sampled
If operation of sources and distribution system are separate	-Delineate Roles -Ensure proper sample collection
If samples are collected by 3rd Party (lab, contract operations, etc.)	-Ensure proper sample collection

Corrective Actions

- **Required if:**
  - Significant deficiencies are discovered during a sanitary survey or
  - A system relying on triggered monitoring collects a sample that is positive for *E. coli* .
- **Corrective Actions include:**
  - Correct all significant deficiencies
  - Provide an alternative source of water
  - Eliminate the source of contamination
  - Provide 4-log treatment for viruses prior to first customer

GWR Public Notifications

Situation or Violation	Report to State	Notify Public[1]	Tier	PN Method
Source water monitoring sample fecal indicator-positive for *E. coli*, enterococci, or coliphage and not invalidated by the state	Within 24 hours	Within 24 hours	1	TV, hand-delivery, public postings, or other state-approved method (consult your state)
Failure to complete required corrective action	Within 48 hours	Within 30 days	2	Hand-delivery, direct mail, public postings, newspaper, or radio announcements
Failure to comply with a state-approved corrective action plan and schedule[2]	Within 48 hours	Within 30 days	2	Hand-delivery, direct mail, public postings, newspaper, or radio announcements
For systems conducting compliance monitoring, failure to maintain 4-log treatment of viruses and restore 4-log treatment within 4 hours	Within 48 hours	Within 30 days	2	Hand-delivery, direct mail, public postings, newspaper, or radio announcements
Failure to conduct required source water monitoring (triggered, additional, or assessment)	Consult your State	Within 12 months	3	CCR[2] (consult your state for other specific PN requirements)
Failure to conduct required compliance monitoring	Consult your State	Within 12 months	3	CCR[2] (consult your state for other specific PN requirements)
Uncorrected significant deficiency	-	Annually	-	Special Notice[2]
Unaddressed fecal contamination (CWSs only)	-	Annually	-	Special Notice in CCR (CWSs only)

1. Systems are required to send a copy of the PN to the state within 10 days of making the notification.
2. Community GWSs may use the Consumer Confidence Report (CCR) to make this notification if it meets the requirement to notify the public within 12 months. NCWSs must use an alternate form of notice approved by their state.

Compliance Monitoring Evaluation

Advantages

- Avoid linkage to TCR results in distribution system
- Avoid potential confusion associated with TCR results in consecutive and wholesale systems
- No Tier 1 Public Notification
- Fewer Sanitary Surveys

Disadvantages

- Adding a Treatment Technique requirement
- Increased potential for Tier 2 Monitoring Violations
- Routine reporting to State
- Increased routine operations and maintenance requirements
- Complexities associated with monitoring at or near first customer
- Requires State approval to modify disinfection practices

Triggered Source Monitoring Evaluation

Advantages

- Can continue operating "as is"
  - No treatment or contact time modifications
- Lowest impact option for systems with rare TCR hits
- Increased disinfection treatment flexibility
- Opportunities exist to reduce source monitoring burden

Disadvantages

- Linked to TCR monitoring results
- More complex planning and interaction with consecutive and wholesale systems
- Potential for Tier 1 Public Notification
- Increased emphasis on maintaining residuals in DS needed
- Increased Sanitary Surveys
- May need to implement Corrective Actions

Overall GWR Compliance Strategy Recommendations

- **Highly system-specific!**
- **Key considerations:**
  - Number of ground water sources
  - System complexity and ease of developing Representative Monitoring Plan
  - TCR history
  - Relationships with consecutive/wholesale systems
- **If already provide 4-log treatment**
  - Complex system – may as well take credit
  - Simple system – may not be worth reporting/monitoring burden
- **If don't meet 4-log treatment**
  - Depends on issue
    - Monitoring location
    - Contact time
- **Representative Monitoring Plan**
  - Worth it if
    - can reduce monitoring burden significantly with little effort
    - Wholesale/consecutive systems
  - Not worth it if too difficult to demonstrate, and very low TCR + history

Ground Water Rule Compliance Options:

Pros and Cons to Consider

Questions?

Presented By:
Melinda Friedman, PE

confluence
ENGINEERING GROUP LLC

Discarded Slides

GWR Compliance Monitoring

- **Follow-up to a Positive TCR Sample:**
  - No follow-up, with respect to the source of supply, required. It can be assumed that the origin of the coliform presence is not related to the drinking water sources.
- **As a Consecutive System:**
  - The system must notify the wholesale supplier providing groundwater within 24 hours of being informed of a positive coliform sample in the region of the system's distribution system served by the wholesale supplier.
- **As a Wholesale System:**
  - It can be assumed that the origin of the coliform presence is not related to the drinking water sources.

GWR Triggered Monitoring:

- **Follow-up if a samples is positive for *E. coli*:**
  - The system will be required to implement corrective action or collect five additional samples at each source (or as described in the Representative Triggered Monitoring Plan) within 24 hours of the collection of the positive *E. coli* sample. *This determination will be made by DOH.*
  - The system will issue a Tier 1 Public Notice to customers within 24 hours.
  - The system must notify DOH within 24 hours.

GWR Triggered Monitoring:

- **Follow-up if a samples is positive for *E. coli* (cont'd):**
  - If any of 5 additional samples are positive for *E. coli*, the system will be required to implement one or more corrective actions.
  - Corrective actions can include:
    - Correcting all significant deficiencies;
    - Providing an alternative source of water;
    - Eliminating the source of contamination;
    - Providing 4-log treatment of viruses.
  - The system must include a special notice in their next Consumer Confidence Report.

GWR Triggered Monitoring:

- **Consecutive Systems:**
  - The system will be required to report a positive TCR sample to each wholesale supplier of groundwater within 24 hours of being notified of the positive sample by the water quality laboratory.
  - If the system is notified by the wholesale system that additional source water monitoring results are *E. coli* positive, the system must:
    - Notify the public with a Tier 1 Public Notice within 24 hours.
    - Notify the public with a special notice in the next Consumer Confidence Report.
  - Consult with DOH and take approved corrective action.

Representative Triggered Monitoring Plan

- **Objective: To reduce the number of required samples to be collected in response to a positive total coliform sample.**
- **A plan must be submitted and approved by DOH prior to implementation.**
  - Establish which sources provide water to each TCR sampling location and consecutive samples OR determine that one or more wells represents multiple wells in the same hydrogeologic setting.
  - When the system observes a positive TCR sample, triggered monitoring samples would be collected only at the sources which provide water to the TCR sampling site as described in the DOH-approved Plan and were online when the sample was collected. This concept also applies to connections with consecutive systems
  - When the system obtains a positive TCR sample, triggered monitoring samples would be collected only at wells representing different hydrogeologic conditions, as described in the Plan, instead of collecting samples at each well source.
  - Could use both approaches!

Representative Triggered Monitoring Plan

- **Groundwater sources representing wells in the same hydrogeological setting:**
  - Develop the Plan to establish which sources share the same hydrogeologic setting and, therefore, provide the same water.
  - A plan based on hydrogeologic setting would need to consider:
    - Well locations plotted using GPS or other means to denote proximity to other wells.
    - Well construction details for each well, including depth, grouting, sanitary seal, and screened interval.
    - Water chemistry analysis demonstrating similarities or differences among wells or vulnerability of wells to contamination
    - Aquifer information and other studies.

Representative Triggered Monitoring Plan

- **Groundwater sources representing coliform monitoring locations:**
  - Develop the Plan to establish which sources provide water to each TCR monitoring location and interties.
  - A plan based on TCR monitoring locations would need to consider:
    - Map or schematic of the distribution system indicating points of entry and TCR sampling sites
    - Source types, level of treatment, type of supply
    - Connections to other systems
    - Data linking TCR sites (or connections to consecutive systems) to particular sources

Representative Triggered Monitoring Plan

- **Consecutive systems:**
  - Systems will be required to report a positive TCR sample to each wholesale supplier of groundwater within 24 hours of being notified of the positive sample by the water quality laboratory unless the system's Plan indicates that the positive TCR occurred in a location served only by the system's sources.

Representative Triggered Monitoring Plan

- **Wholesale Systems:**
  - Systems must sample all of the supply sources in operation on the date the consecutive system(s) positive TCR sample was collected (or as described in the Plan).

Simultaneous Compliance Issues Identified by the USEPA

- **For systems implementing 4-log inactivation of viruses:**
  - Development of New Sources
  - Treatment
  - Distribution
- **Public Notification**
  - Source Water
  - Compliance Monitoring
  - Corrective Actions

Compliance Approaches:

- **Compliance Monitoring**
  - The system demonstrates that it continually provides 4-log virus inactivation at each applicable source.
- **Triggered Monitoring**
  - The system is required to monitor all designated sources whenever a total coliform positive result occurs in the system's distribution system and/or in a consecutive distribution system.

