

Direct Potable Reuse: Summary of California's Newest Reuse Regulation

East Bay Leadership Council

April 16, 2024

Trussell

The logo for Trussell features the word "Trussell" in a bold, blue, sans-serif font. Below the letters "ll" are two concentric, light blue circles that resemble ripples in water. To the right of the text is a vertical blue line that extends from the top of the "ll" circles down to the bottom of the slide.

Brian Pecson, Ph.D., P.E.



California

Indirect Potable Reuse
(IPR)

Direct Potable Reuse
(DPR)



What if we remove the environmental
buffer?

We lose several benefits of pathogen & chemical control

Dilution



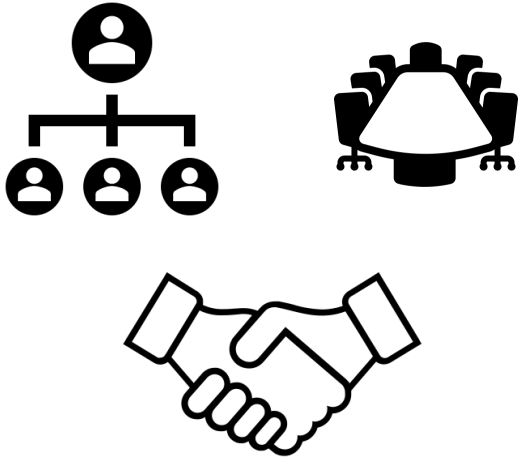
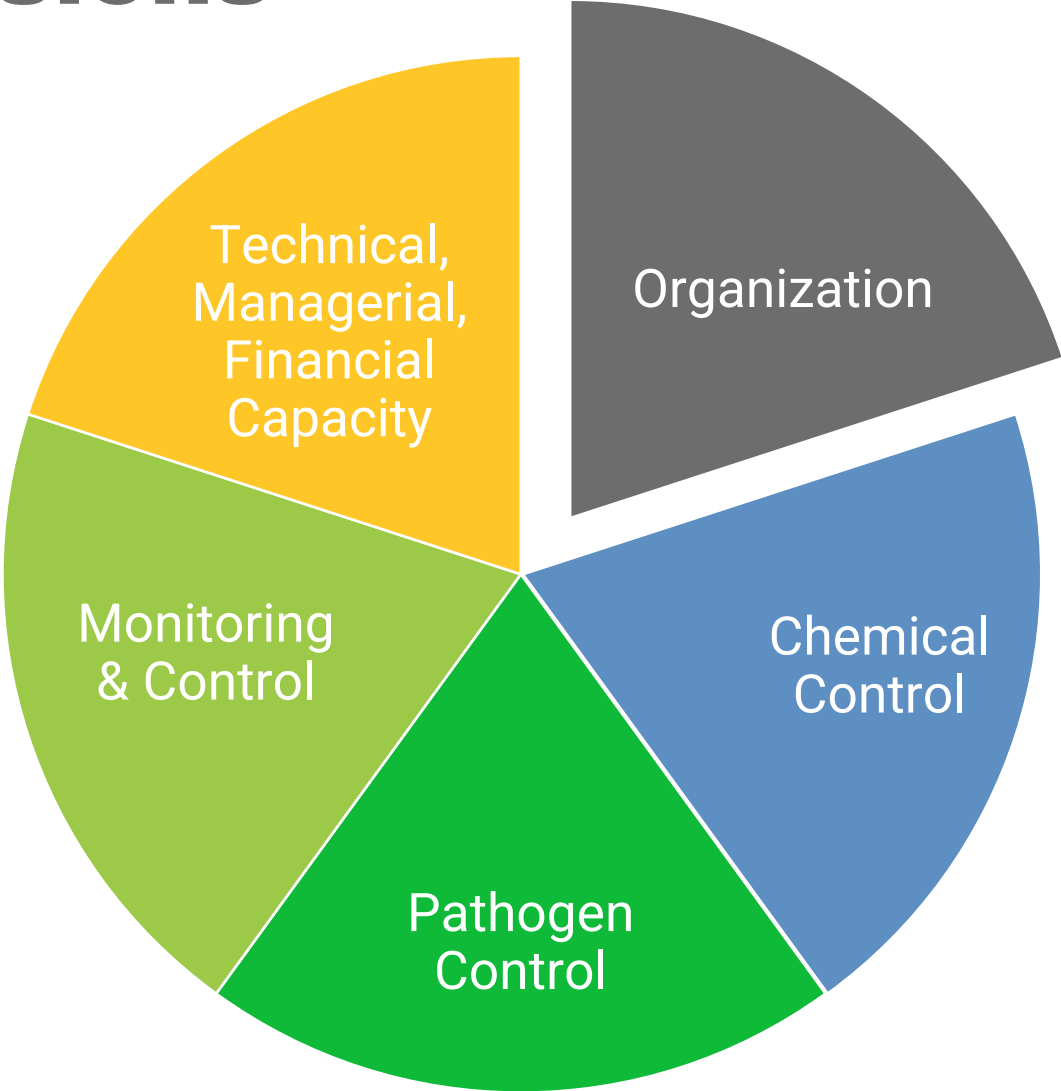
Response Time



