Presentation and Discussion Item 13

FREE CHLORINE CONVERSION EFFICACY

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December 11, 2024

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Nitrification Mitigation Strategies

Water Quality Monitoring Program

Water System Demand Optimization Model

Well Automation and Pilot Reservoir Management System

Temporary Free Chlorine Conversion

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Free Chlorine Conversion

- **Full-scale Free Chlorine Disinfection**
  - Testing March 4 – April 1, 2024
  - Only clear groundwater wells used

- **Testing and Monitoring**
  - Existing plan
  - Select additional monitoring

State Water Resources Control Board
Division of Drinking Water

Sent via email: tracym@mesawater.org

December 8, 2023

Ms. Tracy E. Manning, Chief Operating Officer
Mesa Water District
1965 Placentia Avenue
Costa Mesa, CA 92627

Dear Ms. Manning:

SYSTEM NO. 3010004 – ... FREE CHLORINE CONVERSION ...

Thank you for the email dated November 21, 2023 ... by Ray Lee of your staff, submitting Mesa Water District's Test Plan (Reversal Plan) for a temporary switch from chloramine to free chlorine disinfection of the distribution system. This plan aims to mitigate seasonal nitrification issues by limiting ammonia for ammonia-oxidizing bacteria. The switch will affect the entire distribution system for a duration of up to two months and might recur as needed based on test results. The Division approved a similar temporary chlorination conversion plan in 2014 which was implemented for a period of 28 days according to the District.

As described in the Plan, the District will inform the public in advance about this change. During the conversion, the system will rely on seven clear groundwater wells, dosed with 1.0 mg/L free chlorine without ammonia. The Mesa Water Reliability Facility (MWRF) or the Metropolitan Water District of Southern California (MWDSC) connections will be used only as necessary.

The Plan outlines the startup and reversal processes for this conversion:

Startup:

- Lower reservoir levels as much as possible.
- Cease ammonia and adjust sodium hypochlorite to achieve 0.8 – 1.0 mg/L free chlorine at all clear wells.
- Use these wells to meet demand while the reservoirs are offline, and breakpoint chlorinated to 0.5 ppm free chlorine.
- Weekly nitrite monitoring at five sample sites and two reservoirs.

E. Joaquin Esquivel, chair | Eileen Sobeck, executive director

2 MacArthur Place Suite 100, Santa Ana, CA 92707 | www.waterboards.ca.gov

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Free Chlorine Conversion Results

Distribution System Total Chlorine
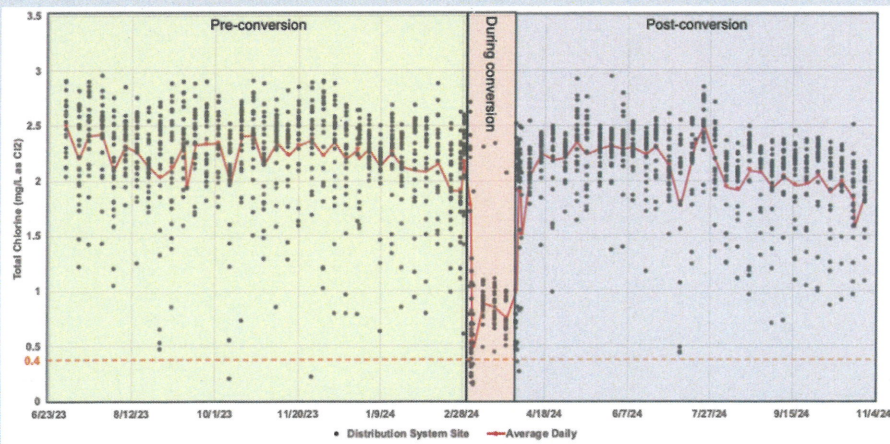
- Well above target

- Consistent

- Post-conversion less variability
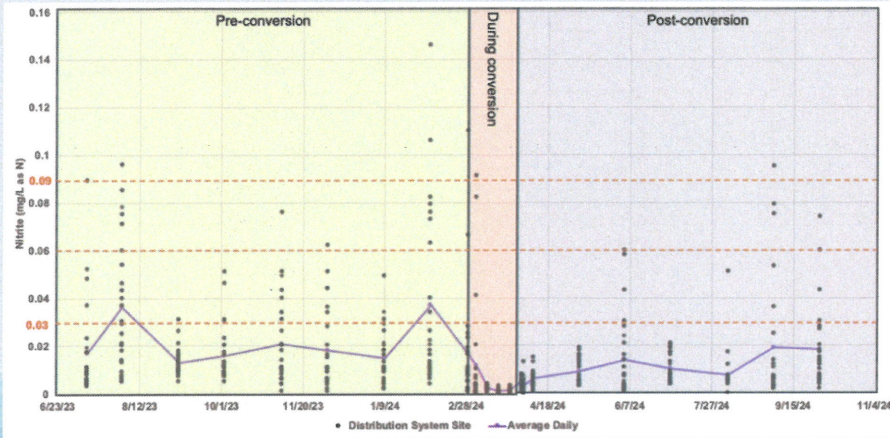
- Stable residual allows for lower setpoint

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Free Chlorine Conversion Results
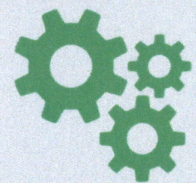
Distribution System Nitrite

- Very low values during testing
- System average dropped, post-conversion
- Below action levels in Nitrification Monitoring & Action Plan

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Conclusions

- Nitrite was reduced with free chlorine conversion
- Multi-pronged nitrification mitigation strategy is effective
- Recommendations
  - Implement temporary free chlorine conversion as needed using existing Nitrification Monitoring and Action Plan

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THANK YOU!

Emily Owens-Bennett, P.E., BCEE
emilyo@trusselltech.com
Trussell Technologies, Inc.

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