Introduction of 4-log Inactivation

Regulation	Simultaneous Compliance Issue
Stage 1/Stage 2 DBP Rules	• Distribution system monitoring • Formation of DBPs • Compliance with DBP MCLs • Monitoring and compliance with MRDLs
Lead and Copper Rule	• change water quality parameters • increase corrosivity • increase lead and copper levels at tap
Arsenic and Radionuclides Rule	May require changes in corrosion control treatment which can affect efficacy of treatment for Arsenic and Radionuclides
Operator Certification	May require new or changes to current certification requirements

Source Water Monitoring: Public Notification

	Notification Requirements
Source water sample positive for *E. coli*	• Consult with DOH within 24 hours • Notify the public within 24 hours (Tier 1 Notification) • Include notice in Consumer Confidence Report
System fails to conduct required triggered or additional monitoring	• Notify the public within 12 months (Tier 3 Notification)

Compliance Monitoring: Public Notification

	Notification Requirements
System fails to conduct required compliance monitoring	• Notify the public within 12 months (Tier 3 Notification)

Corrective Action: Public Notification

	Notification Requirements
System fails to implement corrective action	• ?

GWR Public Notifications

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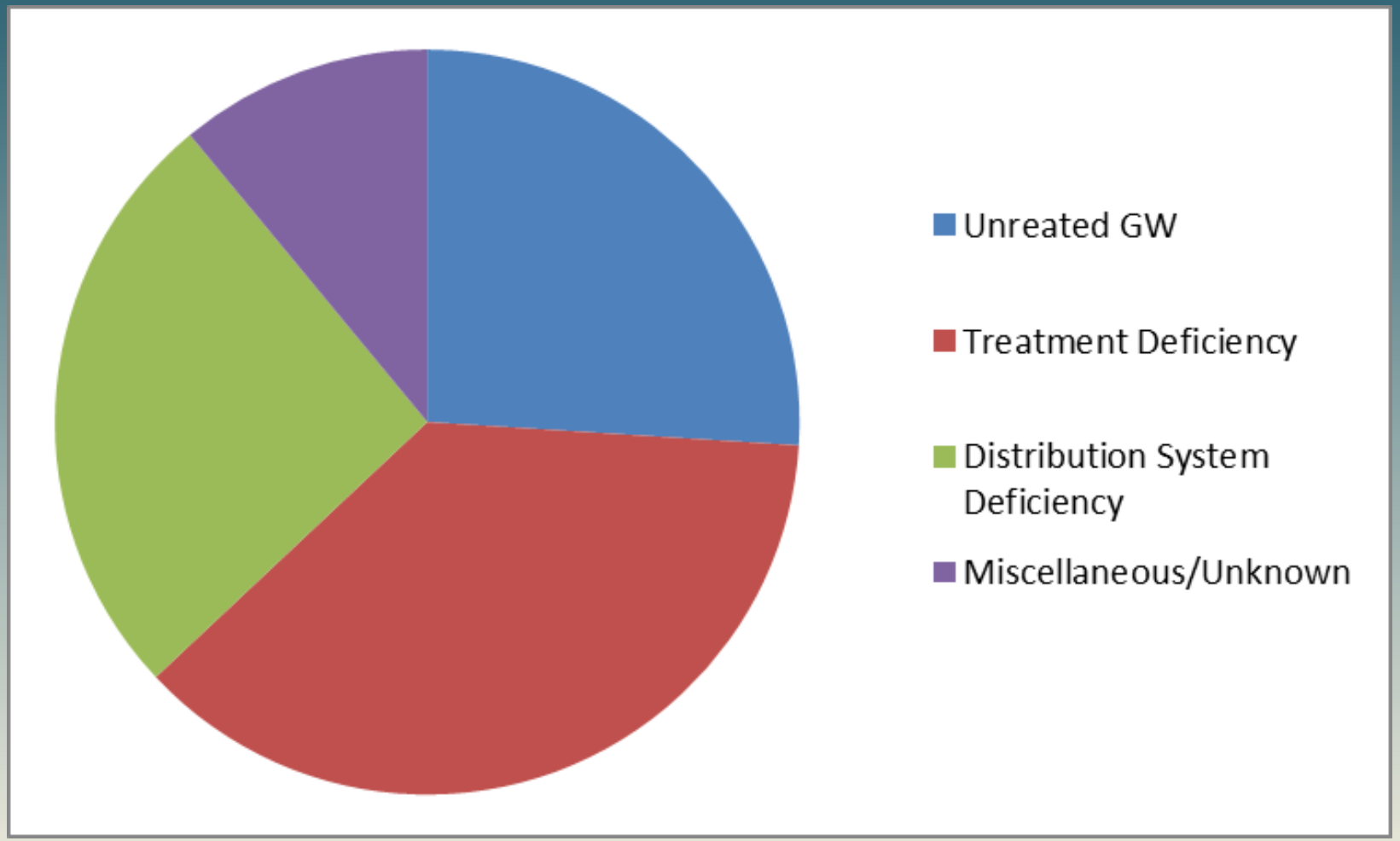
Causes of GW Waterborne Pathogen Outbreaks: 1991-2000 – Community Systems



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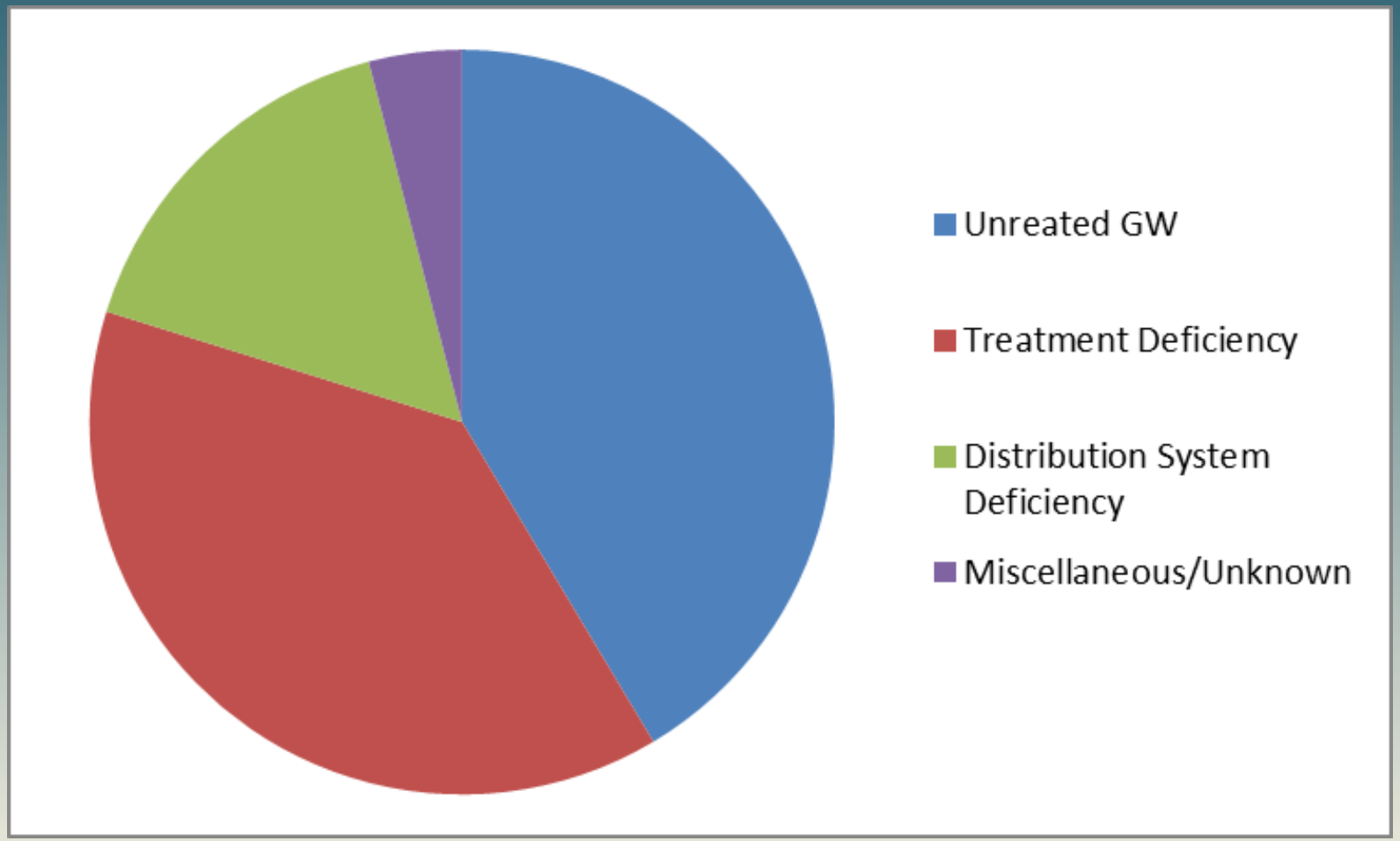

Ground Water Rule Sammamish Plateau Water and Sewer District Case Study

PNWS AWWA 2012
Yakima, WA

Scott Jonas
Operations Manager
Sammamish Plateau Water and Sewer District

Melinda Friedman
President
Confluence Engineering Group, LLC

confluence
ENGINEERING GROUP LLC

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SINCE 1948

System Background

- Very Complex System
  - Blends Surface and Ground water
  - Consecutive and Wholesale system
  - Two Operating Zones are Hydraulically Separate