Pathogen
Reduction



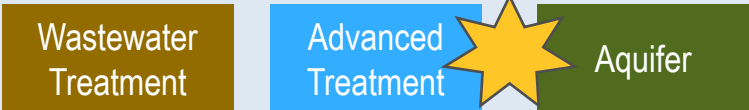
Major Provisions



Organization – Responsible Party

Indirect Potable Reuse

Groundwater Recharge



GRRP Sponsor

Surface Water Augmentation



SWSAP
Water
Recycling
Agency

SWSAP
Public
Water
System

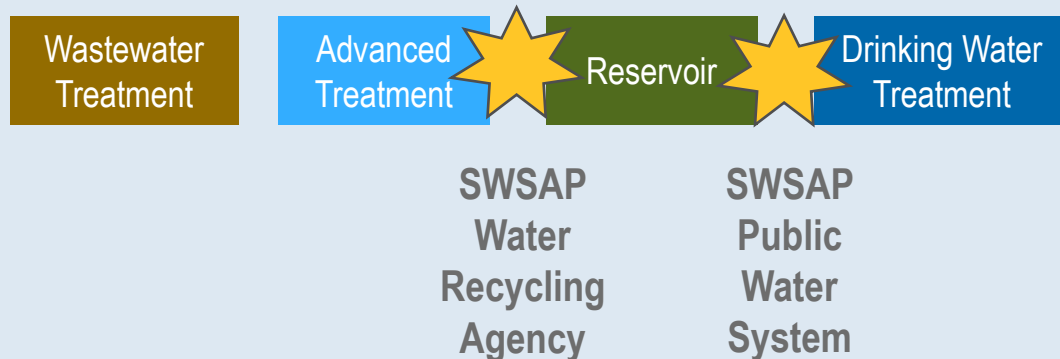
Organization – Responsible Party

Indirect Potable Reuse

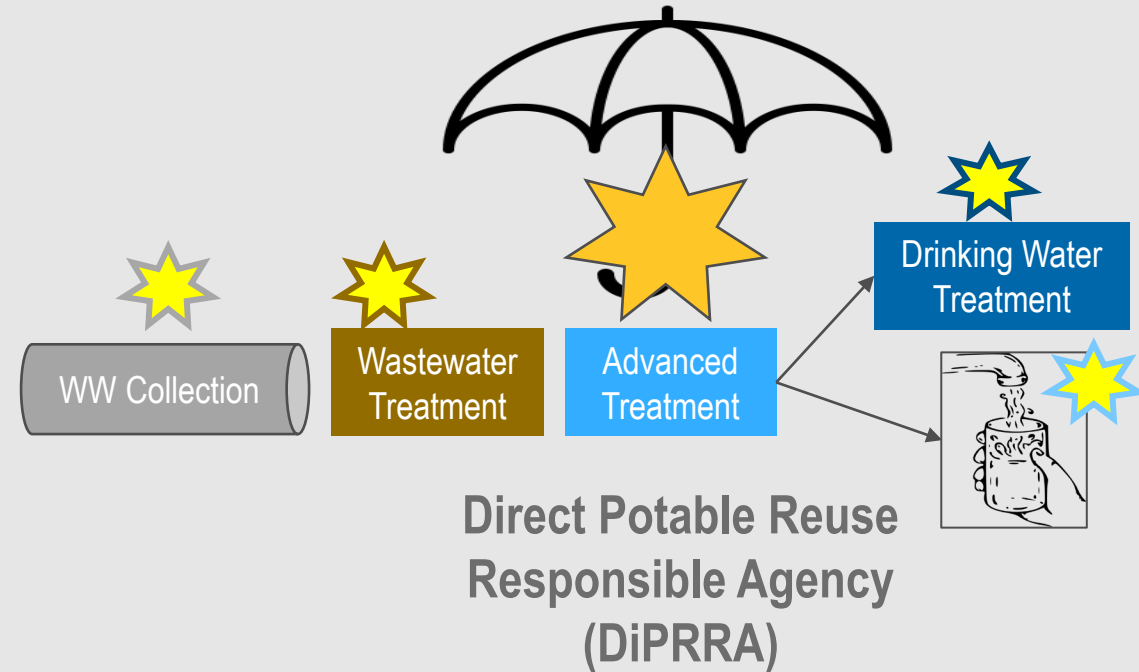
Groundwater Recharge



Surface Water Augmentation



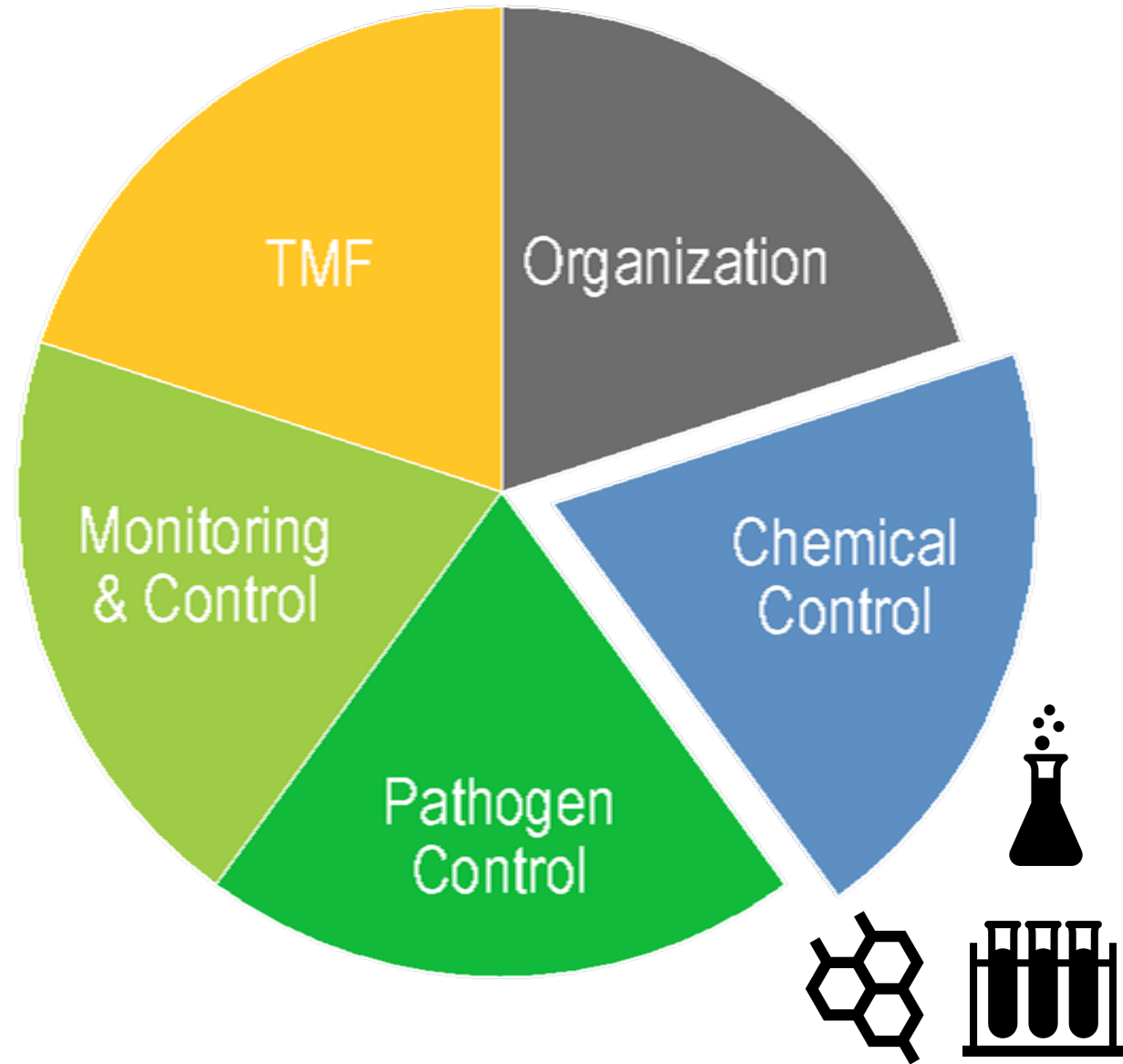
Direct Potable Reuse



DiPRRA must be a Public Water System!

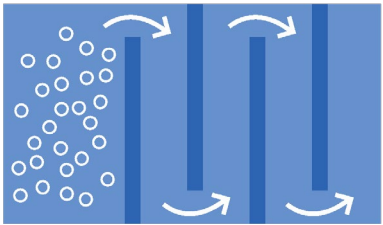
Chemical Control

- ◆ Treatment Train Requirements
- ◆ Blending
- ◆ Peak Attenuation
- ◆ Source Control

