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Orange County Sanitation District
Odor Control Chemical Scrubber
Bleach Only Mode of Operation - OCSD’s Experience

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General Information

• **Two Treatment Plants**
  – Plant 1 - Fountain Valley
  – Plant 2 - Huntington Beach

• **About 100 MGD treated at each Plant**

• **Treat wastewater for 80% of Orange County residents**

• **Final effluent**
  – GWRS
  – Ocean outfall
Plant 1 – Fountain Valley
Plant 2 – Huntington Beach
General Odor Control Strategy

• **Collections Systems**
  - Chemical odor control
    - Ferrous chloride, magnesium hydroxide, calcium nitrate, caustic
    - Headspace 25 ppm H2S target

• **Treatment Plants:**
  - Chemical scrubbers
  - Biofilters and biotrickling filters
  - Activated carbon
    - AQMD Permit levels – 1 to 3.5 ppm H2S
Plant 1 Chemical Scrubbers

• **Headworks**
  – Roughing Scrubbers – inlet H$_2$S loading 10 – 35 ppm
    ▪ One biotrickling filter
    ▪ One chemical
  – Finishing scrubbers – inlet H$_2$S loading: 1 – 5 ppm

• **Primary Treatment**
  – Inlet loading H$_2$S: 0 – 5 ppm
    ▪ Chemically enhanced primary treatment
Chemical Scrubbers

• \( \text{H}_2\text{S}, \) \( \text{pH} \) and chlorine monitoring – Vapex

• PLC controlled

• Originally until about a year ago
  — Operation in manual caustic + bleach mode
    ▪ About 9.5 \( \text{pH} \) and bleach at 2 gph
Chemical Scrubbing Process Concept

Foul Air

Overflow

Drain

Makeup Water

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pH Curve - Hydrogen Sulfide Dissociation

Increasing Calcium Precipitation Potential

$\text{H}_2\text{S} \rightleftharpoons \text{HS}^-$
Caustic Use Impacts
Scrubbers Operation Mode Change

• **Drivers**
  
  – Maintenance
    ▪ Instrumentation and controls
    ▪ Media head loss
  – Reaction time to H$_2$S spikes
  – Chemicals usage and dependence
Scrubbers Operation Mode Change

- Initiated February 2012
  - Initially manual control mode
  - Currently in outlet $\text{H}_2\text{S}$ based control mode
Outlet H2S Control
Bleach Flow Strategy

<table>
<thead>
<tr>
<th>H2S Outlet</th>
<th>Bleach Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.3 PPM</td>
<td>1.0 GPH</td>
</tr>
<tr>
<td>0.5 PPM</td>
<td>2.0 GPH</td>
</tr>
<tr>
<td>1.0 PPM</td>
<td>5.0 GPH</td>
</tr>
<tr>
<td>2.0 PPM</td>
<td>7.5 GPH</td>
</tr>
<tr>
<td>3.0 PPM</td>
<td>9.0 GPH</td>
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</tbody>
</table>
Findings

• **Maintenance Impacts**
  - Decline in instrumentation maintenance
    • Frequency of service required
  - Increase the period between acid washing

• **Performance improvement**
  - System response

• **Chemicals usage**
Impeller Condition Difference

Bleach only mode service

Caustic - Bleach mode service
Scrubber Maintenance

Before Acid Wash

Caustic-Bleach mode service

Bleach only mode service

After Acid Wash

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Chemical Cost Savings
Next Steps

• Application to Plant 2 scrubbers
  — Primary Scrubbers
• Chemical use optimization
• Scrubber permit change
  — Headworks Scrubbers
    ▪ AQMD Permit constraints
Recommendations

• Consider utilizing bleach-only mode
  — Lower $\text{H}_2\text{S}$ loading
• Ensure flexible AQMD permit conditions
Questions?