

Division of Drinking Water

Framework for Regulating Direct Potable Reuse (DPR)

Information Item No.10
State Water Board Meeting
June 5, 2018

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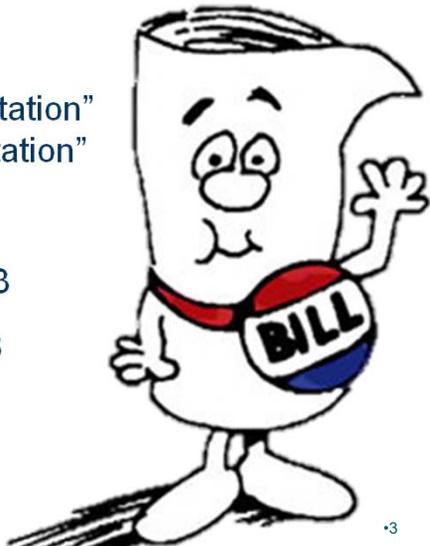
DPR Framework

- DDW thinking on DPR
- Risk across the forms of DPR
- Research to fill knowledge gaps
- New SWA definition
- Stakeholder outreach
- Not a regulatory document

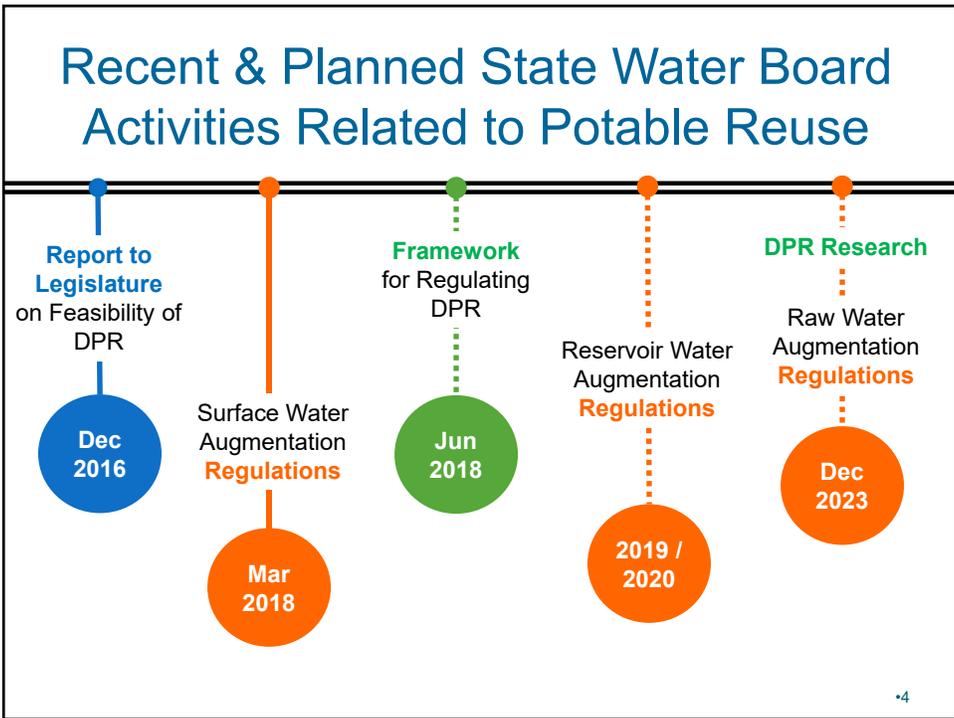


Assembly Bill 574

- Defines “raw water augmentation” and “treated water augmentation”
- Changed SWA definitions
- RWA by December 31, 2023
- Framework by June 1, 2018



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- Section 2: Types of potable reuse
- Section 3: DPR scenarios
- Section 4: Environmental buffer
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- Section 9: Revising SWA regulations

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Types of Potable Reuse



- Indirect potable reuse
 - Groundwater replenishment
 - Surface water augmentation
(now => Reservoir Water Augmentation)