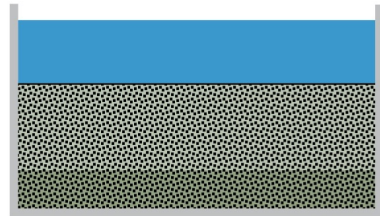


Chemical Control – Treatment

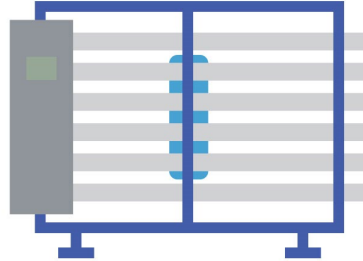
OZONE



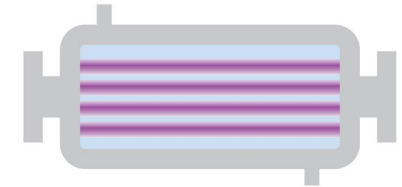
BAC



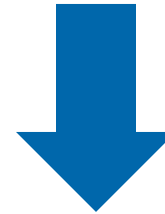
RO



AOP



New requirement

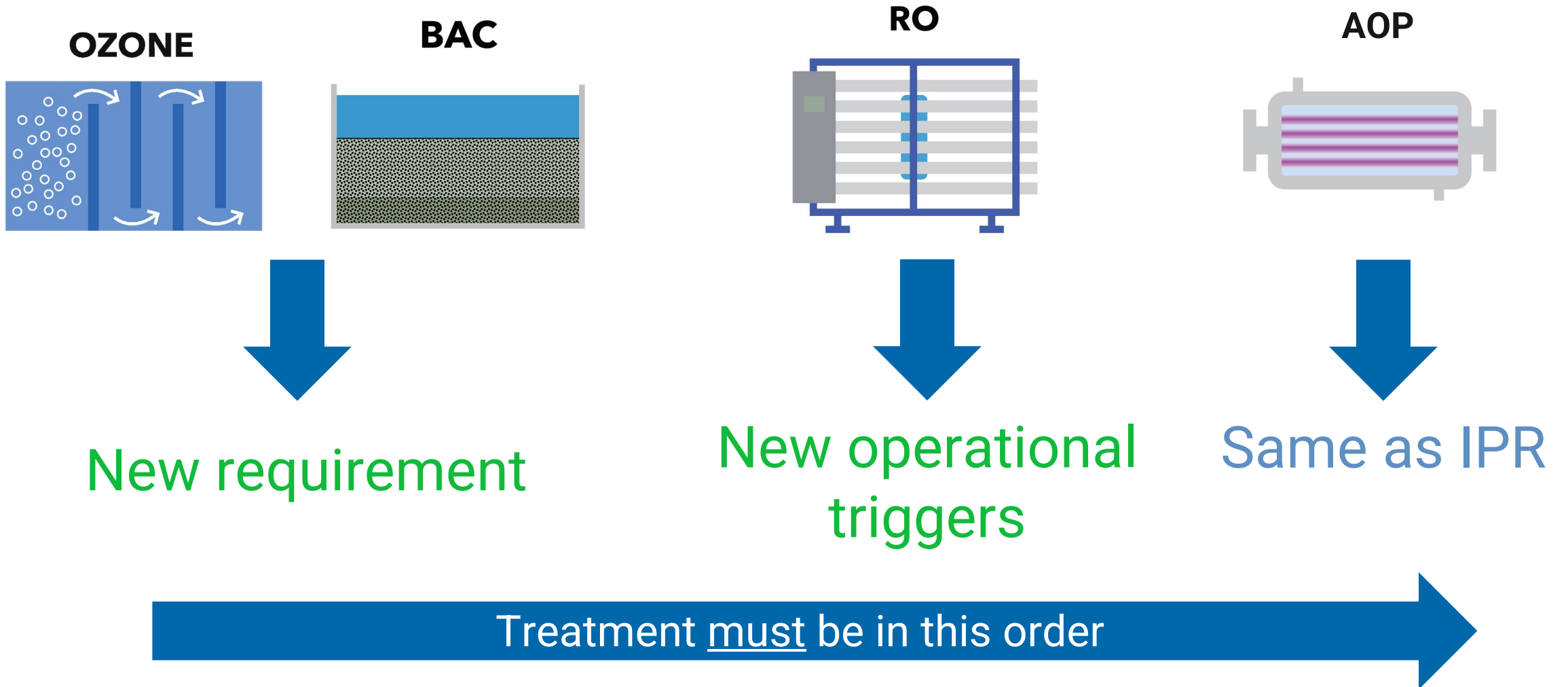


New operational triggers

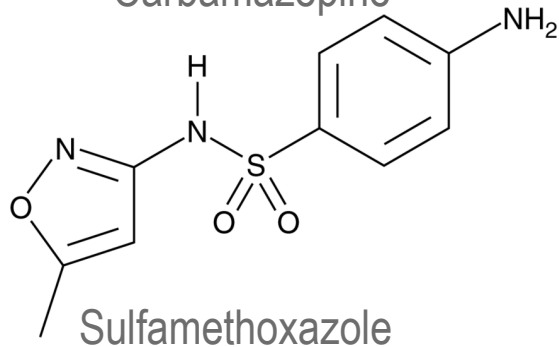
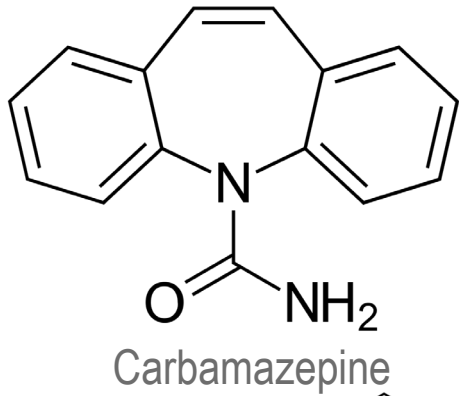
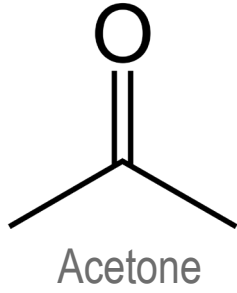
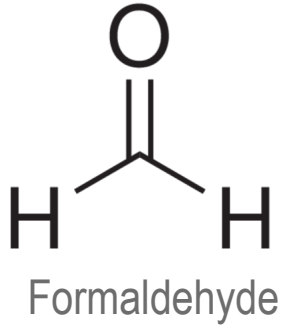


Same as IPR

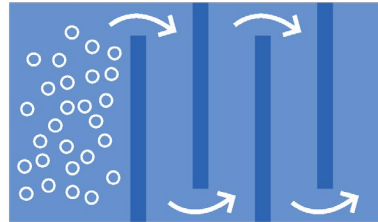
Chemical Control – Treatment



O3/BAC Requirements



OZONE



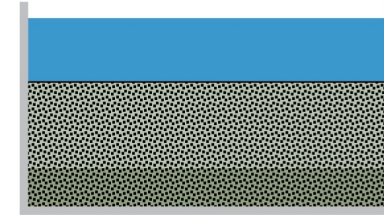
$$O_3:TOC > 1^*$$

1-log reduction:

- Sulfamethoxazole
- Carbamazepine



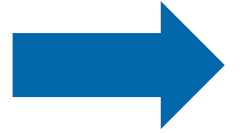
BAC



$$EBCT \geq 15 \text{ min}^*$$

1-log reduction:

- Formaldehyde
- Acetone

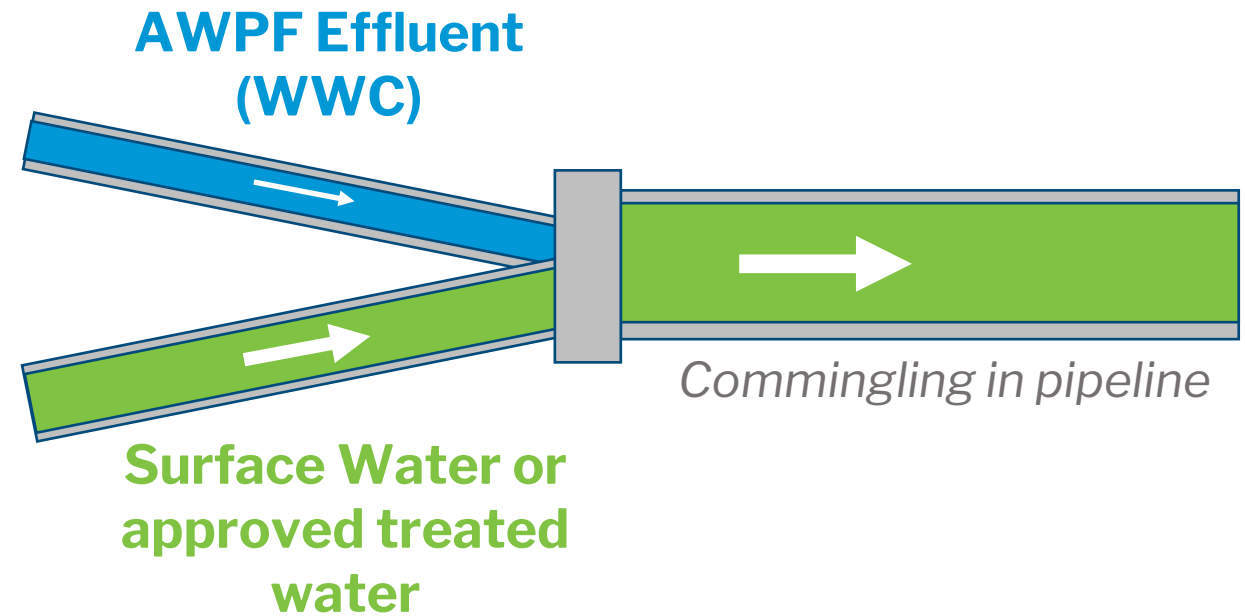


*Alternative design criteria allowable given that defined treatment criteria is demonstrated