- Existing Water System
  - 12 Operating Wells (ground water)
    - Treatment: Cl_2, Fluoride, Filtration, pH control
  - 2 Regional connections (surface water from Seattle via Cascade)
  - 11 Interties (some chlorinated some unchlorinated)
  - 8 Reservoirs / 5 pump stations / 13 pressure zones
  - 17,000 connections / ~ 54,000 population
  - 1.8 billion gallons used annually

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WATER AND SEWER DISTRICT

Two Operating Zones

- Plateau and Cascade Zones
- Physically and hydraulically separate
- Both areas intertie with other systems
- Both areas serviced by ground and surface water

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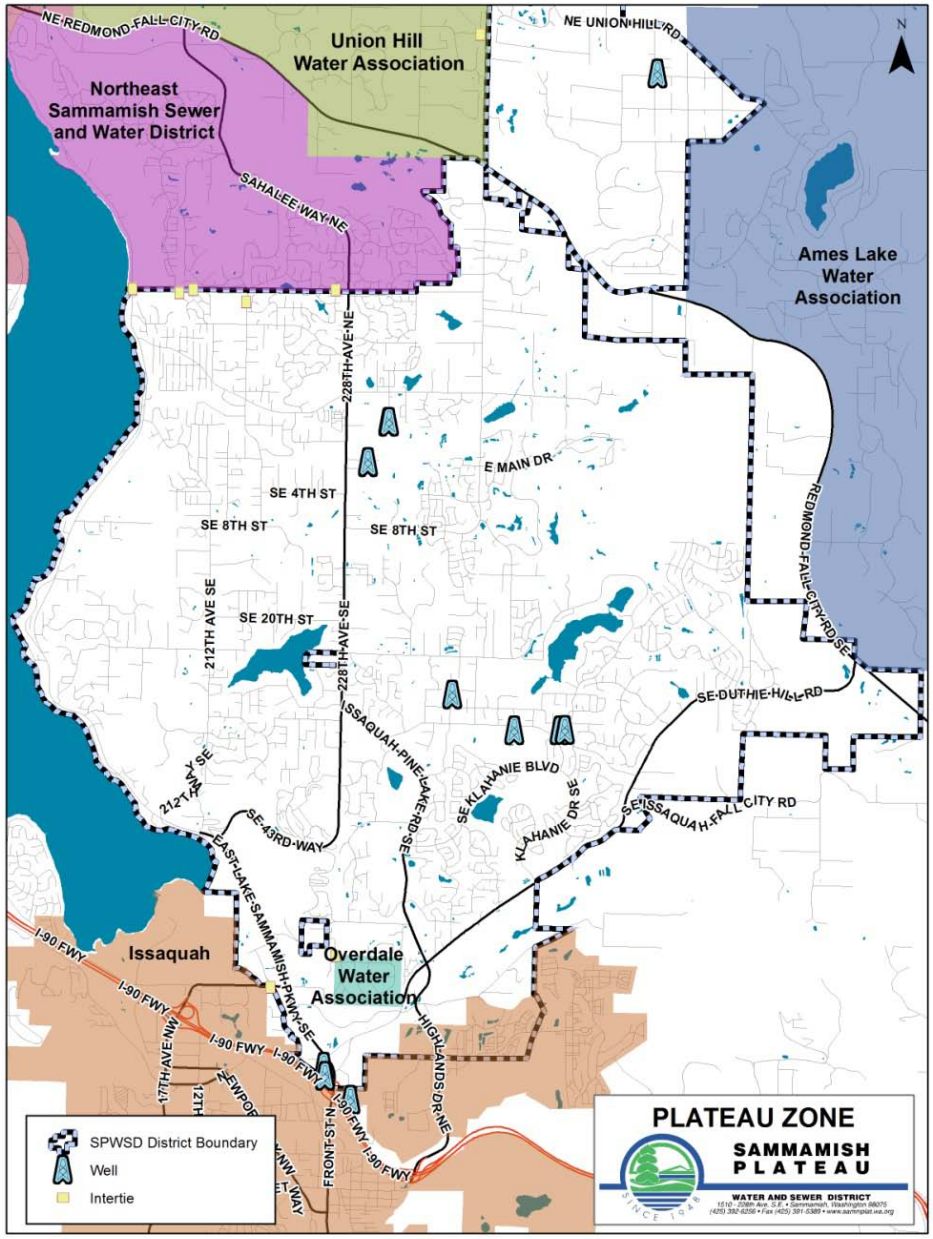
WATER AND SEWER DISTRICT

District's GWR Preference

- Compliance Monitoring where feasible
  - Already exists
  - Very minor upgrades
- Representative Triggered Monitoring and Triggered Monitoring elsewhere

Plateau Zone



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Plateau Zone Existing System

- Wells
  - 10 Active wells
    - 3 wells in the Valley Aquifer Zone in Issaquah
    - 3 deep well in the Plateau Aquifer in Sammamish
    - 4 shallow wells in the Plateau Aquifer Sammamish and King County

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Plateau Zone Existing System

- Regional Connection
  - One regional connection 24” Cascade Water Alliance Seattle Tolt Supply via Bellevue - Issaquah Pipeline, B.I.P.

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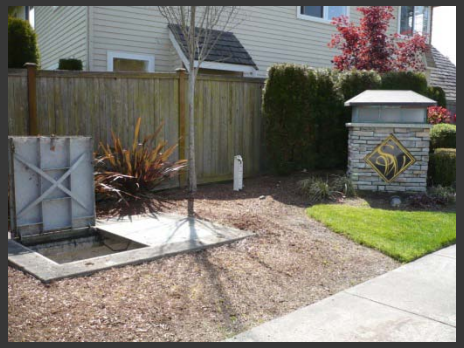
WATER AND SEWER DISTRICT

Plateau Zone Existing System

- Interties (7)
  - City of Issaquah 2 interties
  - Overdale Water Association 1 emergency intertie
  - N.E. Sammamish Sewer and Water District 4 interties



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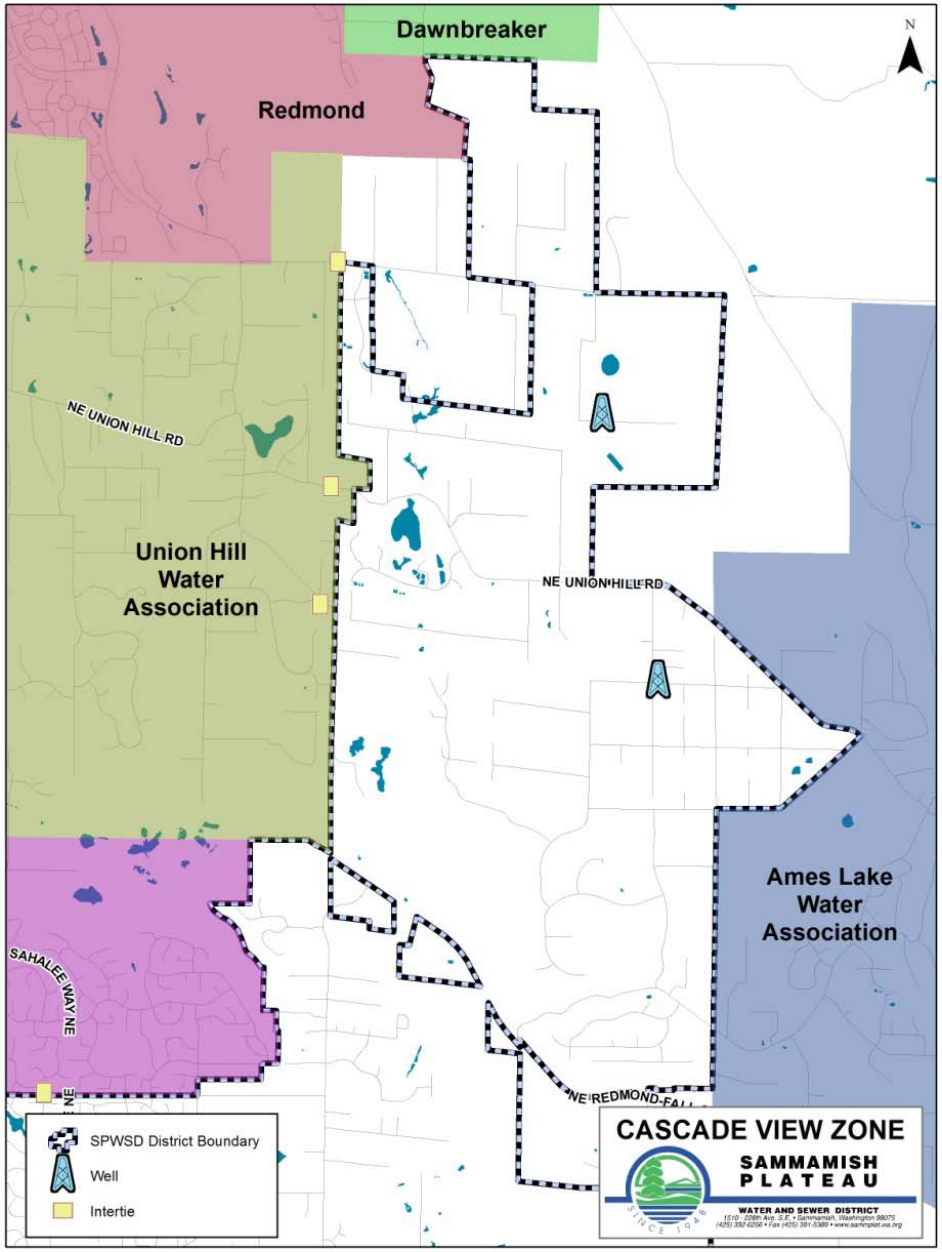
Cascade Zone