- Direct potable reuse
 - Raw water augmentation
 - Treated water augmentation



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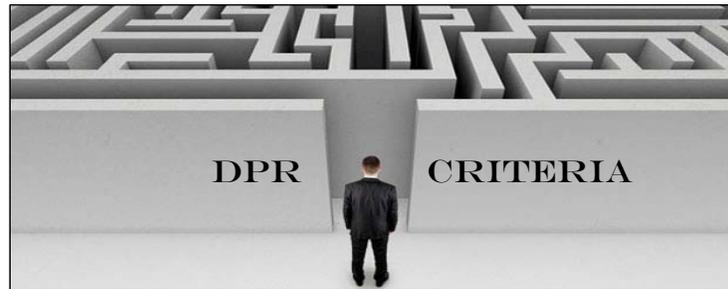
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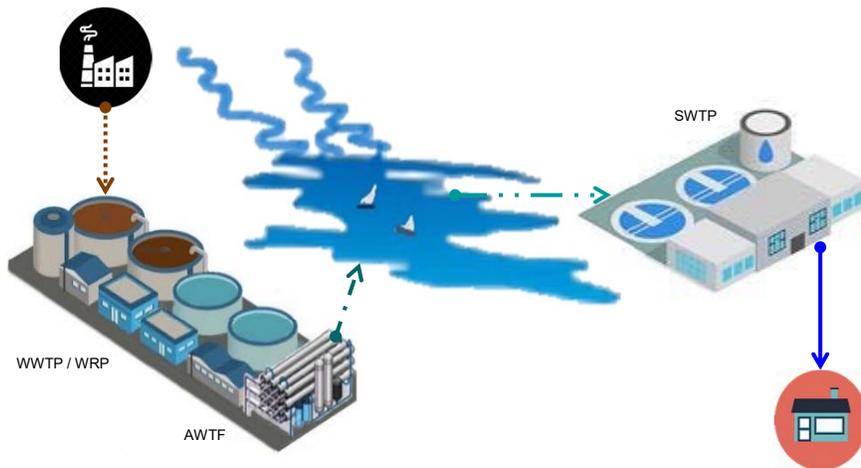
DPR Scenarios

- Forms of DPR:
 - “Treated Water Augmentation”
 - “Raw Water Augmentation”
- Challenge – develop appropriate DPR criteria