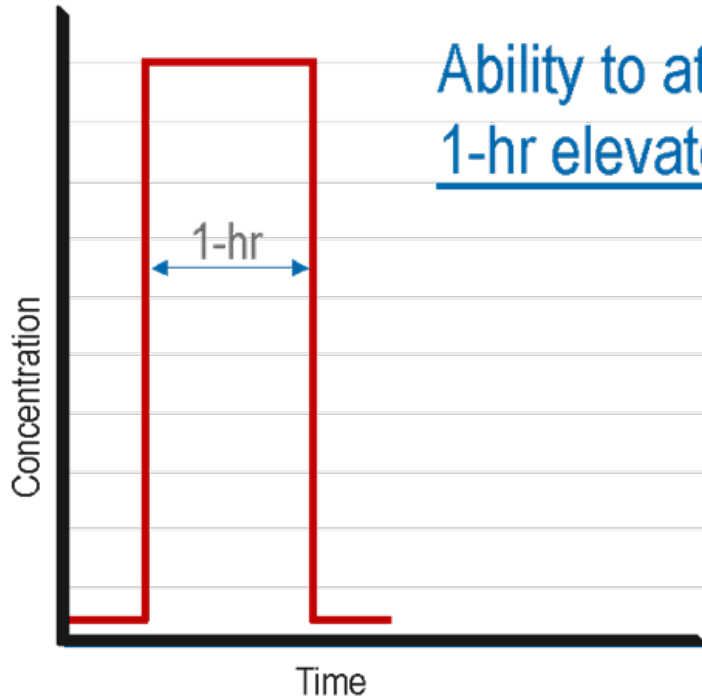
Blending

- A continuous blending process can be used to fully or partially replace O₃/BAC
- Wastewater Contribution (WWC)

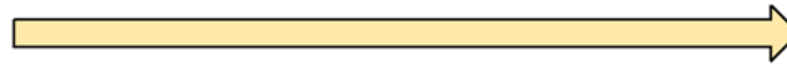
$$WWC = \frac{Q_{wastewater}}{Q_{wastewater} + Q_{dilution}}$$



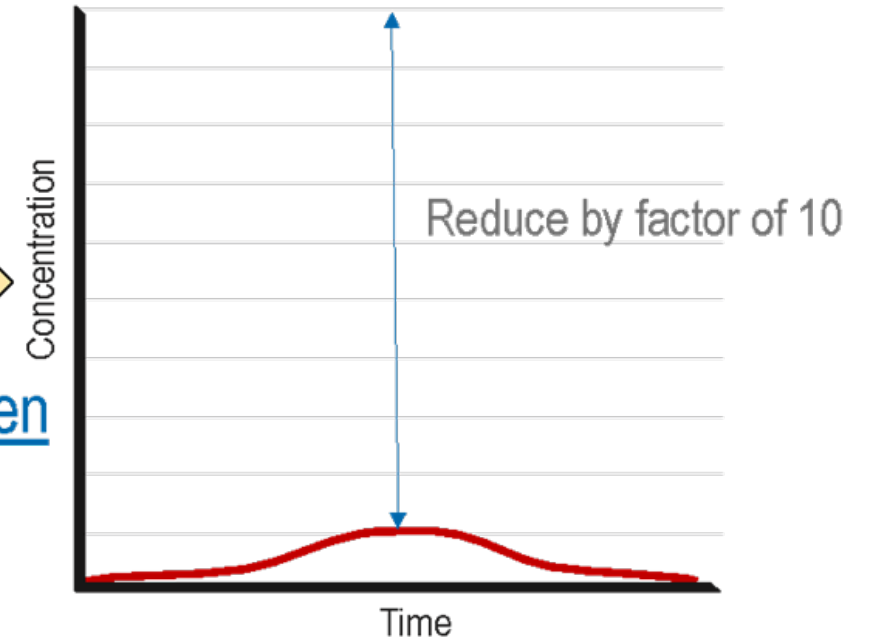
Chemical Control – Peak Attenuation



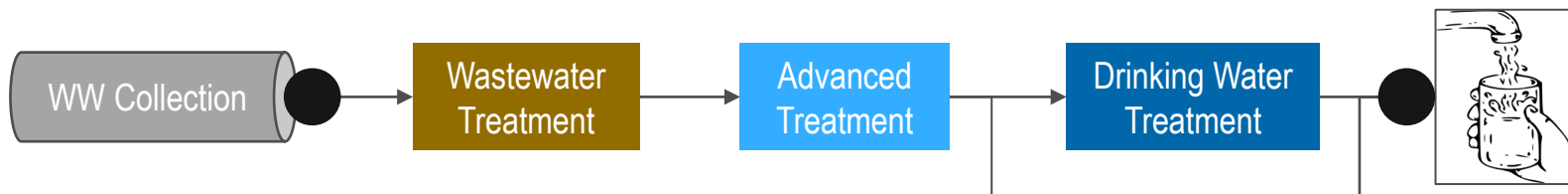
Ability to attenuate a
1-hr elevated concentration...



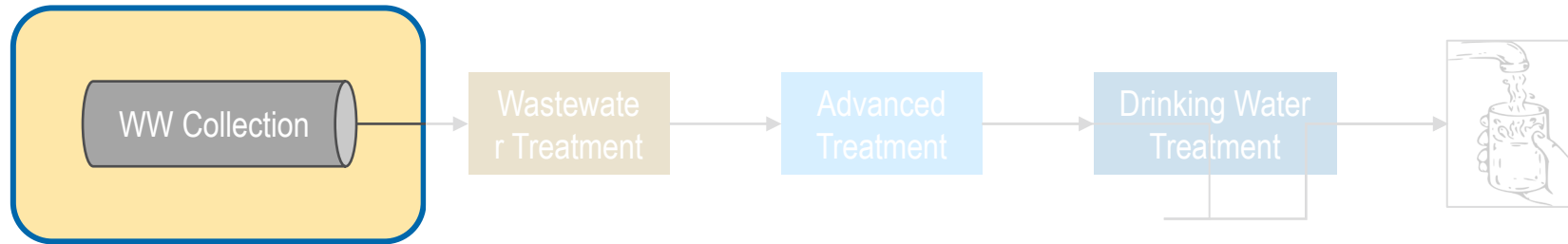
...by a factor of ten



...via longitudinal mixing.