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Cascade Zone Existing System

- Wells
  - 2 Active wells in the Cascade aquifer in King County

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WATER AND SEWER DISTRICT

Cascade Zone Existing System

- Regional Connection
  - One regional connection 8” Cascade Water Alliance (Seattle Tolt Supply) via City of Redmond
  - Used for ASR in the winter and peak demand in the summer

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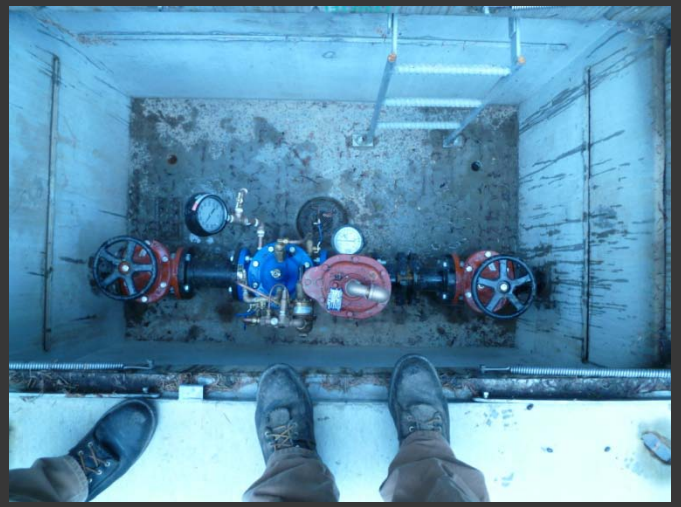
Cascade Zone Existing System

- Interties (4)
  - Ames Lake emergency intertie
  - Union Hill Water Association 3 interties



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Plateau Shallow Aquifer Compliance Example #1 Well 2.1 and 2.2

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WATER AND SEWER DISTRICT

Compliance Monitoring Example #1 Plateau Zone

- Well 2.1 and 2.2
  - Two wells - Treatment located at Well 2.1 (200 feet west of Well 2.2)
  - Treated water flow usually goes in 3 directions
    - For CT time need to assume worse case all flow in one direction
    - Piping configuration (east, west and north)
    - Determine first customer from treated source and contact time

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WATER AND SEWER DISTRICT

Well 2 CT Example

Calculations for CT Time

Standard pipe and tank volumes

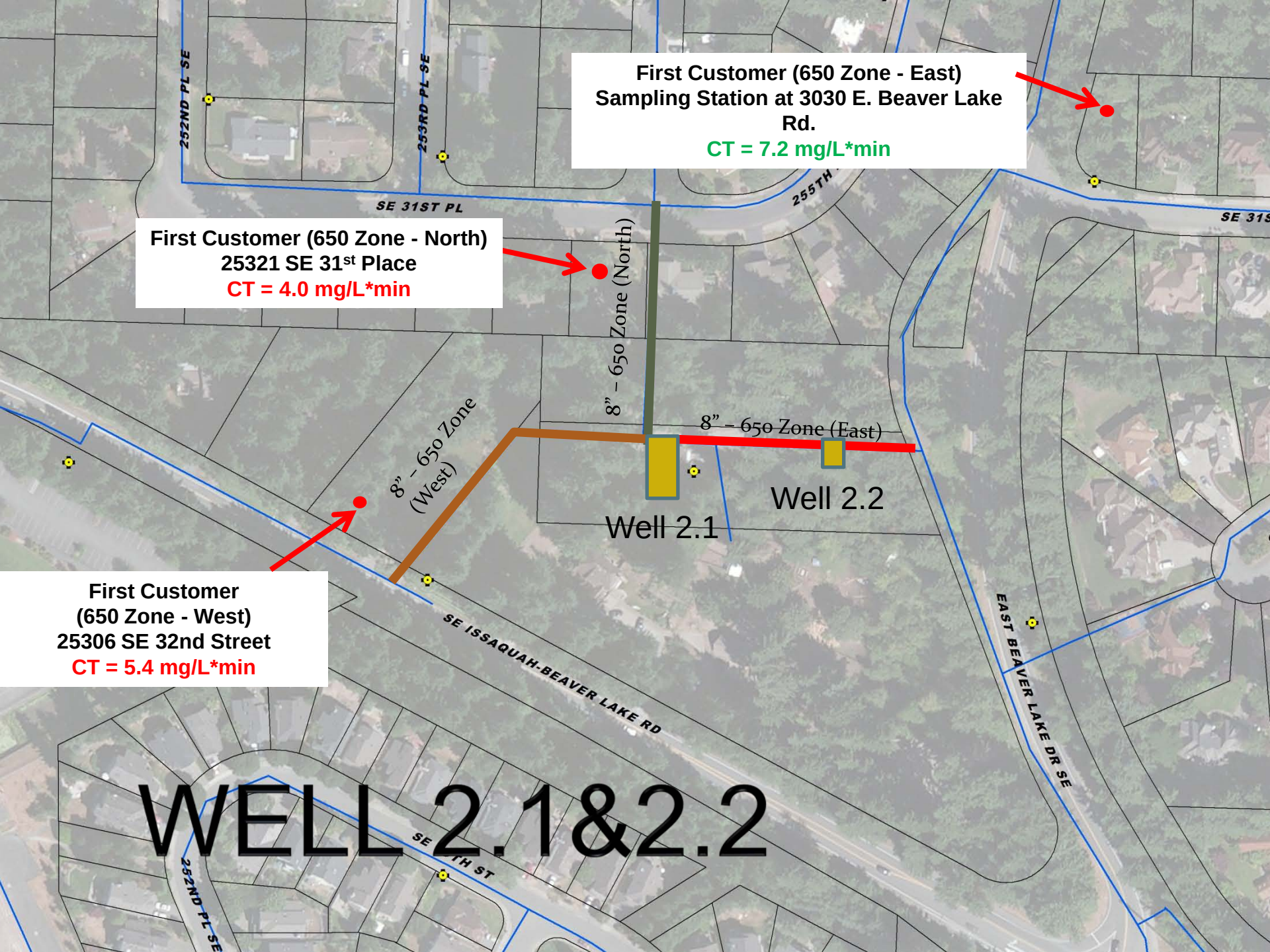
Standard Pipe Diameter (in)	6	8	12	16	24	30	
Area (SF)	0.20	0.35	0.79	1.40	3.14	4.91	
Volume/Ft of Pipe (gals)	1.47	2.61	5.88	10.45	23.50	36.72	

Tanks		Diameter (ft)	Height (ft)	Open Space or Baffling	Volume/cf (gals)		Tank Volume
Single Manganese Filter		4.00	4.00	50%	7.48		188.02

Facility CT Time:

Facility Piping	17.3	12.5					
Manganese Filters							4
Facility Piping	3	38.25					
Yard Piping		7.5			38		
Volume of Water (gallons)	29.8	152.1	0.0	0.0	893.1	0.0	752.1

Total Available Volume	1,827.1	Gallons
Total CT Time:	1.8	min-mg/l


First Customer (650 Zone - East)
Sampling Station at 3030 E. Beaver Lake Rd.
CT = 7.2 mg/L*min
First Customer (650 Zone - North)
25321 SE 31st Place
CT = 4.0 mg/L*min
First Customer
(650 Zone - West)
25306 SE 32nd Street
CT = 5.4 mg/L*min
8" – 650 Zone (North)
8" – 650 Zone (West)
8" – 650 Zone (East)
Well 2.1
Well 2.2
WELL 2.1&2.2
SE 31ST PL
252ND PL SE
253RD PL SE
255TH
SE ISSAQUAH-BEAVER LAKE RD
EAST BEAVER LAKE DR SE

Compliance Monitoring Example #1 Plateau Zone Well 2.1 & 2.2 Conclusion

- Meets CT for one direction, close on one, however does not meet going north
- Meets CT with all pipes open
- Could close north feed then well would met CT but would cause other issues fire flow, water quality
- Could raise residual by 0.3 mg/L (40% increase)
- Not worth modifications – will likely go with Triggered Monitoring

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Plateau Deep Aquifer Compliance Example #2 Well 4 and 11

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Compliance Monitoring Example #2 Plateau Zone Deep Wells