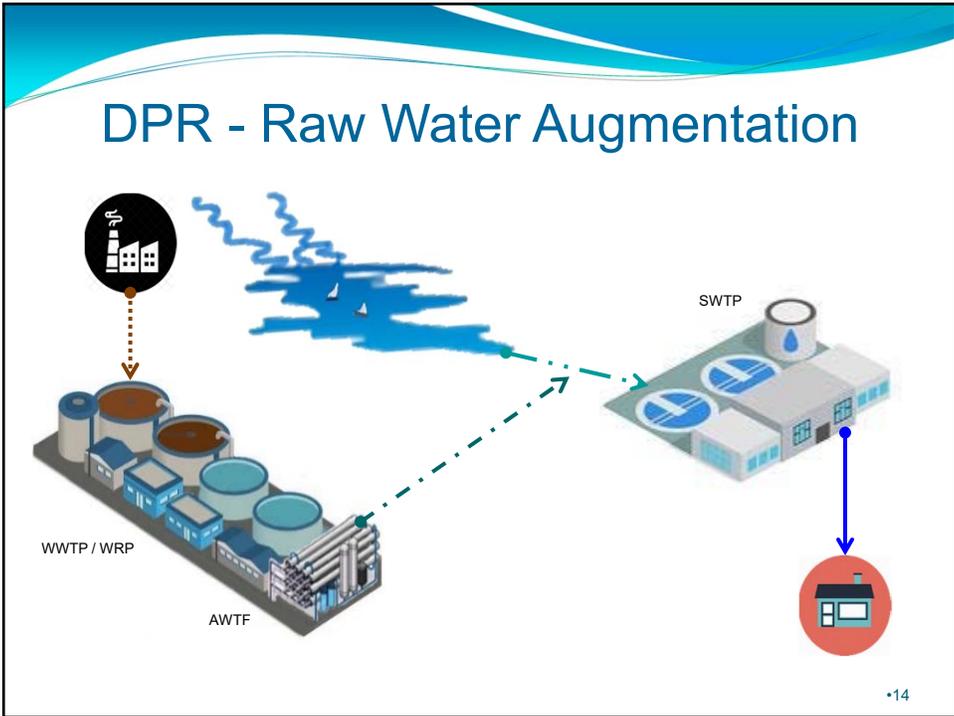
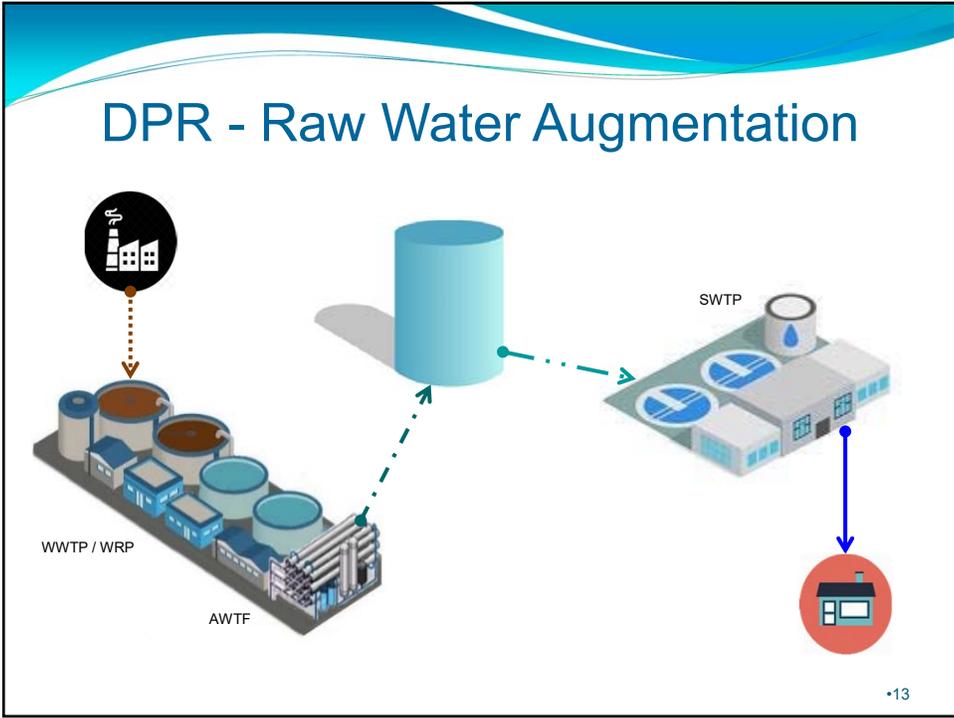


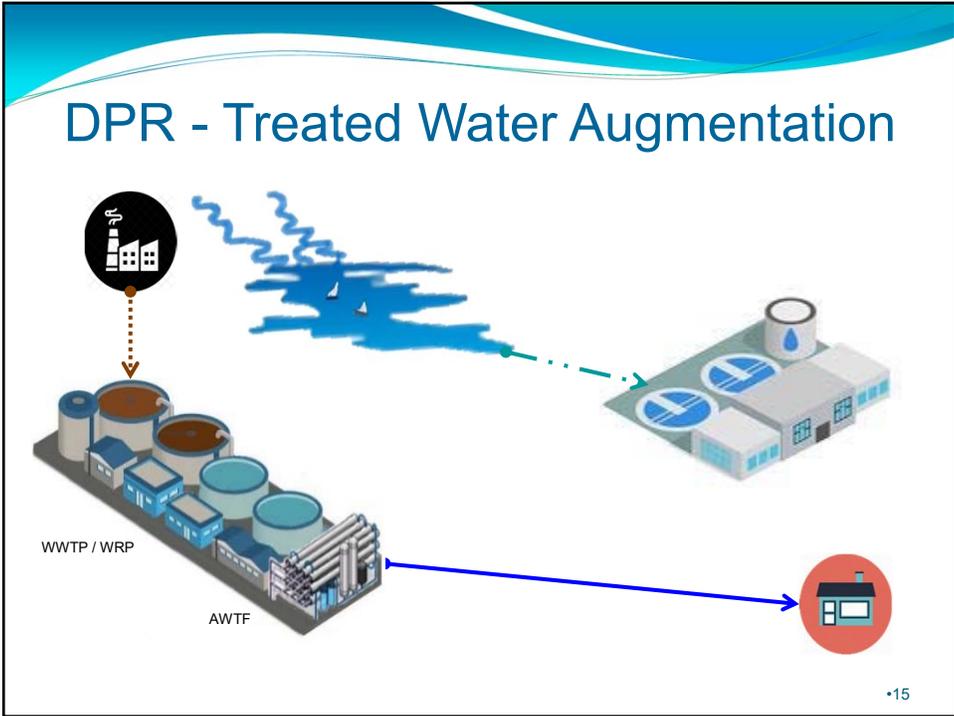
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DPR - Raw Water Augmentation