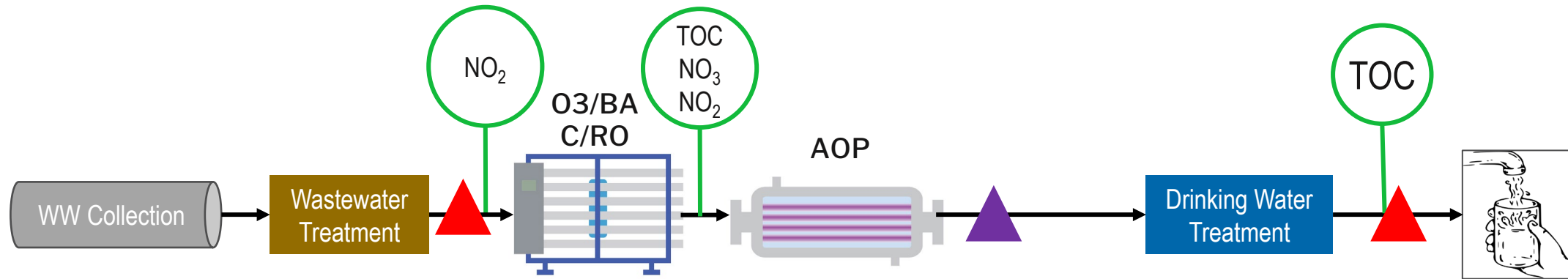


Source Control



- ✦ Baseline requirements are the same as indirect potable reuse
- ✦ New requirements include:
 - Local limits utilized to identify and limit contaminants in wastewater
 - Source control committee
 - 5-year audit by independent party
 - Early warning program
 - Online monitoring
 - Notification of failures
 - Community outbreak surveillance

Chemical Control – Water Quality Monitoring



3 Sampling Locations:

Wastewater feed

Post AOP

Finished water

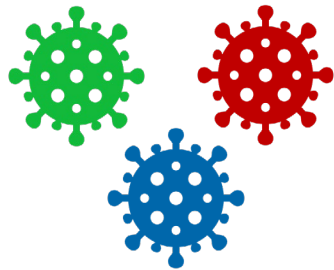
- **Weekly** sampling of acutes in finished water
- **Monthly** sampling at all 3 locations
 - *MCLs, NLs, lead, copper*
 - *Low molecular weight compounds*
 - *Byproducts & precursors*
 - *Business/household sources of chemicals*
- **Quarterly** sampling at all 3 locations
 - *Industrial sources and business/household pharmaceuticals, PCPs, and hazardous substances*
 - *CECs based on State Board Advisory Bodies and scientific literature*
 - *List of prescribed chemicals*

