Overview of Draft Surface Water Augmentation Regulations

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What is Surface Water Augmentation?

• Intentional placement of recycled water into a reservoir that supplies drinking water
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Regulatory Requirements

• Chemical
  - NDMA
  - Bisphenol A
  - PFOA

• Pathogen

• Treatment

• Reservoir-specific considerations
Chemical Requirements

• Satisfy drinking water standards
  – Maximum Contaminant Levels
  – Notification Levels
• Control of unregulated chemicals
  – Pharmaceuticals
  – Personal care products
  – Fire retardants
• No degradation of existing water source
Pathogen Requirements

**Virus**: 12-log removal $\rightarrow$ 99.9999999999%

**Giardia**: 10-log removal $\rightarrow$ 99.9999999999%

**Crypto**: 10-log removal $\rightarrow$ 99.9999999999%
Treatment Requirements

• Full advanced treatment
  – Reverse osmosis
  – Advanced oxidation

• Multiple barriers
  – Maximum of 6-log removal for a single process
  – Minimum of 3 processes with \( \geq 1.0\)-log removal
Reservoir-Specific Considerations

How do we make sure our cup of reliability...
Reservoir-Specific Considerations

How do we make sure our cup of reliability...

...is full?
Addressing Failure in Groundwater Recharge

• Plugs of off-spec water spend long periods (i.e., months) in the environmental buffer

• Aquifer provides time to detect and respond to treatment issues
Addressing Failure in Reservoir Augmentation

• Despite long residence times \((V/Q_{out})\), peaks can be seen at the reservoir outlet shortly after failures
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Addressing Failure in Reservoir Augmentation

- Despite long residence times ($V/Q_{out}$), peaks can be seen at the reservoir outlet shortly after failures.

Even with $V/Q_{out}$ of 4-6 months...

...see peak concentration after 1 day.
Reservoir-Specific Considerations

- Retention time \((V/Q_{\text{out}})\)
  - Default of 180 days
  - DDW can approve \(V/Q_{\text{out}}\) as low as 60 days
    - Additional 1-log removal required if < 120 days

- Dilution at reservoir outlet
  - 100:1 dilution (max 1% inlet flow at outlet)
  - 10:1 dilution w/ +1 log removal (max 10% inlet flow at outlet)
**Reservoir-Specific Considerations**

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Reservoir-Specific Considerations

• Credit for drinking water treatment plant
  – 12/10/10 for virus/Giardia/Crypto
  – Drinking water treatment credits of 4/3/2 included
  – Advanced treatment requirements
    • 8/7/8 V/G/C removal with 100:1 dilution
    • 9/8/9 V/G/C removal with 10:1 dilution
SWA Regulations Summary

- Builds off groundwater recharge regulations
- Adds requirements for using a reservoir
  - Minimum retention time \((V/Q_{\text{out}})\)
  - Minimum 24-hr dilution (100:1 or 10:1)
- Include DWTP log removal

Public comments accepted until September 12
Questions?

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