- Well 4 and 11.1 and 11.2
  - Three wells treatment located at Well 4 (2,200 feet west of Well 11.1 and 11.2)
  - Treated water flow can go in 3 directions and to 3 pressure zones
  - One pressure zone (700) Serves NE Sammamish and District customers
  - For CT time need to assume worse case all flow in one direction to one pressure zone
    - Piping configuration 3 pressure zones
    - Determine first customer from treated source and contact time

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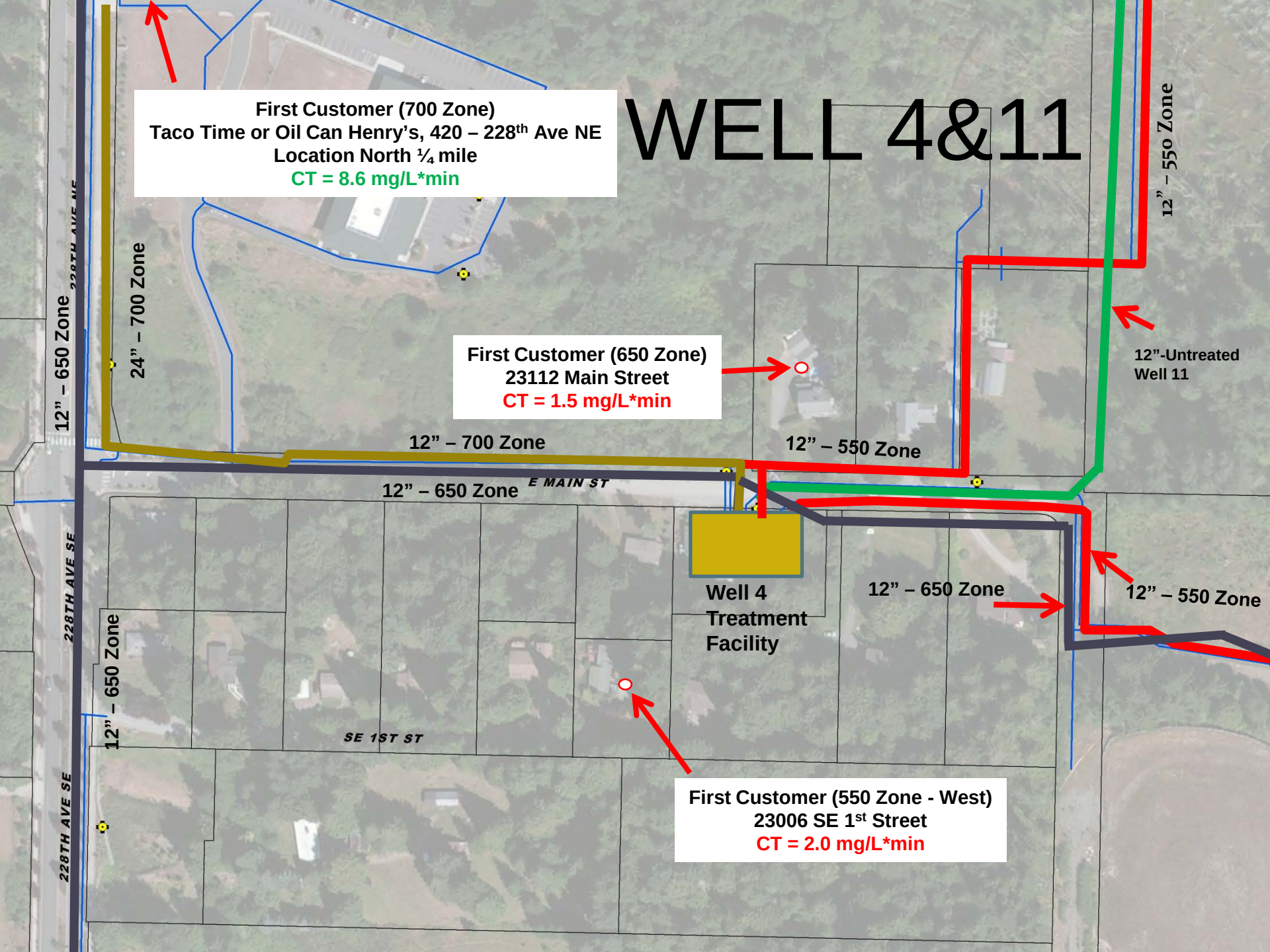
WELL 4&11
First Customer (700 Zone)
Taco Time or Oil Can Henry's, 420 – 228th Ave NE
Location North ¼ mile
CT = 8.6 mg/L*min
24" – 700 Zone
12" – 650 Zone
228TH AVE NE
12" – 550 Zone
First Customer (650 Zone)
23112 Main Street
CT = 1.5 mg/L*min
12"-Untreated
Well 11
12" – 700 Zone
12" – 550 Zone
12" – 650 Zone
E MAIN ST
Well 4
Treatment
Facility
12" – 650 Zone
12" – 550 Zone
228TH AVE SE
12" – 650 Zone
SE 1ST ST
228TH AVE SE
First Customer (550 Zone - West)
23006 SE 1st Street
CT = 2.0 mg/L*min

Compliance Monitoring Example #2 Plateau Zone Deep Wells 4&11 Conclusion

- Serves NE Sammamish and District customers
  - Share tank for equalization and fire flow
  - NE Sammamish undisinfected/not fluoridated
- 1 site meets CT, 2 do not meet CT
  - Can't increase Cl_2 because of NE Sammamish
  - First service to 650 zone could be relocated
- Not worth modifications

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Valley Aquifer Compliance Example #3
Well 7,8,9 and Regional Connection

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Compliance Monitoring Example #3 Valley Aquifer Wells and Regional Connection

- Well 7,8 and 9 Plus regional connection
  - Treatment located at Well 9 (2,200 feet from Well 7 and 8)
  - Usually one well operates at a time, but occasionally requires two wells
  - Treated water flow goes in one direction thru 30” transmission main
  - Determine first customer from treated source and contact time

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WATER AND SEWER DISTRICT


24” – untreated water
First Customer (297 Zone)
6415 East Lake Sammamish Parkway SE
CT = 6.6 mg/L*min
Well 8
Well 7
30” – 297 Zone treated water
24” – Untreated water from well 7&8
30” – 297 Zone
Well 9 Treatment Facility
Regional Intertie
WELL 7,8,9 and REGIONAL CONNECTION
FRONT ST N
SAMMAMISH PLATEAU
WATER AND SEWER DISTRICT

Monitoring Example #3 Valley Aquifer Well 7,8,9 and Regional Compliance Conclusion

- More straightforward
- Meets CTs because of large pipe and 1st customer farther away
  - Meets @ sampling station
  - On-line analyzer exists
- Will probably take credit

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WATER AND SEWER DISTRICT

Need for On-line Analyzers

- If don’t meet CT at District facility, need to install continuous analyzer at first customer – not often practical
- Issues to consider
  - Cost
  - O&M
  - SCADA

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Triggered Monitoring

- Need to consider seasonal operations of wells and can eliminate those that meet CT
  - 6 wells definitely need to be on Triggered Monitoring

Year Round	Summer Only	Supplemental
4, 7, 11.1, 11.2 12, 13	1, 2.1, 2.2, 10, 8	9

- Interties (11)
  - Issaquah
  - Redmond
  - Union Hill
  - NE Sammamish

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Valley - Plateau Zone Example

- Issaquah gets a coliform hit at TCR site
  - Well 7 and regional line are operating
    - Meets CT
  - Water mixes with Plateau water and Wells 1,2,4 and 10 which are also running
    - Wells 4 and 2 do not meet CT
    - Wells 1 and 10 do
    - Need to communicate and figure out if Issaquah's wells meet CTs, which are operating, etc.
- Need communications before incident!!!

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Representative Triggered Monitoring vs. Triggered Monitoring

- Might not be worth effort to determine representative source for each TCR site
  - 60 unique sites
  - Frequency of hits
  - Number of sources that feed zone
  - Disinfectant residual practices
  - Flushing/reservoir practices
- Worth it for Cascade vs. Plateau Zones
- Might be worth it for specific interties
  - Frequency of hits
  - Number of sources that feed zone
  - Disinfectant residual practices
  - Flushing/reservoir practices

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WATER AND SEWER DISTRICT

Summary of District's Approach

- Identify wells that already meet CTs always
- Identify wells that meet CT sometimes
  - What types of improvements are needed?
- Figure out where representative Triggered Monitoring makes sense
  - Between Cascade and Plateau zones – yes
  - Within zone?
  - At interties?
- Do Triggered Monitoring at rest, and until all work listed above is complete!