Pathogen Control

Giardia



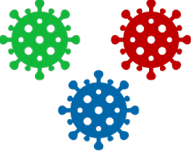


Virus



Cryptosporidium

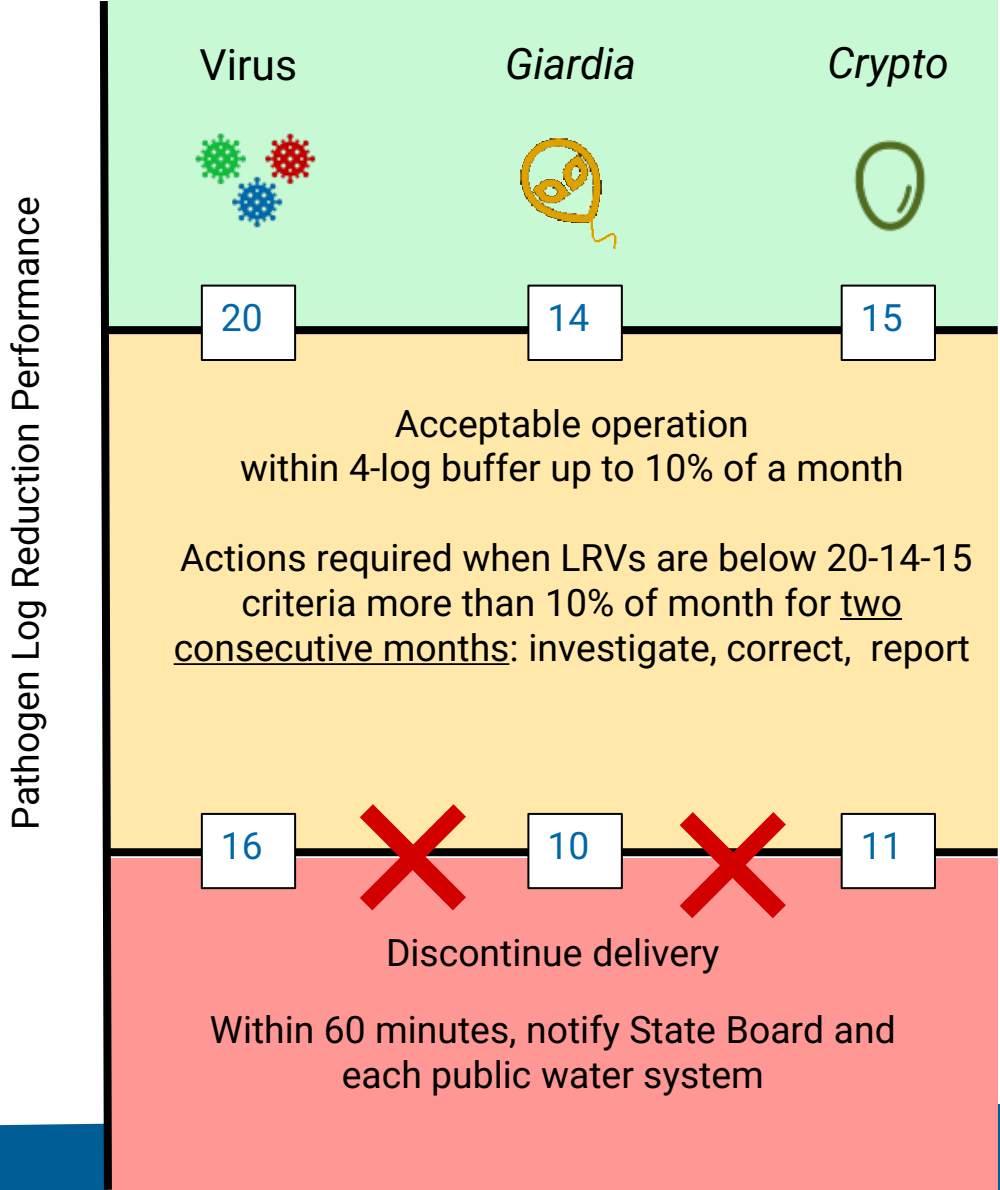


Pathogen Control

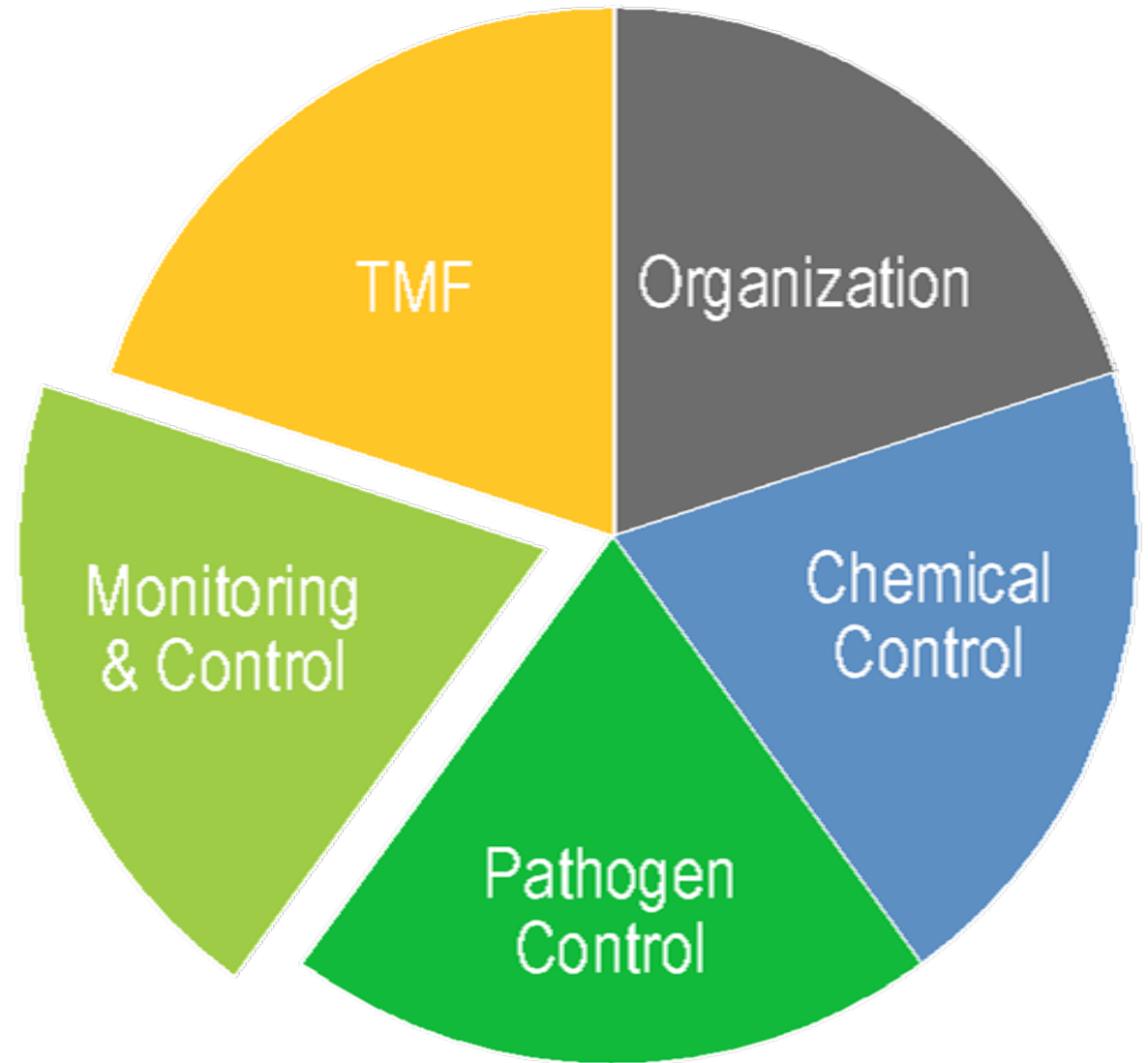
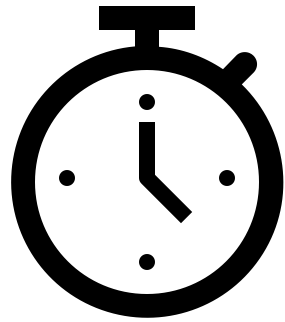
	Groundwater Recharge	Surface Water Augmentation	Direct Potable Reuse
Virus 	12	12 to 14	20
Giardia 	10	10 to 12	14
Cryptosporidium 	10	10 to 12	15

- ✦ 4 processes providing at least 1-log for each pathogen
 - ✦ *GWR is 3 processes total*
 - ✦ *SWA is 2-3 processes total*
- ✦ 3 mechanisms for each pathogen :
 - ✦ *UV inactivation (300 mJ/cm²)*
 - ✦ *Physical separation*
 - ✦ *Chemical inactivation*
- ✦ Alternative mechanisms may be approved
 - ✦ *Must include 'physical' and 'inactivation'*