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IPR - Environmental Buffer

- Reliable
- Provide benefits such as:
 - Attenuation of chemical peaks
 - Robust pathogen barrier
 - Response time



Barrier Loss

- Lack of substantial environmental barrier.
- Ensure reliable, robust, redundant, resilient treatment and optimization control.



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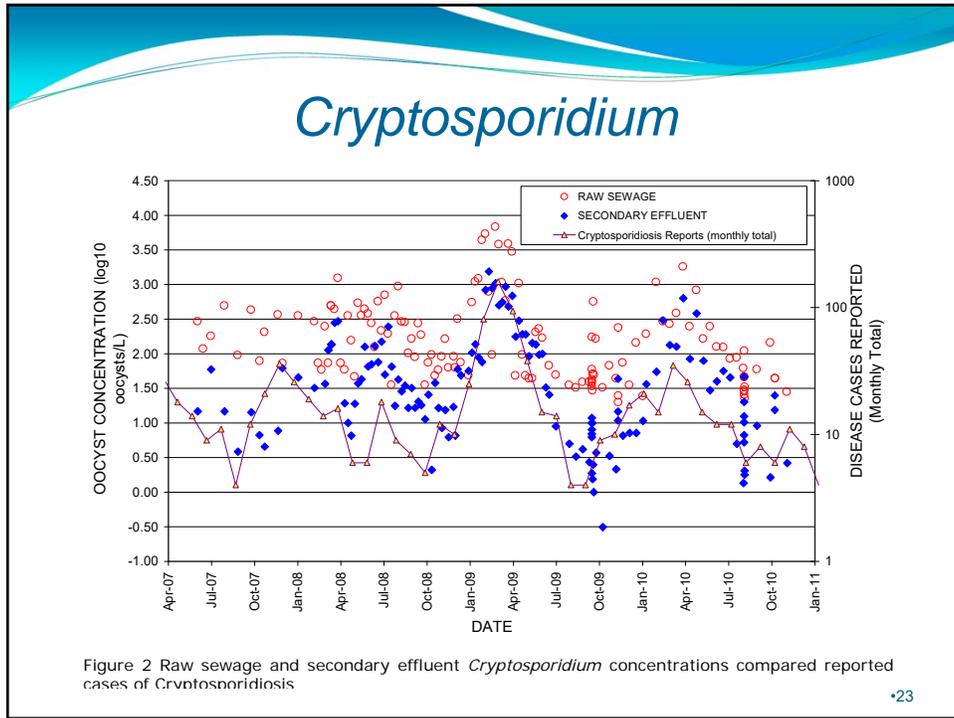
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Pathogens – Removal Targets

- Reference pathogens
- Worst case wastewater pathogen density
 - Uniform statewide criteria
 - Case-by-case requires method & duration (peaks infrequent)
 - At what point is it OK for pathogens to leak through?
- LRV calculated from ratio of safe density to worst case wastewater density
- Quantitative microbial risk assessment (QMRA) used to verify LRVs meet risk goal
 - Annual or daily risk

