DPR Criteria Expert Panel Meeting 2
December 1, 2021

CALIFORNIA
Water Boards

Division of Drinking Water

Topics We Will Cover

- Addressing RWA and TWA in the DPR Criteria
- Pathogen Treatment Alternatives in the DPR Criteria
- Drinking Water Distribution System Requirements

Addressing RWA and TWA in the DPR Criteria §64669.45 and §64669.50

Bob Hultquist, PE
Principal Engineer (ret)

CALIFORNIA
Water Boards

Division of Drinking Water

Statute

- Raw water augmentation - the planned placement of recycled water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant
- Treated drinking water augmentation - the planned placement of recycled water into the water distribution system

- The difference between RWA and TWA could include transport time, blending with a raw DW source, and a SWTP – but they are not necessitated by the definition.

Regulation Approach Options

- Develop a RWA regulation by building on the RWA definition to specify clear benefits that could occur – such as a minimum blend and a SWTP – but this narrows the scope of the statute and requires justification of the minimums, or
- One set of criteria with consideration for any RWA benefits.
- Regardless of the approach, the health protective features of RWA must be understood and quantified if RWA and TWA are to be consistent in risk management approach.
- SWB chose to develop one comprehensive DPR regulation.

Consideration of RWA Benefits

- Blending dilutes wastewater contaminants
  - Blending to eliminate the need for Ozone/BAC (64669.50(b))
    - Ozone/BAC must be designed to reduce specified chemicals by 1-log. A 9:1 dilution accomplishes the same thing.
  - Blending to reduce the fraction of flow treated by Ozone/BAC (64669.50(b))
    - Blending to dilute the recycled water between 9:1 and 1:1 allows a fraction of the recycled water flow to be treated such that the entire flow meets the 1-log treatment objective. Dilution less than 1:1 offers scant treatment downsizing benefit.

Another Blending Credit

- Blending to reduce the threat from discharges of low molecular weight chemicals (64669.50(I))
  - A reclaimed water TOC limit of 0.5 mg/L is set to control the magnitude of low-molecular-weight-chemical discharges that could pass through RO. An equation is used to allow blending to be taken into account as a mitigation for the threat. If the RO permeate is going to be diluted, a higher TOC level in the permeate is tolerable.

SWTP LRV Credit

- SWTP LRV validation (64669.45(a)(2))
  - The criteria recognize Surface Water Treatment Rule approved validation methods for membranes and disinfection, and
  - Pilot testing for media filter validation is accepted.

Pathogen Treatment Alternatives in the DPR Criteria

Bob Hultquist, PE
Principal Engineer (ret)

CALIFORNIA
Water Boards

Division of Drinking Water

- The DPR criteria allow alternatives to the specified chemical treatment technologies.

- It has been suggested the criteria also allow alternatives to pathogen control treatment requirements.

- The criteria don't specify treatment technologies for pathogens. They require log reduction validation for whatever treatment is used [64669.45 (a)(3)].

Section 64669.45 (a)(1)

- The subsection promotes multibarrier treatment by requiring for each pathogen type at least four treatment process that provide a minimum of 1-log reduction each, and no more than 6-log may be credited to any single process.

- The section does not limit the number of treatment processes that can be used to meet the log reduction targets.

- The section does not require that each process achieve at least 1-log.

Section 64669.45 (a)(2)

- The subsection promotes the use of diverse treatment mechanisms and specifies the use of three mechanisms that have been demonstrated to be effective for indirect potable reuse.

- The section does not require that the specified treatment mechanisms provide all or most of the required log reductions.

- Other treatment mechanisms could be used for the bulk of the required log reductions.

Log Reductions by Chemical Treatment

- Substantial log reductions are achieved by the required pathogen reduction mechanisms due to the required chemical treatment processes – Ozone/BAC, RO, and AOP.

- Should alternatives be demonstrated and approved for these processes the requirement for diverse pathogen could have more significance.