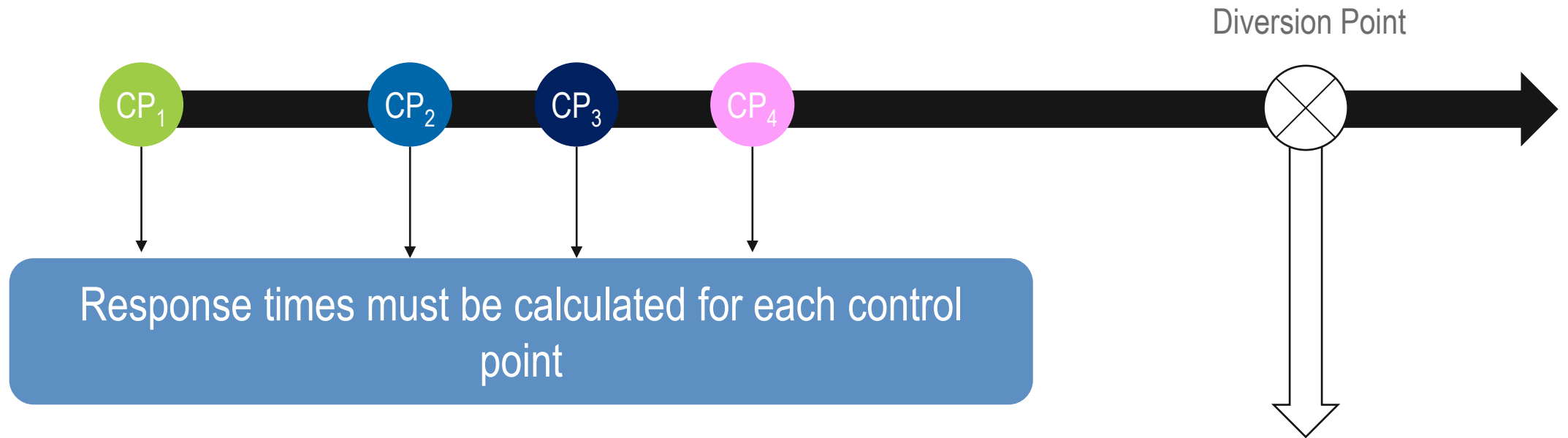
Pathogen Control



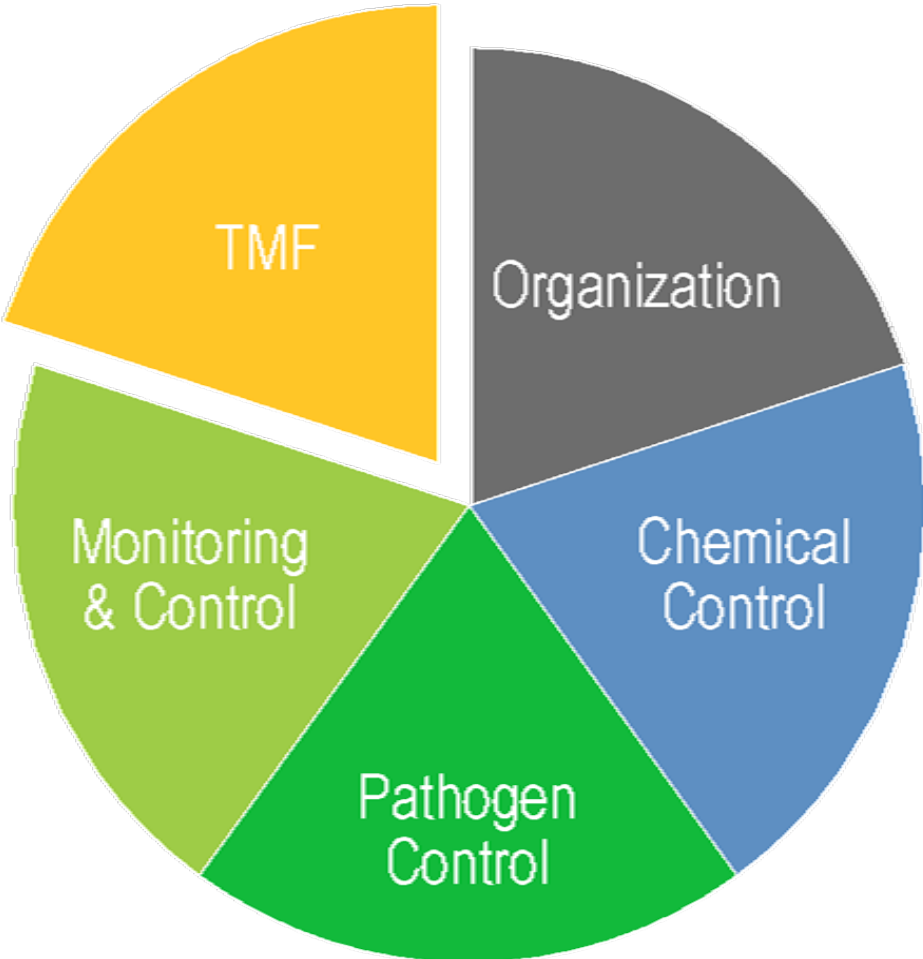
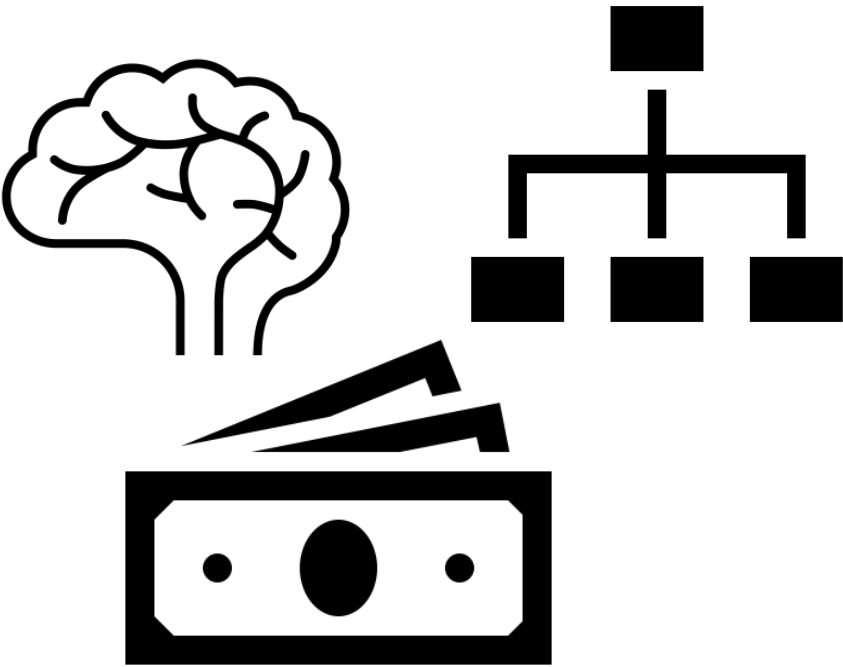
Monitoring & Control



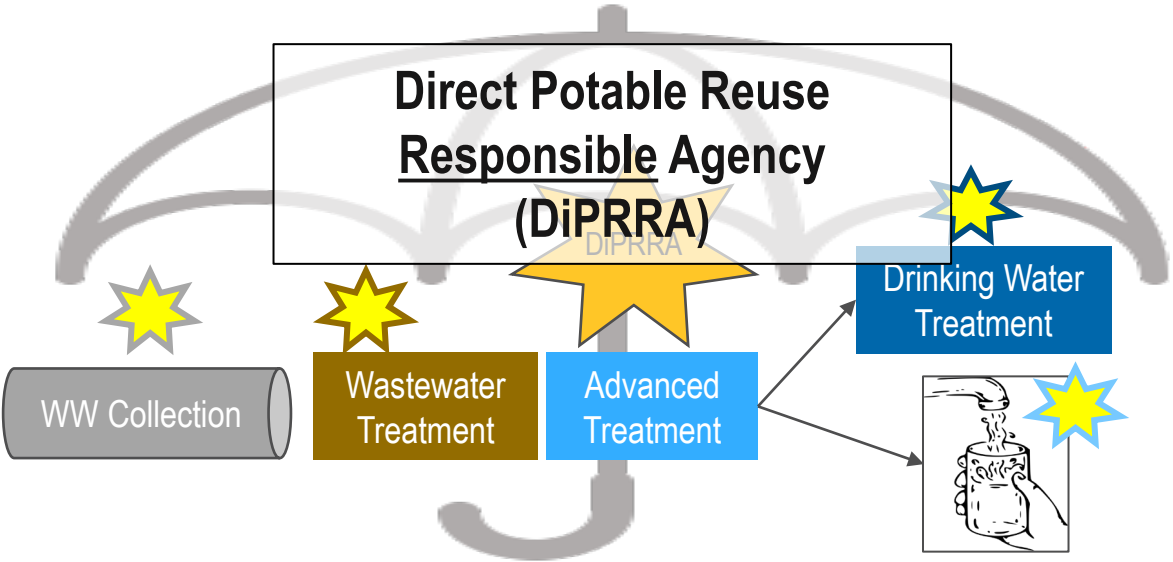
Response Time – Pathogens & Acute Chemicals



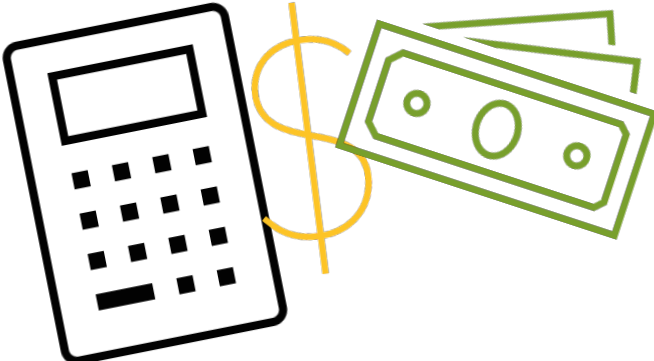
Technical, Managerial, Financial Capacity



TMF – Capital Preparedness & Responsibility



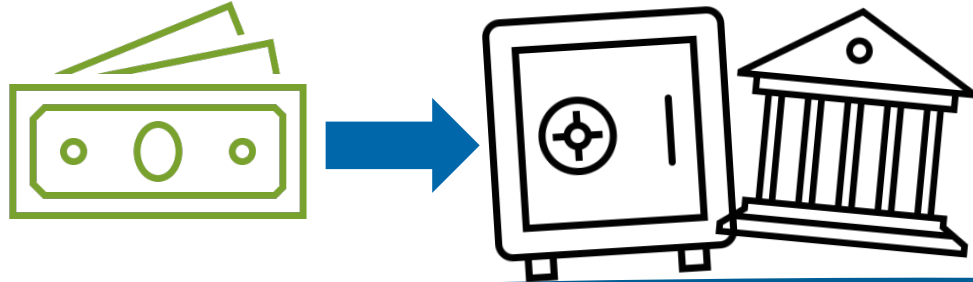
Cost analysis required



Reliable and continuing funding sources must be identified for O&M, and capital replacement

Participating agencies must provide details on facilities, staffing, and support services

An icon showing a building, four stylized human figures, and a hand holding a document, representing the provision of details on facilities, staffing, and support services.