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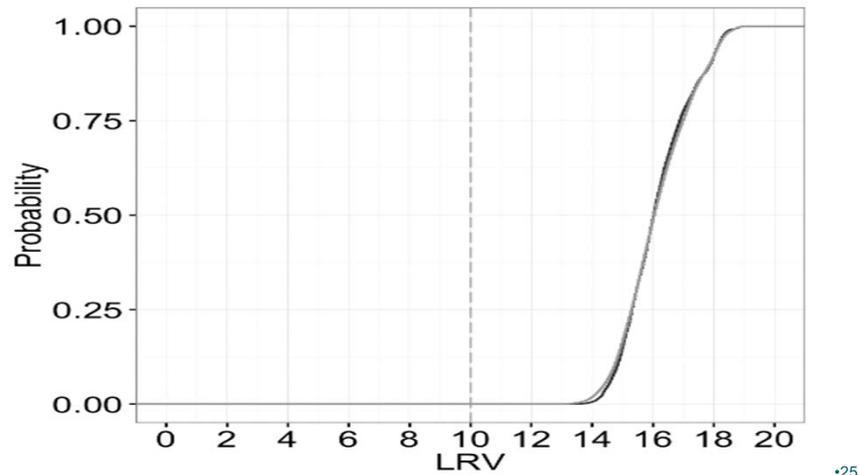
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Pathogens - Treatment

- Redundant treatment (extra log reduction capacity) may be required:
 - To compensate for the lack of an effective environmental buffer
 - A tolerable (very low) probability of failure to meet the LRV may be established
- Probabilistic analysis of treatment train performance (PATTP) will be used
 - Use Monte Carlo approach to create a cumulative distribution function for a set of treatment process – a treatment train

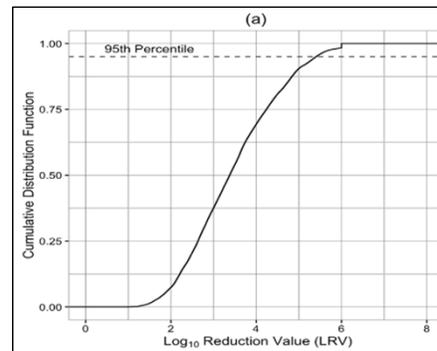
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Example PATTP - *Cryptosporidium*



Pathogens - Treatment

- Validate processes and trains
 - Determine the LRV a treatment will achieve most of the time (5th percentile)
 - Correlate performance with a measurable parameter and identify limits indicating failure



Pathogens - Treatment

- Monitoring and Control
 - Close proximity of wastewater pathogen densities to drinking water for DPR
 - The need for knowledge of water quality and the ability to take corrective action is urgent
 - Provide continuous monitoring of critical processes and fail-safe control
 - Fail-safe is not intended to mean failure proof
 - Fail-safe means the system will revert to a safe condition if a critical component fails

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Chemicals

The threat posed by chemicals in DPR is similar to that for IPR in that advanced treatment must be provided to control the potential chronic exposure hazard from a wide variety of unregulated chemicals.

The threat posed by chemicals in DPR is different for IPR in two important ways:

- Without an environmental buffer pulses of low molecular weight chemicals may pose an acute threat
- Without an environmental buffer the urgency of recognizing and responding to treatment deficiencies increases

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Chemicals

- The goal:
 - remove chemicals to levels that are below public health concern
- The approach:
 - Enhanced source control and public education
 - Conformance with MCL and Notification Level (NL) requirements
 - Development of additional NLs as appropriate
 - Required advanced treatment
 - Something to deal with pulses of low molecular weight chemicals
 - Rigorous monitoring and treatment control



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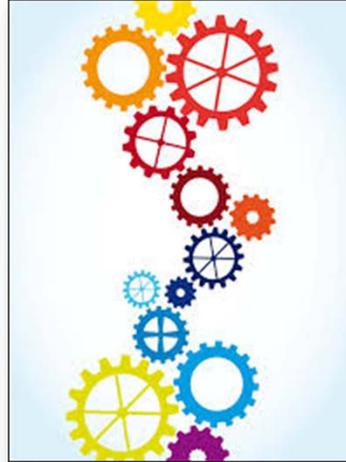
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DPR Criteria Elements

- DPR Permitting Authority
- Addressing Pathogens
- Chemical Control
- Source Control
- Critical Control Point Approach
- Cross Connection



