FROM COP TO COLLABORATOR:
Facilitating Wastewater Nutrient Removal in Rural America

GRANT WEAVER
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13,000 communities have wastewater flows smaller than 1.0 MGD

many being mechanical plants ...

... most being lagoons

Median wastewater flow rate is 300,000 GPD
Optimizing existing plants: a good place to start

<table>
<thead>
<tr>
<th>Community</th>
<th>Flow (MGD)</th>
<th>Population</th>
<th>Cost</th>
<th>Nitrogen (mg/L) Before</th>
<th>Nitrogen (mg/L) After</th>
<th>Phosphorus (mg/L) Before</th>
<th>Phosphorus (mg/L) After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinook, Montana</td>
<td>0.065</td>
<td>1,250</td>
<td>$10,000</td>
<td>25</td>
<td>3</td>
<td>2.5</td>
<td>1.0</td>
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<tr>
<td>Norris, Tennessee</td>
<td>0.100</td>
<td>1,650</td>
<td>$7,500</td>
<td>20</td>
<td>5</td>
<td>4.0</td>
<td>4.0</td>
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<tr>
<td>Conrad, Montana</td>
<td>0.200</td>
<td>2,550</td>
<td>$7,500</td>
<td>35</td>
<td>7</td>
<td>2.5</td>
<td>0.2</td>
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<tr>
<td>Upton, Massachusetts</td>
<td>0.217</td>
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<td>$2,500</td>
<td>22</td>
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<td>0.2</td>
<td>0.1</td>
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<td>Big Sky, Montana</td>
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<td>1.0</td>
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<tr>
<td>Columbia Falls, Montana</td>
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<td>$5,000</td>
<td>10</td>
<td>6</td>
<td>1.0</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Nutrient Removal for $10,000 or less
Optimizing Nitrogen & Phosphorus Removal in Mechanical Plants

Change day-to-day operations to optimize nutrient removal

1. Training: Operator & Regulatory Staff
2. In-plant technical support (w/ Regulatory Staff)
3. Raise expectations: regulatory advocacy

Grant’s experience: most all wwtps can be made to remove N&P
Can lagoons be made to remove nutrients?

Option 1: Modify lagoon(s) to remove nutrients
   Is this technically viable for both short-term and long-term?

Option 2: Replace lagoon(s) with mechanical plant
   “Package plants” make this an affordable option.
   Particularly, with remote process control.

Option 3: ??
Design Review & Approval: from cop to collaborator

Package Plants:

Do package plants need to comply with design standards?

What level of engineering review do package plants with proven performance require?

Do small facilities need redundancy & everything required of big wwtp's?

Is it necessary to require lagoons to be “closed” when replaced by new wwtp's?
Permitting: from cop to collaborator

Optimization schedules (vs. design & construct schedules)
Annual reporting on N&P efforts
Rolling average vs. monthly, daily maximum (acute vs. chronic)
“Punishing” good work by tightening limits
Plant Inspections & Permit Enforcement: from cop to collaborator

Experienced pros vs. entry-level newbies
Permit compliance vs. excellence
Encourage non-compliance w/O&M Manuals
Technology transfer

Empower excellence
Given automation, what are real plant staffing needs?

How do current licensing/staffing regs accommodate remote operations?

Besides ...

Most states are experiencing low license passing rates for operators.

Enable off-site expertise
Finance & Administration: from cop to collaborator

1% of SRF Funds for training & technical support (vs. design & construct funds only)
“Safe Harbor” letters
Excellence vs. permit compliance
Recognize & celebrate excellence

Empower excellence by finding funds for practical solutions
Discussion

ID and revise policies & procedures
- Design Review
- Permitting
- Plant Inspections
- Licensing Operators
- Funding Optimization Efforts

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