TMF Requirements

Project Development:

- Engineering Report
- Joint Plan
- Source Control Program
- Water Safety Plan

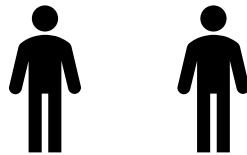
Project Startup:

- Operations Plan
- Monitoring Plan
- Pathogen and Chemical Control Point Monitoring & Response
- Corrosion Control and Stabilization Plan

Ongoing Compliance:

- Annual Report
- Monthly Compliance Report
- Cross-Connection Control Survey (Annual)
- Consumer Confidence Reporting
- Water Safety Plan (audit every 5 years)
- Source Control Program (audit every 5 years)
- Source Control Committee Formation
- On-going training program
- Annual Climate Change Report

DPR Operator Staffing & Certification



Chief
Operator

AWT5

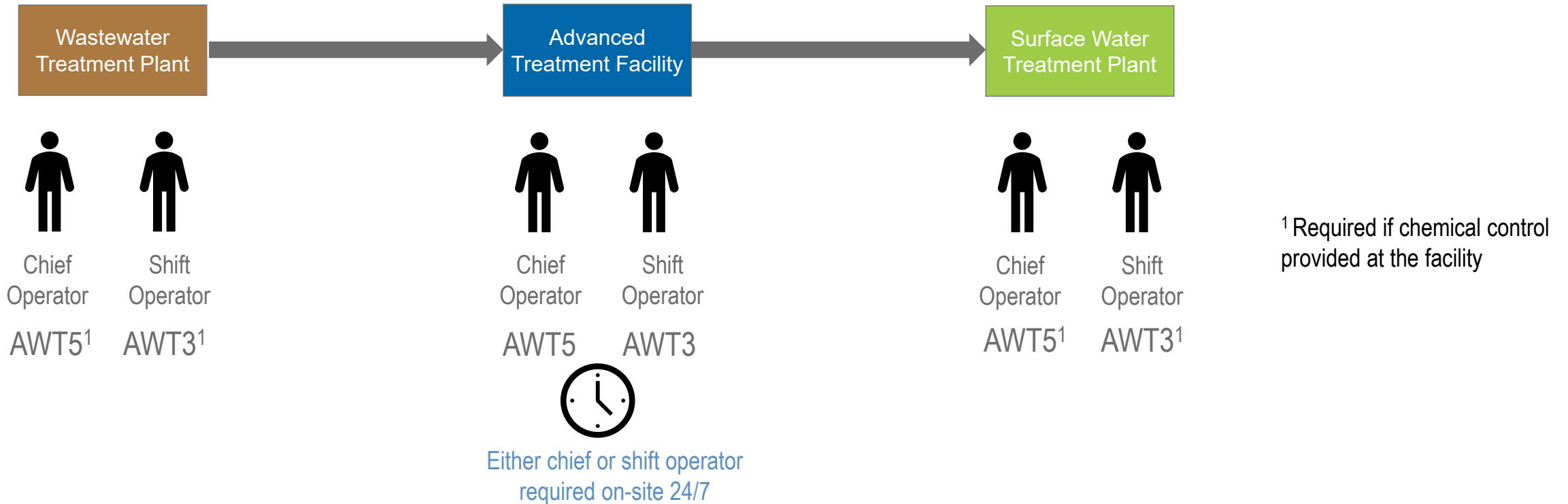
Shift
Operator

AWT3

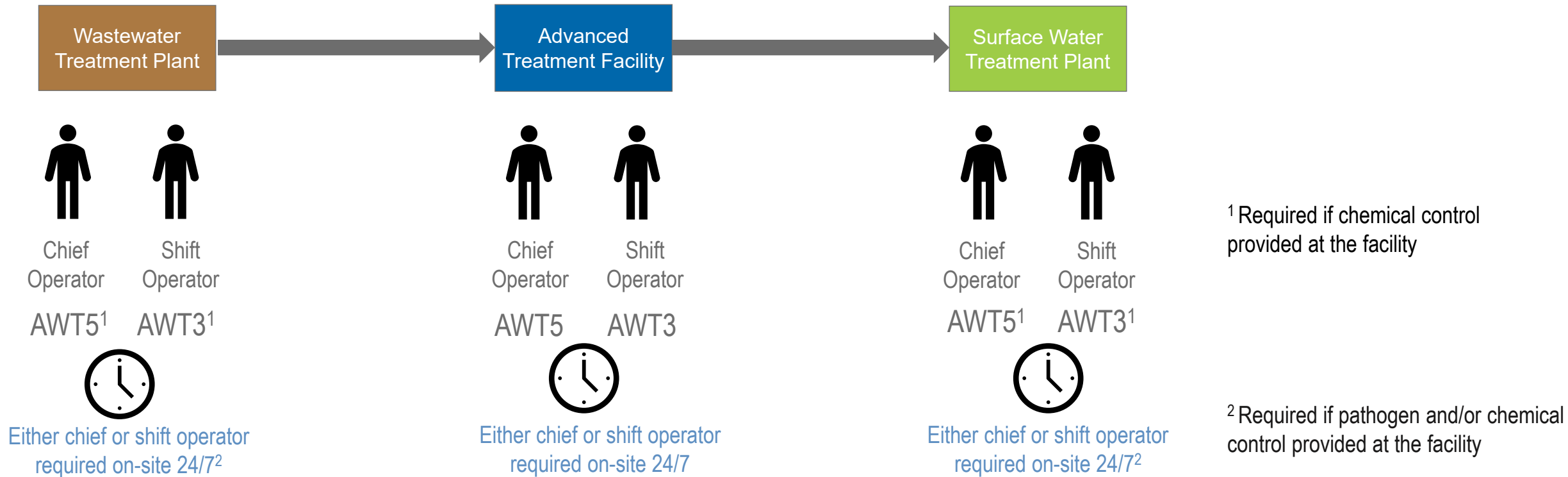


Either chief or shift operator
required on-site 24/7

DPR Operator Staffing & Certification

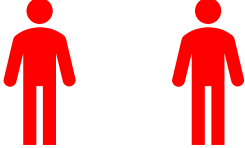


DPR Operator Staffing & Certification



DPR Operator Staffing & Certification

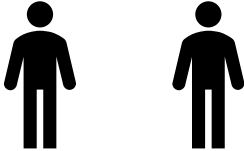
Entire Treatment Train

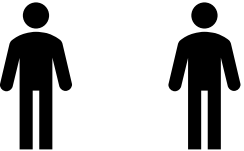
Chief Operator T5

 Shift Operator T3

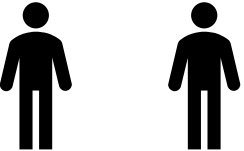
Wastewater Treatment Plant

Advanced Treatment Facility

Surface Water Treatment Plant


 Chief Operator AWT5¹
 Shift Operator AWT3¹


 Chief Operator AWT5
 Shift Operator AWT3


 Chief Operator AWT5¹
 Shift Operator AWT3¹

¹ Required if chemical control provided at the facility



Either chief or shift operator required on-site 24/7²

Either chief or shift operator required on-site 24/7

Either chief or shift operator required on-site 24/7²

² Required if pathogen and/or chemical control provided at the facility

Summary of DPR vs. IPR

- DPR regulations are a major success for CA reuse industry!
- Loss of environmental buffer leads to significant increase in DPR requirements
 - *Higher pathogen requirements: 20/14/15 vs. 12/10/10*
 - *Additional chemical treatment control: O3/BAC plus full advanced treatment*
 - *More water quality sampling: more locations, greater frequency, more compounds*
 - *Higher TMF requirements: greater coordination, more plans and reporting*
 - *Greater operator staffing requirements, additional AWTO certification required*
- DPR offers a new set of benefits (and costs) to complement IPR options

Questions?

Brian Pecson

brianp@trusselltech.com