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DPR Permitting Authority

- Facilities co-located or separate
- Various ownership scenarios
- Regional Board regulatory approvals
- Regional Board authority
- Dual permits
 - Safe Drinking Water Act
 - Clean Water Act
 - Porter-Cologne WQC Act



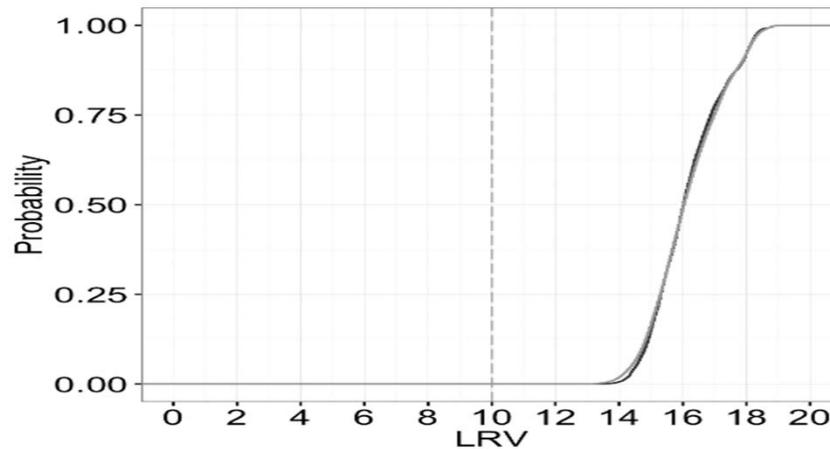
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Addressing Pathogens

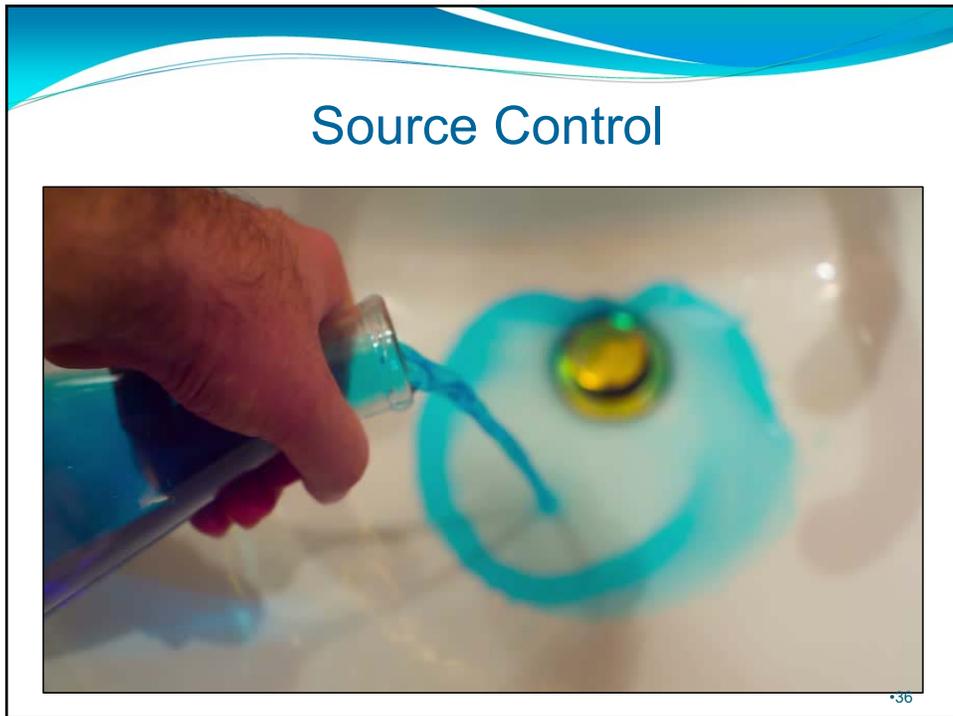
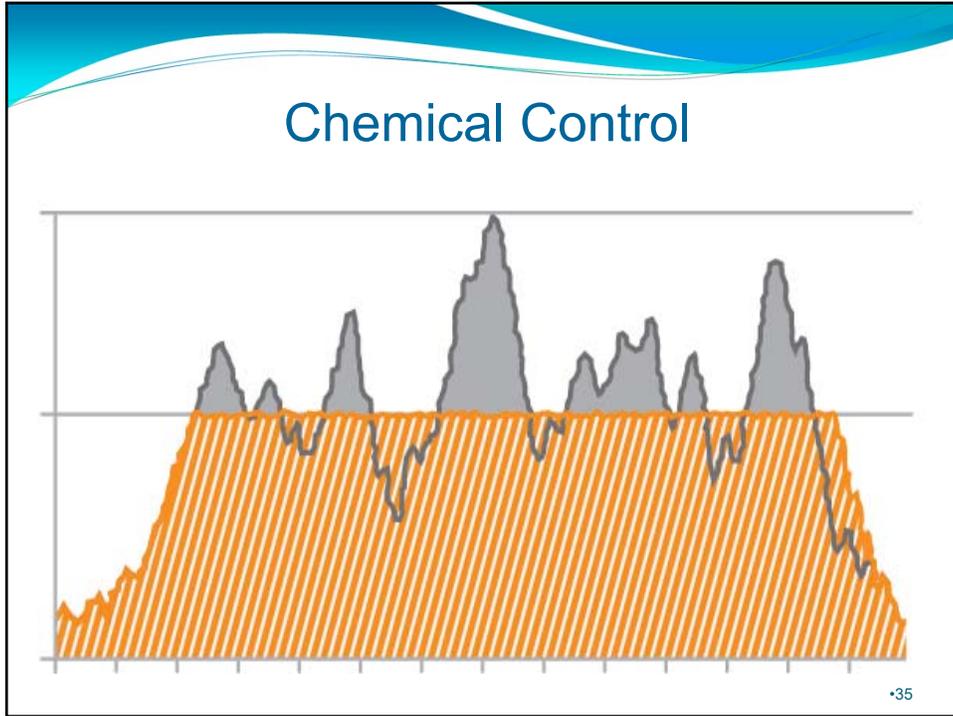
- Identify LRVs
- Set LRV compliance criteria
 - Treatment train minimum LRV (using QMRA)
 - Multi-barrier requirements
 - Tolerable excursions (using QMRA)
- Treatment validation criteria
- Treatment train evaluation with PATTP
- Perhaps preapproved treatment train(s)
- Operations plan to assure treatment efficacy

