Consolidation

• **Primary Audience:** Legislature

• **Objective:** Rapidly examine feasibility to discern order of magnitude costs to physically consolidate of out of compliance systems with in compliance systems

• **Approach:**
  1. Categorize systems
     1. In/out of compliance
     2. System size: Population and connections
  2. Use GIS utility boundary and area roadway layers to discern physical consolidation feasibility
  3. Assign costs based upon size and distance categories
Example
Proposition 50 Funded Nitrate Treatment Project

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Corona Environmental Consulting
Dr. Jeannie Darby
University of California, Davis

May 10, 2019
Problem Statement

- Nitrate is a persistent non-compliance issue
- Ongoing operations and maintenance is expensive
- Could managerial consolidation make nitrate treatment more feasible and/or cost effective?
Nitrate MCL Violations 2013 - 2016

Systems with Nitrate MCL Violations 2013 - 2016

Years in violation
- Yellow: 1 Year
- Orange: 2 Year
- Red: 3+ Years

USEPA SDWIS Data

Sources: U.S. EPA, Natural Earth, USGS.
Nitrate MCL Violations 2013 – 2016
USEPA SDWIS Data

National Summary: 1,208 Systems in 42 States/Primacy Agencies serving ~1.9 million people
Proposition 50 Project - Objectives

- $5M in grant funds to install and operate strong base anion exchange (SBA-IX) systems over a three-year period
- Minimize O&M costs by sharing:
  - Operations
  - Brine disposal
  - Salt delivery
Initial Project

Consolidated Management of SBA-IX for Nitrate Removal

Ionex – Equipment provider

Nitrate

RBG School

Nitrate

Woodville

Nitrate

LSID-Tonyville

Nitrate Perchlorate

Nitrate

Triple R
Initial Project

Consolidated Management of SBA-IX for Nitrate Removal

- RBG School: Nitrate
- Woodville: Nitrate
- LSID-Tonyville: Nitrate, Perchlorate
- Ionex—Equipment provider
- Triple-R: Nitrate
Project Changes

Consolidated Management of SBA-IX for Nitrate Removal

Alternative Equipment Providers
Site Design
Procurement Bid Documents
Full vs Partial Flow SBA-IX vs RO
Additional Site Improvements
Changing Costs
Arsenic

RBG School
Woodville
TCP
LSID-Tonyville
Nitrate
Nitrate Perchlorate

Nitrate

Nitrate

Nitrate
System Improvements
LSID - Tonyville
System Improvements
LSID - Tonyville

Current System Configuration

Friant Kern Canal → Surface Water Treatment → Chlorination → Storage Reservoir → Booster Pump → Hydro-pneumatic Tank → To Distribution System
System Improvements
LSID - Tonyville

Proposed System Configuration Option 1

- NLH Well
- Pre-Filter
- SBA-IX Perchlorate
- SBA-IX NO₃
- SBA-IX NO₃
- Chlorination
- Storage Reservoir
- Booster Pump
- Pressure Tank
- To Distribution System
- Brine Pump
- Brine Tank
- Spent Brine Tank
- Waste Brine
System Improvements
LSID-Tonyville

• Unique challenges
  • Existing surface water is of relatively high quality but groundwater treatment is still required
    • Largely due to periodic dry up of the Friant Kern Canal

  • Cost to treat is significantly more than that of surface water

  • Perchlorate and potentially arsenic in brine can limit disposal and comingling possibilities
Smaller ≠ simpler

The needs are unique and therefore so is the right solution

If details are not carefully considered the proposed solution may create long term water quality or operational challenges

A balance is needed between treatment system sophistication and operational requirements

There is a real need for continued improvement and innovation with nitrate treatment approaches
Affordability: What Does it Mean?

- Affordability is a subjective concept
  - It is normative; it involves judgment
  - There is no bright line; there is a continuum
- Affordability concerns large as well as small systems
- Affordability is a growing concern
  - Water bills already rising at pace > CPI
  - Real incomes of the poor are going down
<table>
<thead>
<tr>
<th>County</th>
<th>Rio Bravo</th>
<th>Tonyville</th>
<th>Woodville</th>
<th>CA</th>
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</thead>
<tbody>
<tr>
<td>County</td>
<td>KERN</td>
<td>TULARE</td>
<td>TULARE</td>
<td>-</td>
</tr>
<tr>
<td>Population Served</td>
<td>887</td>
<td>500</td>
<td>1673</td>
<td>-</td>
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<tr>
<td>Connections</td>
<td>16</td>
<td>50</td>
<td>467</td>
<td>-</td>
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<tr>
<td>Households</td>
<td>N/A</td>
<td>100</td>
<td>446</td>
<td>-</td>
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### Census Data