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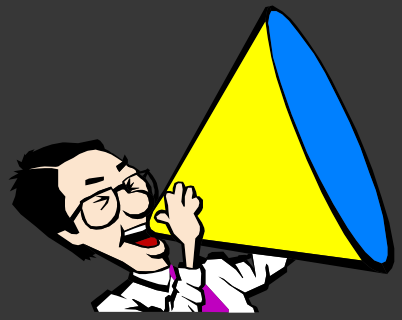
WATER AND SEWER DISTRICT

Conclusions

- GWR seems simple, until you get a hit!
- CT analysis and compliance can be complex
- Make sure you have raw water sample taps before treatment in place before the event
- Clearly need a plan in place for various scenarios
- Consecutive systems must also do public notification so communicate with agencies that you are connected to



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Compliance Strategies used by Idaho's Small Systems

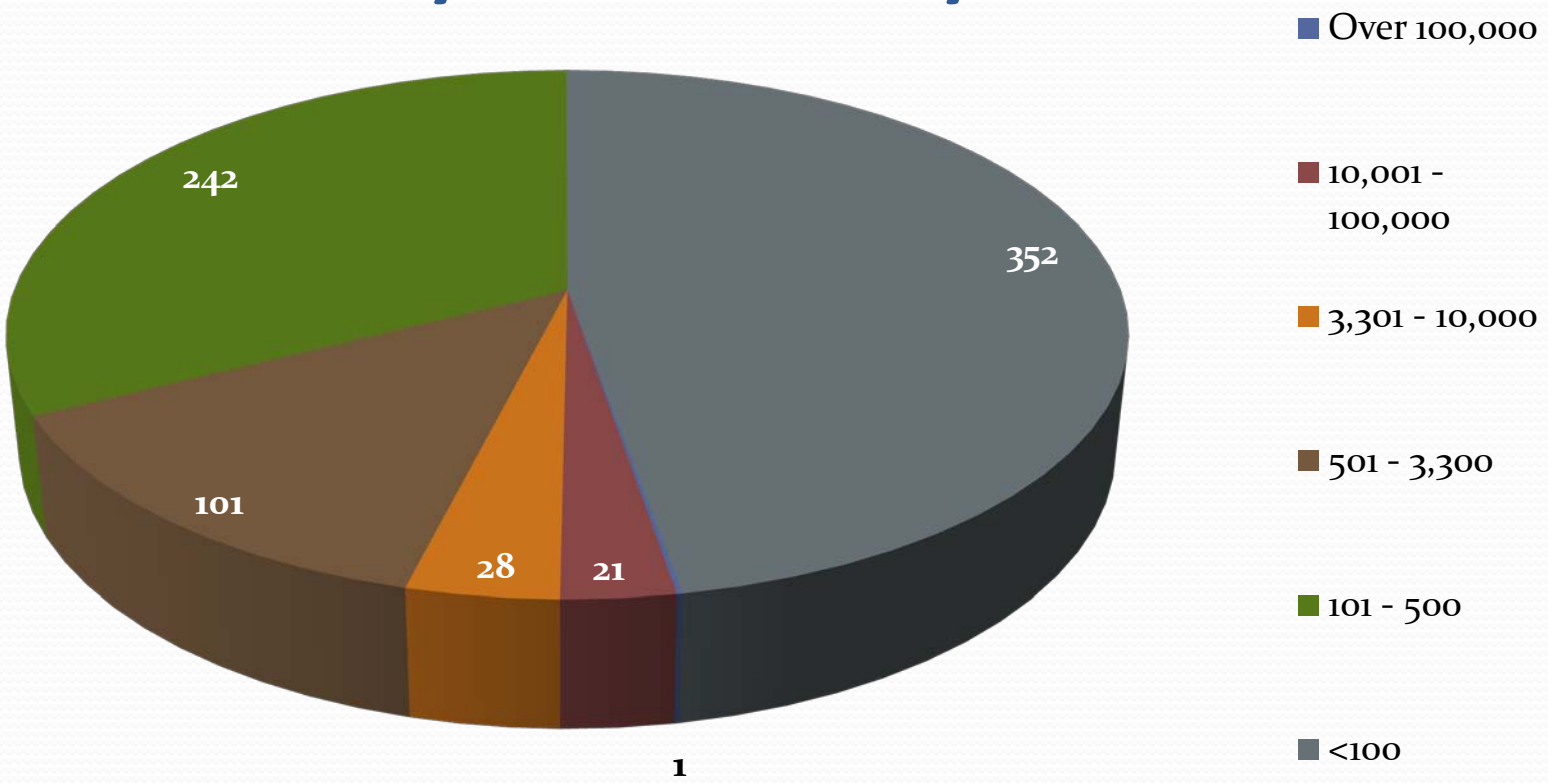
Jerri Henry
Idaho Department of Environmental Quality
May 3, 2012

- Demographics
- Contaminants
  - Arsenic
  - Uranium
- Compliance Strategies
  - Interconnection/Deregulation
  - Central Treatment
  - Blending
  - Time/Flow Weighted Averaging
  - Point-of-Use

Demographics of Idaho

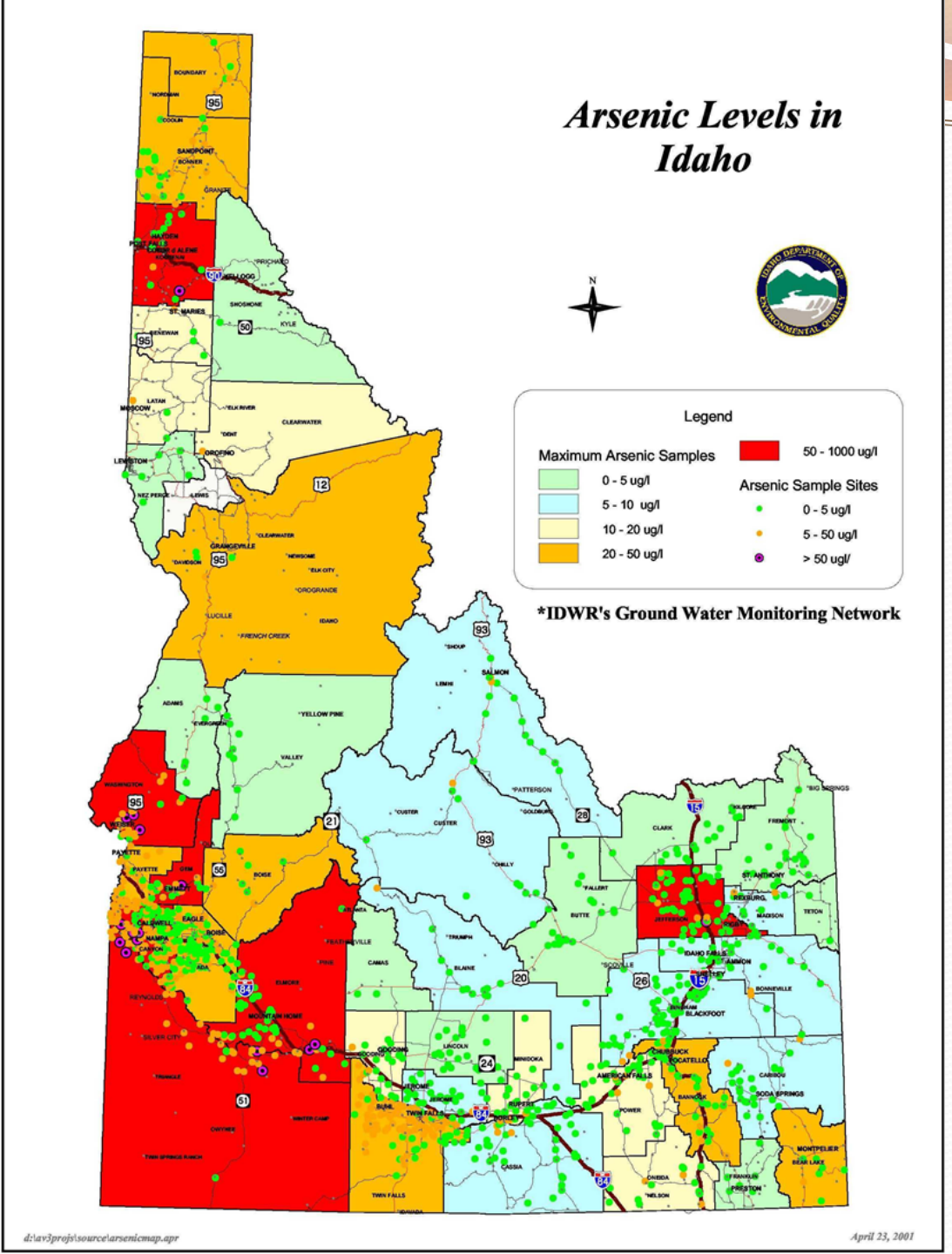
- 2010 population: 1,567,582
- Public Water Systems: 1955
  - Community water systems: 745
    - ~700 serving <3,300
    - ~350 serving 100 or less people
  - Non-community non-transient water systems: 224
  - Non-community transient: 986
- Primarily groundwater
  - < 70 CWSs using surface water or GWUDI

Community Water System Sizes



Arsenic and Idaho

- 2006 Effective date of new 10 ug/L MCL
- 2006: ~80 CWS/NCNT impacted (1+ samples > 10ppb)
- 2008: ~40 CWS and 4 NCNT out of compliance
- 2011: 25 CWS and 2 NCNT out of compliance (some new)
- Most results are between 10 and 20 ug/L.



Most of the impacted systems in the more populated SW Idaho.