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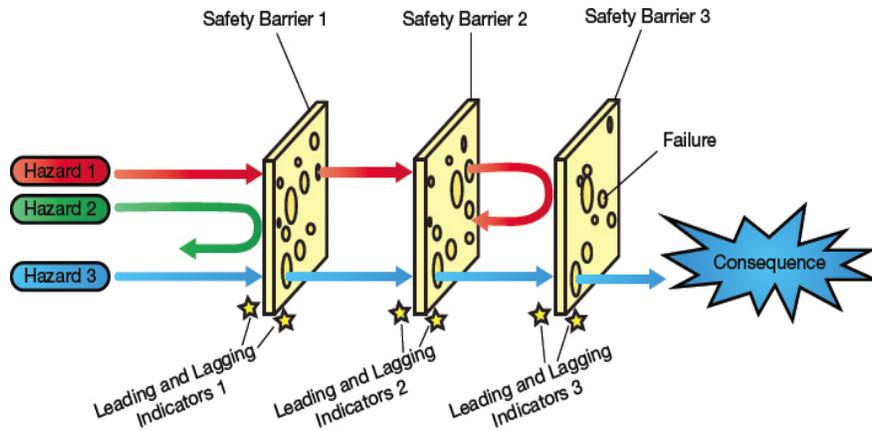
Example PATTP - *Cryptosporidium*



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Critical Control Point Approach



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Cross-Connection



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Other Considerations

- Potable reuse inspection and supervision program
- Treatment system resilience
- Operations quality control
- Public health protection culture
- Public health surveillance