<table>
<thead>
<tr>
<th>Census Data Basis</th>
<th>School district</th>
<th>Tonyville CDP</th>
<th>Woodville CDP</th>
<th>State</th>
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<tbody>
<tr>
<td>Census CDP Population</td>
<td>4,451</td>
<td>684</td>
<td>1,770</td>
<td>38,982,847</td>
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<tr>
<td># Housing Units</td>
<td>1,466</td>
<td>121</td>
<td>453</td>
<td>12,888,128</td>
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<tr>
<td>MHI</td>
<td>$94,048</td>
<td>$48,859</td>
<td>$28,508</td>
<td>$67,169</td>
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<tr>
<td>20th Percentile Household Income</td>
<td>$34,702</td>
<td>$24,920</td>
<td>$15,191</td>
<td>$26,498</td>
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<tr>
<td>Unemployment Rate</td>
<td>9.8% +/- 5.6</td>
<td>10.4% +/- 12.0</td>
<td>12.7% +/- 5.0</td>
<td>7.7% +/- 0.1</td>
</tr>
</tbody>
</table>
Income Distribution

From the 2017 U.S. Census ACS 5 Yr (2013 – 2017)
Treatment Costs

- Average current water bill
- Average water bill with CM treatment

Excludes capital costs.
Estimated O&M Costs Tonyville

2020 With CM
- Labor: $22,500
- Chemical: $7,800
- Disposal: $8,700
- Other Costs: $4,200
- Contingency: $26,100

Sum: $69,300

2020 Without CM
- Labor: $40,000
- Chemical: $16,100
- Disposal: $12,400
- Other Costs: $59,200
- Contingency: $8,700

Sum: $136,000

Legend:
- Labor
- Chemical
- Disposal
- Other Costs
- Contingency
### Affordability Metrics

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Water Services</th>
<th>Organization</th>
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</thead>
<tbody>
<tr>
<td>1.5% of MHI</td>
<td>Drinking Water</td>
<td>CA SWRCB (SWRCB 2016)</td>
</tr>
<tr>
<td>2.5% of MHI</td>
<td>Drinking Water</td>
<td>US EPA (US EPA 2002)</td>
</tr>
<tr>
<td>3% of MHI</td>
<td>Drinking Water</td>
<td>United Nations (UNDP 2014)</td>
</tr>
<tr>
<td>2% of MHI</td>
<td>Wastewater</td>
<td>US EPA (US EPA 1997)</td>
</tr>
<tr>
<td>4.5% of MHI</td>
<td>Drinking Water and</td>
<td>US EPA (US EPA 2002)</td>
</tr>
<tr>
<td></td>
<td>Wastewater</td>
<td>US EPA (US EPA 1997)</td>
</tr>
<tr>
<td>7% – 10% of LQI</td>
<td>Drinking Water and</td>
<td>AWWA, NACWA, WEF</td>
</tr>
<tr>
<td></td>
<td>Wastewater</td>
<td>(Draft Report 2019)</td>
</tr>
</tbody>
</table>
Affordability Without Grant

*Includes current water bill, includes capital costs for treatment.*
Affordability Without Grant

*Includes current water bill, includes capital costs for treatment.
Affordability Without Grant

*Includes current water bill, includes capital costs for treatment.
Affordability With Grant

*Includes current water bill, excludes capital costs for treatment.*
Affordability With Grant

*Includes current water bill, excludes capital costs for treatment.*
Affordability With Grant

*Maintain current water bill, excludes capital costs for treatment.*
Affordability With Grant

Subsidy needed for household water cost to be < 1.5% of MHI

Affordability With Grant

Median Household Income

Subsidy needed for household water cost to be < 1.5% of MHI

Household water cost/MHI (%)

 LSID-Tonyville  Woodville

with CM  w/out CM  with CM  w/out CM

24%  60%  18%  45%

Affordability With Grant

Median Household Income

Subsidy needed for household water cost to be < 1.5% of MHI

Summary

• The grant to pay for capital is critical to affordability
• Nitrate treatment market place needs further development
• Consolidated management is expected to lower O&M costs
• Even with a capital grant and consolidated management the ongoing operation and maintenance is not affordable
Acknowledgements

- UC Davis – Dr. Jeannie Darby
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- DWR – Steve Giambrone, Mally Vue