WATEREUSE LA CHAPTER MEETING - INITIAL EXPANSION OF OCWD GWRS

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INITIAL EXPANSION OF ORANGE COUNTY WATER DISTRICT'S GROUNDWATER REPLENISHMENT SYSTEM
OCWD GWRS PROJECT OBJECTIVES

- Protect groundwater basins from seawater intrusion
- Replenish local groundwater supplies
- Provide multi-barrier treatment system to meet drinking water requirements
MULTI BARRIER TREATMENT SYSTEM

• MF Pretreatment
  • Hollow fiber PVDF membranes, 0.2 um pore size
  • Removes bacteria, protozoa, and suspended solids

• RO Membranes
  • Removes dissolved solids, viruses, organic compounds (including pharmaceuticals), etc.
  • Concentrate blended with WWTP effluent and discharged to ocean

• Advanced Oxidation – UV/H₂O₂
  • Low pressure, high output system
  • Destroys trace organics
  • Removes NDMA and 1,4 Dioxane

• Post-Treatment Stabilization
  • Decarbonation to raise pH
  • Lime addition to stabilize RO permeate
EXPANSION PROVIDED AN OPPORTUNITY TO ENHANCE OPERATIONS AND RELIABILITY

- Secondary effluent flow equalization provided to minimize diurnal flow variations and maximize production
- Incorporated energy recovery devices (ERD) to new RO units to reduce energy consumption and prolong membrane life
- New RO building layout to improve accessibility to basement and pipe gallery
- Pilot tested and implemented new lime slurry system to enhance post-treatment reliability
INCORPORATE ENERGY RECOVERY DEVICES TO REDUCE ENERGY CONSUMPTION

- Annual energy savings of approximately $17k per RO unit
- Payback period of ERDs is approximately 5 years
IMPROVED OPERATION ACCESS IN NEW RO BUILDING
ALTERNATIVE POST-TREATMENT TARGET TO IMPROVE STABILITY AND RELIABILITY IN WATER QUALITY

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Current Goal</th>
<th>Alternative Target</th>
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<tbody>
<tr>
<td>pH</td>
<td>8.5 to 8.8</td>
<td>7.6 to 7.9</td>
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<tr>
<td>Alkalinity, mg/L as CaCO₃</td>
<td>40</td>
<td>40 to 50</td>
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<tr>
<td>Calcium, mg/L</td>
<td>3 to 4</td>
<td>10 to 13</td>
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<tr>
<td>Hardness, mg/L as CaCO₃</td>
<td>7 to 10</td>
<td>25 to 33</td>
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<tr>
<td>Free Carbon Dioxide, mg/L</td>
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<td>&lt; 3</td>
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<tr>
<td>Buffer Intensity</td>
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<td>0.100</td>
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<tr>
<td>CCPP, mg/L as CaCO₃</td>
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<td>-3</td>
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- Alternative target mimics rain water quality for groundwater replenishment
- Increased buffer intensity improves reliability
- Increased calcium content better protects cement mortar lined pipes
- Alternative target minimizes transport of metals within groundwater supply
LIME SYSTEM IMPROVEMENTS

Existing Lime Slurry System

• Existing system is a flow paced system that is ramped up and down based on flow conditions (inconsistent reaction times in slurry make-up tank)
• Dry lime transfer system is susceptible to plugging and is controlled by screw conveyer speed
• Unable to keep up with peak lime demands

New Lime Slurry System (RDP Lime Slaker System)

• Lime slurry make-up is controlled by weight, providing a greater level of accuracy over the existing flow paced system
• Temperature controlled system to maintain optimum reaction conditions
• Dry lime transfer system is not susceptible to plugging
PHOTOS OF RDP SLAKING SYSTEM PILOT TEST

Lime Slaker Tank

Lime Slurry Aging Tank

Slurry Transfer and Feed Pump

Lime Slurry Feed Assembly
CONSTRUCTION PHOTOS
Building a world of difference.

Together

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