- We don’t believe the pathogen control requirements significantly impede the validation of innovative technologies for pathogen log reductions.

- It is, of course, easier to use treatment that has already been validated, including full advanced treatment and many conventional wastewater and surface water treatment processes.

Drinking Water Distribution System Requirements

Jing Chao, PE
Senior Sanitary Engineer
Technical Specialist

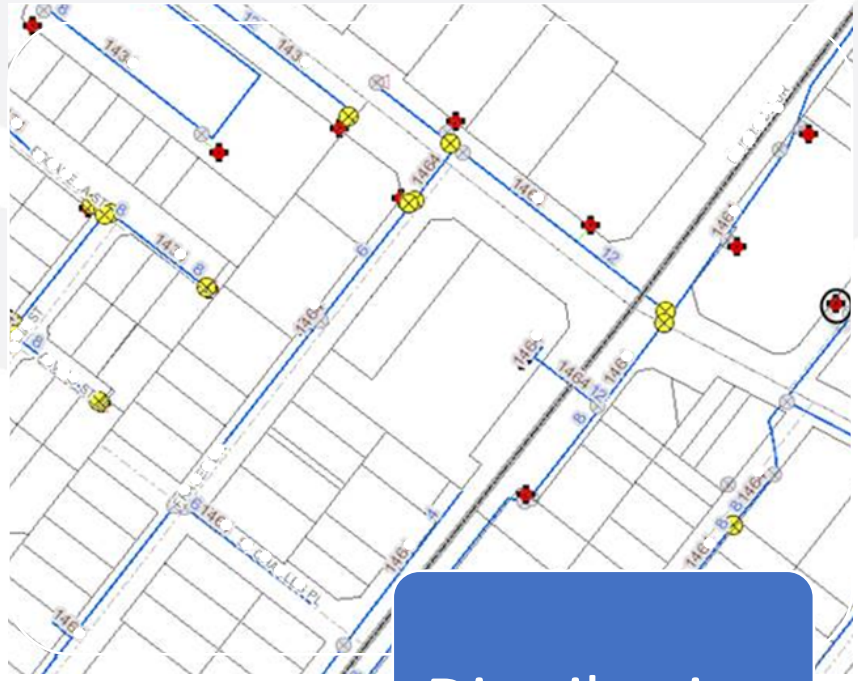
CALIFORNIA
Water Boards

Division of Drinking Water

Drinking Water Distribution System

Source

Treatment



Distribution

Regulations Governing Distribution System Water Quality

- Lead and Copper Rule §64670 et seq
  - PWS must demonstrate Optimized Corrosion Control
  - Large PWS must conduct Corrosion Control Study, unless it can demonstrate through water quality monitoring data that it has already optimized corrosion control
  - Medium and small PWS must conduct Corrosion Control Study if required by DDW.

Regulations Governing Distribution System Water Quality

- Lead and Copper Rule
  - Corrosion Control Study Procedure §64683
    - Evaluate effectiveness of treatment or combination of treatments: alkalinity, pH, or calcium hardness adjustments, or addition of corrosion inhibitor
    - Evaluate using either pipe rig/loop tests, metal coupon tests, partial-system tests
    - Measure Water Quality Parameters before/after applying treatment: lead copper, pH, alkalinity, calcium, conductivity, corrosion control inhibitor, temperature
    - Identify constraints that limit or prohibit use of a proposed treatment
    - Evaluate the effect of the chemicals used for corrosion control treatment on other water treatment processes
    - Recommend a corrosion control treatment based on the results of the corrosion control study for DDW review and approval
    - Specify WQP acceptable limits/range of values