Uranium in Idaho

- 2003 Effective date for new MCL of 30 ug/L
- 2003: unknown number of systems impacted
- 2008-2011: 26 CWS out of compliance
- 2011: 4 CWS systems out of compliance
- Systems impacted are primarily in SW Idaho

Compliance Strategies:

- Interconnection
- Deregulation
- New source
- Blending
  - New entry point
  - Time weighted average (TWA)
- Treatment
  - Central
  - POU

Interconnection/Deregulation

- Arsenic: 5 systems
- Uranium: 9 systems

- Examples:
  - Mobile Home/RV park evicted families of 5 and 4 to change PWS class from C to TNC
  - Subdivision drilled new well, split into two unregulated systems
  - Subdivision sought annexation into city (expensive—sewer, taxes, connection fee)

Central Treatment

City of Fruitland

Population: ~4,500
Connections: 1476

Central Treatment

- 11 wells impacted by arsenic (range 8-46 ug/L)
- EPA arsenic demonstration project
  - Ion exchange system on 1 well
- Operation from June 14, 2005 to September 21, 2005
  - Treated 21.6 MG
  - 98,605 pounds of salt (weekly deliveries of 3,200 to 9,000lbs)
  - Impacted waste water lagoons
- Abandoned IX treatment for new surface water source and membrane plant
  - Abandoned several wells and other wells for emergency use
- $11.5 million for plant, intake, and re-piping (now only 1 entry point)

City of Castleford

Population: 275

Connections: 112

Figure 1. Front View of Five Media Treatment Vessels

Central Treatment

- City of Castleford: 2 wells impacted by arsenic, range 7-24 ug/L
- Denied extension (exemption) request from EPA
- $606K SRF "disadvantaged system loan" at 0%; FY05 and FY06 federal awards totaling $1M with waived match requirements
- Reported costs were not all arsenic related
  - Repairs and upgrades from deferred maintenance (new well, storage reservoir, distribution system)
- Installed co-precipitation/ion exchange system 2009
- Difficulties were/are with wastewater: backwash/re-use solids would plug bag filter system increasing cost of operation (City not reclaiming backwash)

Time/Flow Weighted Averaging

- Information from the arsenic rule guidance
- 5+ CWS using time/flow weighted averaging
- Systems with multiple wells
  - Seasonal use wells
  - Optimal with SCADA operations
- Sampling location more representative of water served year-round but **all** connections must be served safe water
- Increased monitoring that is averaged & reported quarterly
- Public perception & issues with reporting in CCRs
- Systems must apply with plan for consideration

POU

- Idaho's POU rule adopted November 2005
- 33 systems
  - 20 community water systems, 4 in pilot phase
    - 13 for arsenic
    - 3 arsenic/uranium
    - 3 uranium
    - 1 fluoride
  - 10 non-transient non-community
    - 8 arsenic
    - 1 nitrate
    - 1 arsenic/nitrate
  - 3 transient
    - nitrate
  - Largest CWS with POU (uranium tx): 69 connections serving 230 people

Lessons learned: POU

- **POU only feasible option for uranium treatment**
  - Waste disposal issue
    - Household waste
    - Liquid waste – de minimis and not regulated

- **SRF Challenges:**
  - POU units are pre-engineered & no changes in distribution system so DEQ exempted systems from engineering plan and specification process (P&S)
    - SRF rules require facility plans & P&Ss
      - Only 1 or 2 POU systems qualified for an SRF loan
    - Environmental Information Document (EID) process
      - Applied to get "finding of no significant impact"
  - SRF language in the Code of Federal Regulations (CFR) and related SDWA language are both silent on POU but specifically allow point of entry (POE)

- **Jurisdiction issues (Plumbing Bureau)**
  - DEQ's authority stops at the service line to homes
  - Idaho Division of Building Safety; Plumbing Bureau
    - Systems are required to obtain a permit for installation and have units inspected after installation
      - Department provides copy of POU application to Plumbing Bureau
    - Units must be installed by a licensed plumber
    - DEQ does not have the authority to "inspect" installations
  - DEQ does not have the authority to review or approve access agreements—these are legal documents between systems and homeowners
    - AG recommended that DEQ not provide access agreement templates
- **Public Education Difficulties**
  - Perception that arsenic is not a public health issue—
    - "*I have been drinking this water for* [x] *years and I'm fine*"
    - Water that was fine yesterday and not fine now
    - Water that is "just above" the MCL is okay
  - Time to assist public water systems with education and outreach
    - Attending public or HOA meetings
  - For systems interested in POU, participation requirements

- **Participation Issues**

  Applications are **not** accepted unless 100% participation
  - Hold-outs—pre and post application approval
    - Urged systems to write CC&Rs that give them the ability to shut off water
      - Systems are obligated to serve safe water to each connection
  - Subdivisions where there are vacant, bank-owned properties
    - Notify bank if we know who it is (no response)
    - Home(s) not counted for 100% compliance until occupied

- **Operator Certification/Licensure**

  Questions regarding the certification requirements for operators & system classification
  - DEQ consulted with drinking water advisory committee:
    - No special or additional certification requirements are necessary for POU
    - No change in system classification is required-no additional complexity for using POU
      - Units are simple to manage--change a filter, change a unit, or contact the vendor with issues
      - Training for a “treatment” license does not provide anything useful when working with POU

- **Sampling Requirements**
  - For the contaminant being treated with POU, the sampling point is changed *from* the entry point to the distribution system *to* each POU unit
  - Lead and copper (Pb/Cu) rule sampling
    - The rule is specific that Pb/Cu samples were not to be taken at a tap with treatment
      - From EPA: POU units were not an acceptable location for sampling for Pb/Cu unless all homes had POU devices
        - DEQ interprets the prohibition to be intended for incidental POU installations not when POU is being used for a compliance technology

POU from a PWS Perspective

- Contacted four operators:
  - What were the barriers and implementation issues for using POU?
  - In retrospect, would the system select POU today?
  - Any other relevant information?

Barriers and Implementation Issues: PWS Perspectives

- Rising costs
  - Filter cartridge costs are significantly higher than a year ago
    - May be able to retrofit with another filter
- Gaining access to each home
  - Extreme cases where homeowners refuse access
    - One operator will bring a POU unit & have the homeowner change it out
    - May need homeowner to sample
  - Changed CC&Rs to include a copy of the access agreement
- Existing POU units
  - System needed to replace existing unit with approved unit OR
  - Ensure existing unit met DEQ requirements and buy it from homeowner
- Convincing homeowners of need to treat 1st then the need to sample and maintain the devices
  - Would have liked to have more peer reviewed information or talking points to share with customers—make it relevant to the customer
  - Requires a lot of time for operators to build relationships

- Technical issues i.e. foul taste causing people not to use POU unit
  - Change the pre-filter to a post- filter
  - May need to add a pre-filter
- Technical issues i.e. filter material breaking down & getting orange/brown water
  - pilot testing important
- Technical issues: i.e. multiple contaminants reducing life of filter
- Vendor integrity &/or knowledge
  - Vendors not ensuring the units are appropriate given the water quality characteristics (some vendors did not ask pertinent water quality questions)
  - Cost variation between vendors
- Issues with the regulatory agency
  - Not being able to provide vendor information
  - Inconsistent messages or approaches to POU before the rule was in place
  - Application process is lengthy

Would these system use POU today?

- **Yes!**
- Affordability as primary reason
  - "No other feasible options"
    - One system without separate irrigation and drinking water, the cost to centrally treat was too high
  - Engineering costs are high & it is difficult to hire an engineer for small projects
  - Waste disposal issues were a barrier to central treatment for several systems
  - "The good outweigh the bad"
  - One operator liked the availability of units and price
  - One system when considering option to de-regulate, decided to use POU as it provided safer water to the public

Word of advice:
Need to follow the manufacturer's recommendations…

Questions?