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Inspection and Audits



Treatment System Resilience



Operators



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Public Health Minded



Public Health Surveillance

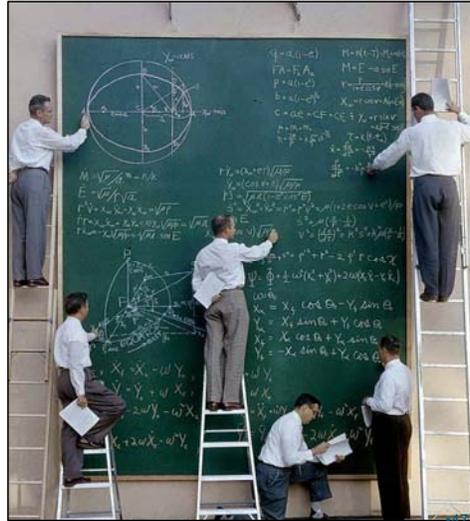


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DPR Research

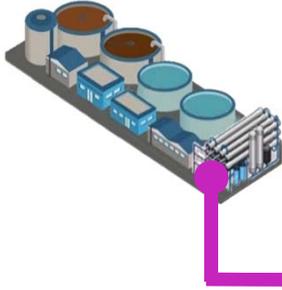
- QMRA
- Raw wastewater monitoring
- Outbreak data collection
- Averaging
- Unknown-CEC methods



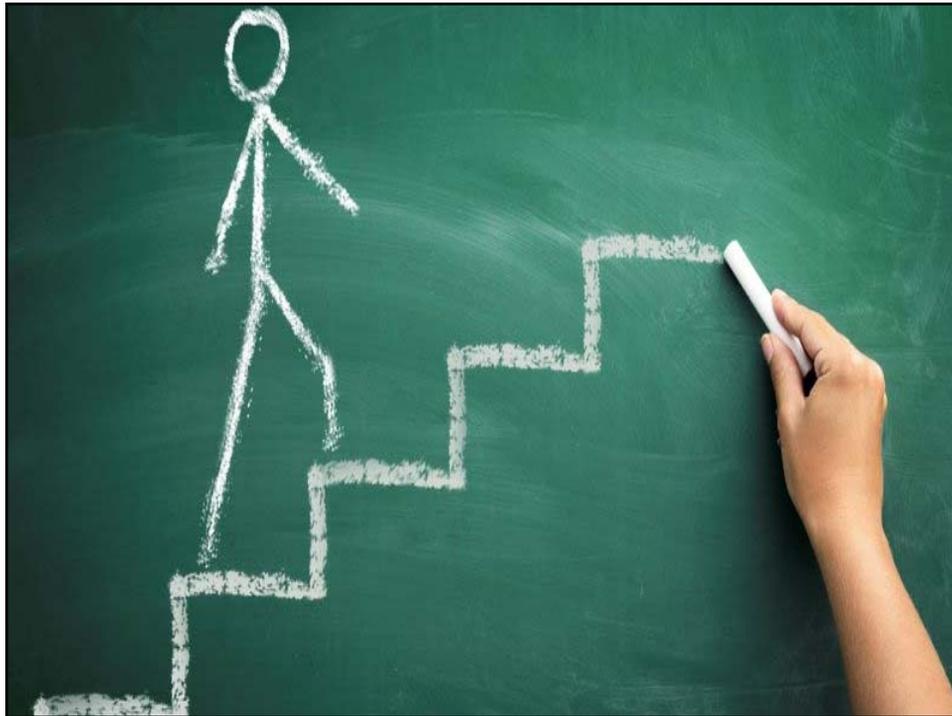
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New SWA Definition



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For today's presentation, Framework, comment & contact info, visit
SWRCB DDW Direct Potable Reuse webpage

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/direct_potable_reuse.html

For future updates, visit and subscribe to
SWRCB electronic mailing list

http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml

Drinking Water → "Recycled Surface Water Augmentation & Direct Potable Reuse"

For more information on 2016 Report to Legislature, visit
DDW Report to the Legislature webpage

http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/rw_dpr_criteria.shtml

Contact Us

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Submit comments on the Framework

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By mail	Sherly Rosilela, P.E. Division of Drinking Water, Recycled Water Unit State Water Resources Control Board P.O. Box 100 Sacramento, CA 95812-100

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