Regulations Governing Distribution System Water Quality

- Lead and Copper Rule
  - PWS must demonstrate Optimized Corrosion Control
  - Lead and Copper monitoring in distribution system §64670 et seq
    - Action Level calculated using the 90th percentile (not maximum!) lead/copper concentrations detected
    - # of samples based on PWS size (5 – 100 homes for standard monitoring, 5-50 homes for reduced monitoring)]
    - Representative sampling locations (at the tap) selection risk-based using information on pipe/plumbing materials, age/type of structures/homes
    - Sampling frequency: 6-month, annual, triennial
  - Water Quality Parameter monitoring §64680 et seq
    - pH, alkalinity, calcium, conductivity, water temperature, and orthophosphate/silica (as appropriate if adding corrosion inhibitor)

Regulations Governing Distribution System Water Quality

- Lead and Copper Rule
  - Exceed Lead Action Level ?
    - Notify resident
    - Investigate source and source treatment §64684 et seq
    - Install treatment
    - Return to standard lead and copper monitoring
    - Public education §64687
    - Lead service line monitoring and replacement §64688, §64689

Regulations Governing Distribution System Water Quality

- Total Coliform Rule
  - Requirements to control bacterial growth
  - Coliform bacteria monitoring @ representative locations based on system size and population served (60 – 480 samples per month for a large water system)
  - Repeat sampling if total coliform positive samples found, investigate source of contamination
  - Detect significant rise in bacterial counts → investigate potential contamination 64426
  - Submit TCR Monitoring Plan
  - E. coli bacteria MCL exceedance → public notification

Regulations Governing Distribution System Water Quality

- Surface Water Treatment Rules
  - Requirement to maintain a disinfectant residual (control bacterial growth for Legionella)
  - Residuals monitoring @ entry point and @ representative locations in the distribution system based on water system size (sample at same locations as TCR Monitoring Plan)
  - Sampling for HPC bacteria
  - Residual must be detectable (or HPC <500 CFU/mL) in 95% of samples collected in the distribution system.

Regulations Governing Distribution System Water Quality

- Disinfectants/Disinfection Byproduct Rules
  - Requirements to control DBP formation (TTHM, HAA5)
  - Initial Distribution System Evaluation → Identify “hot spots”
  - DBPR Monitoring Plan
    - Quarterly or annual sampling frequency
    - DBP monitoring at representative hot spots in distribution system
    - 2 – 20 monitoring locations in distribution system, depending on systems size for standard monitoring, less for reduced monitoring.
  - Disinfection Byproduct Precursors Monitoring (surface water)
  - Treatment technique for disinfection byproduct precursors control (TOC reduction requirements)

Regulations Governing Distribution System

- California Waterworks Standards
  - Water main materials and installation
  - Pipeline separation requirements
  - Tank materials and construction
  - Flow meters, flushing, isolation, air valve installation/construction requirements
- Water System Operations and Maintenance Plan
  - Develop and submit if directed by DDW
  - Can include schedule and procedures for flushing water mains, inspection of water mains, tanks, etc., program for control of organisms in water mains, etc.
  - Nitrification Action Plan

Proposed Criteria – Corrosion Control and Stabilization 64669.110

- (a) A DiPRRA shall provide water that is stabilized as agreed upon by the DiPRRA and a public water system receiving advanced treated water or finished water from the DPR project.
- (b) Prior to delivery of water from a DPR project, a DiPRRA and a public water system receiving advanced treated water or finished water shall jointly submit a Corrosion Control and Stabilization Plan to the State Board for review and written approval describing how it will assess and address potential impacts resulting from the introduction of advanced treated water into a water treatment plant and/or introduction of finished water into a drinking water distribution system. At minimum, the plan shall include information on:

Proposed Criteria – Corrosion Control and Stabilization 64669.110

- …At minimum, the plan shall include information on:
- (1) Maintaining chemical and microbial stability in the drinking water distribution system as the drinking water quality changes with anticipated increasing fractions of finished water;
- (2) Maintaining treatment effectiveness throughout the water treatment plant as the source water quality changes with anticipated increasing fractions of advanced treated water;
- (3) Assessments to be performed prior to and during operation of the DPR project with respect to paragraphs (1) and (2);