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Proposed Revised Total Coliform Rule
Potential Impacts to Utilities and Washington State

Carol Stuckey
Office of Drinking Water

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Washington State Department of Health

Mission

To protect the health of the people of Washington State by ensuring safe and reliable drinking water

Outline

- Background
- Current Total Coliform Rule
- Current Rule vs. Proposed Rule Significant Changes
- Office of Drinking Water Comments on Proposed Rule
- Potential Impacts of Proposed Rule
- Process and Schedule for Final Rule

Background

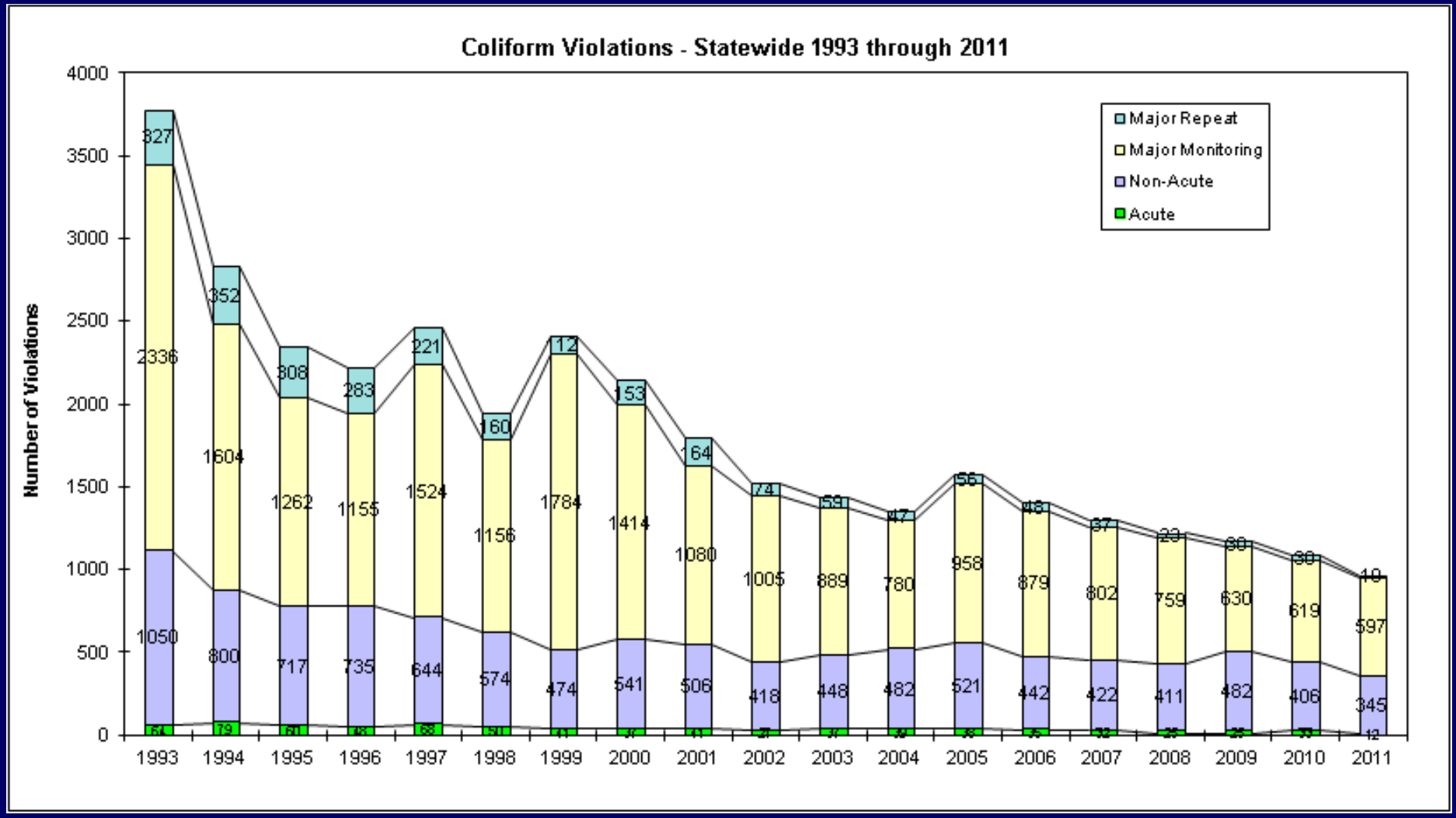
- Current rule in effect since December 1990
- Total Coliform Rule Distribution System Advisory Committee process 2007-2008
- Proposed rule – published July 2010
- Final rule – expected 2012
- Rule effective date – expected to be 2015

Current Total Coliform Rule

Current Total Coliform Program

- **Our current coliform program:**
  - **Protects public health**
  - **Requires robust surveillance**
    - Frequency and number of samples
  - **Proactive**
  - **Keeps consumers informed**
  - **Requires appropriate follow-up ("find and fix")**

Current TCR – Success!



Current Coliform Program

- **Current Total Coliform Rule (TCR) works for:**
  - **Most Water Systems**
    - **Only 4 non-acute MCL violations in 5 years for the 96 systems in the state that serve populations over 10,000**
  - **Office of Drinking Water**
    - **Provides tools to work with other water systems**

      PN for acute and non-acute MCL violations

      Accumulate violations ➞ SSNC➞ treatment or other additions/changes to barriers

What We've Heard: Weaknesses of Current TCR

- Burdensome costs
- Use of fecal coliform 'outdated'
- Confusion around non-acute public notice

Current and Proposed Rule Significant Changes

Current TCR	Proposed RTCR
• *E. coli* / fecal coliform (FC) MCLG = 0 • Acute MCL based on FC / *E. Coli* + samples	• *E. coli* MCLG/MCL = 0 • No FC MCLG/MCL • 3 definitions for *E. coli* MCL violation • Triggers Level 2 Assessment (MCLG= maximum contaminant level goal)

Current TCR	Proposed RTCR
• TC MCLG = zero	• No MCL/MCLG for TC
• TC monthly MCL based on # of TC+ samples in a month (2 or more-or 5%)	• 2 or more (or 5%) TC+ samples in a month triggers assessment and corrective action
• Public Notice (PN) required	• PN not required

Proposed RTCR: Total Coliform

- **Eliminates non-acute MCL violation**
- **TC+ triggers an assessment and corrective action**
  - Two levels of assessment
  - Goal: To find sanitary defects if they exist
  - Corrective action to resolve sanitary defects
- **Treatment technique violation**
  - Failure to conduct a required assessment or corrective actions within required timeframes
  - PN required

Current TCR	Proposed RTCR
• Federal rule allows reduced routine monitoring • Washington does not allow reduced monitoring	• States will have discretion to adopt reduced routine monitoring • States will have to provide EPA with criteria which EPA must review & approve as part of primacy agreement

Proposed RTCR: Reduced Monitoring

- Annual site visit by the State or voluntary level 2 assessment done by a party approved by the State
- Monitoring for community systems can be reduced to as infrequently as quarterly
- Monitoring for non-community systems can be reduced to as infrequently as annually

Current TCR	Proposed RTCR
• Four repeat samples required after a TC+ • Five routine coliform samples required the month following a TC+	• Three repeat samples required after a TC+ • Usual # of routine coliform samples required the month following a TC+ (if monitoring monthly)

Current TCR	Proposed RTCR
• Repeat samples to be collected within 5 connections upstream and downstream	• Allows for Coliform Monitoring Plan (CMP) to include an SOP regarding repeat sample site selection • Seasonal systems

Office of Drinking Water Comments on the Proposed Rule

Office of Drinking Water Comments on Proposed RTCR

- Support changes to:
  - Eliminating FC MCL and MCLG
    - Many labs no longer analyze for fecal coliform
  - Repeat sample site selection - more flexibility good (though a caveat relative to potential invalidation)
  - Non-acute MCL PN improvements

Comments on Proposed RTCR (cont.) Total Coliform MCL

- RTCR removes the goal of no TC in a water system
- Total coliform presence in a water system indicates a source, treatment or distribution anomaly with potential for negative public health impact

Comments on Proposed RTCR (cont.) Total Coliform MCL

- **Proposed RTCR preamble described new framework as proactive in preventing a second TC+ trigger**
  - System operators react to a TC+ by performing surveillance & preventative actions
- **We believe that being proactive prevents the first TC+ trigger**
- **Current TCR: includes incentives to a water system for preventing the first TC+ trigger**

Comments on Proposed RTCR (cont.) Eliminating Non-Acute Violation

- **Eliminating non-acute violation for TC+**
  - Removes strong incentive for water systems to perform proactive O&M to meet a distribution water quality standard
  - MCL violation compels reluctant utilities to improve existing barriers and provide additional barriers
- **Eliminating non-acute PN means less communication with system consumers**

Comments on Proposed RTCR (cont.) Modify Non-Acute PN Language

- Would address large water system concerns and better inform water system consumers
- We gave EPA PN language that we thought would be less confusing

Comments on Proposed RTCR (cont.) Reduced Monitoring

- EPA's analysis of data collected over 6 years finds 25% fewer positive samples are likely because of reduced monitoring
  - This reduction would not result from improved water system quality or operations, but simply a result of less frequent sampling
- Cost Shift to States for performing site visits to allow reduced routine monitoring

Potential Impacts of the Proposed Rule

Potential Impacts to Utilities

- Update to CMP
- Less required follow-up monitoring
- Elimination of non-acute PN
- Documentation of follow-up activities ("Find and Fix" becomes a regulated procedure)
- Timing of Assessment for water system subject to "5% Rule"
- Treatment technique violations instead of non-acute MCL

Potential Impacts to Our Program

- Significant operator training
- Implementing Assessments
  - Clearly define ‘sanitary defects’
  - “Find & Fix” becomes a regulated procedure
  - Resources to review assessments
  - What evidence required to show a sanitary defect has been corrected?
  - Might have to take enforcement action on something we haven’t seen

Process and Schedule for the Final Rule

Proposed RTCR Process

- Final Revised TCR expected to be published 2012
- Final Revised TCR expected to be Effective 2015
- We haven't talked to Washington State Board of Health about RTCR or the comments we provided to EPA on the proposed rule

Questions?

PUBLIC HEALTH
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HEALTHIER WASHINGTON

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