Sewer Inspection & Rehabilitation Plan and Sewer Cleaning Plan: Implementing the Consent Decree
Seattle Sanitary Sewer Overflows (SSOs)

- 1,416 miles of sewer pipes (& 68 pumps)
- Regulatory Standard
  - Zero Sanitary Sewer Overflows (ultimately)
What Is the Problem?

Achieving performance; avoiding one size fits all prescriptions.
## Sanitary Sewer Overflows - Causes

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number</th>
<th>% of Number</th>
<th>Gallons</th>
<th>% of Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debris</td>
<td>2</td>
<td>4%</td>
<td>6</td>
<td>0%-1%</td>
</tr>
<tr>
<td>Fats, Oil, Grease</td>
<td>4</td>
<td>9%</td>
<td>860</td>
<td>1%</td>
</tr>
<tr>
<td>Roots</td>
<td>17</td>
<td>36%</td>
<td>10,103</td>
<td>8%</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>23%</td>
<td>27,172</td>
<td>21%</td>
</tr>
<tr>
<td>Structural</td>
<td>13</td>
<td>28%</td>
<td>91,837</td>
<td>71%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>47</td>
<td></td>
<td>129,978</td>
<td></td>
</tr>
</tbody>
</table>
Emergency/Urgent Response (Weeks to Months)

Collapse – Significant Blockage

Oil & Grease – Significant Blockage
Accelerated Response
(Weeks to 1 Year)

Void – Visible

Broken Deformed – Roots
Planned Response
(2 to 5 Years)

Broken – Crown

Broken – Soil Visible
Monitor (5-20 years)

Multiple Fractures at Crown. Assess degradation rate.

Significant corrosion on Non-Reinforced Pipe. Assess degradation rate.
# Collection System Characterization

<table>
<thead>
<tr>
<th>Criticality</th>
<th>Current Backlog</th>
<th>Identified/Yr</th>
<th>Desired LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Response</td>
<td>17</td>
<td>10</td>
<td>wks – 3 mths</td>
</tr>
<tr>
<td>Accelerated Response</td>
<td>200</td>
<td>65</td>
<td>mths-1yr</td>
</tr>
<tr>
<td>Planned Response</td>
<td>1,520</td>
<td>400</td>
<td>2-5 yrs</td>
</tr>
<tr>
<td>Monitor</td>
<td>3,500</td>
<td>700</td>
<td>5-20 yrs</td>
</tr>
<tr>
<td>Total</td>
<td>5,237</td>
<td>1,175</td>
<td></td>
</tr>
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</table>
What Are We Required To Do?

Inspect, Clean, Rehabilitate, Inspect, Clean, Rehabilitate
Implement a Performance Based Program

The **RIGHT** work,

at the **RIGHT** time,

at the **RIGHT** cost.
Promise and Consequence:

• Implement adaptive asset management approach and stay within the national high performance service band (less than 4 overflows per hundred miles of pipe).

• Failing to meet the performance target = corrective action plan and more costs.
Adaptive & Performance Based Management

- Allows SPU to focus on delivering control benefits specific to SPU system.

<table>
<thead>
<tr>
<th>System Element</th>
<th>Prescriptive</th>
<th>SPU Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection (CCTV)</td>
<td>10% to 20% of system per year.</td>
<td>Performance based.</td>
</tr>
<tr>
<td>Cleaning</td>
<td>X miles per year.</td>
<td>Performance based.</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>Y miles per year.</td>
<td>Performance based.</td>
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</tbody>
</table>
Adaptive & Performance Based Management

• Allows SPU to focus on delivering control benefits specific to SPU system.

<table>
<thead>
<tr>
<th>System Element</th>
<th>Prescriptive – Los Angeles</th>
<th>Seattle Public Utilities</th>
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</thead>
<tbody>
<tr>
<td>Inspection (CCTV)</td>
<td>9.2% per year.</td>
<td>Performance based.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>130 miles per year</td>
</tr>
<tr>
<td>Cleaning</td>
<td>43% per year.</td>
<td>Performance based.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>609 miles per year</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>55 specific projects.</td>
<td>Performance based.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21 miles per year</td>
</tr>
</tbody>
</table>
State of Utility Performance

- City A - 2000
- City B - 2000
- City C - 2000
- SF Bay (2008)
- So. Cal/AZ (2008)
- CIWQS (CA) (2008 & 09)
- QualServ (2005) 2
- City C - 2010
- SPU - 2011
- City B - 2011
- City A - 2011

Multi-Utility Studies

SSOs Per 100 Miles

- Below Average "Band"
- Average "Band"
- High Performing "Band"
Impact to SPU of Not Meeting Performance Threshold

• Requires corrective action plan, limiting or losing ability to use adaptive management approach.
• Additional cost of $375 M over compliance period (to 2025).
• Loss of National and State Regulatory credibility.
• Loss of Public confidence.
The Key Elements

A More Detailed Look
Action Plan Objectives

• Improve SPU’s work level to industry best practices.
• Provide additional resources to minimize risk of regulatory non-compliance.
Collection System Inspection

• Conducted using closed circuit television.
• Identifies pipes that need to be cleaned.
• Allows for condition assessment of pipes.
  • Establishes criticality of corrective action.
  • Supports determination of appropriate technology.
Collection System Rehabilitation

• Directly addresses pipe failures that could result in overflows.
• Extends the structural life of the pipes.
New Resources Needed (O&M) – Sewer Inspection and Rehabilitation


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<tbody>
<tr>
<td>Baseline staffing level</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Plus adds in this Action Plan – CCTV staff</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Plus adds in this Action Plan – Assessment and support staff</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
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<tr>
<td>Proposed staffing levels</td>
<td>21</td>
<td>21</td>
<td>21</td>
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</thead>
<tbody>
<tr>
<td>Baseline staffing level</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Plus adds in this Action Plan</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Proposed staffing levels</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
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Collection System Inspection – Sewer Inspection and Rehabilitation Action Plan

- Capital Expenditures
  - $1.1 Million for purchase of two CCTV trucks
  - $250,000 for overhaul of two existing trucks.

- Amount of system inspected
  - Currently - 30%
  - Action Plan – 50%

- Benefit - provides improved targeting of system cleaning and rehabilitation efforts.
Collection System Rehabilitation – Sewer Inspection and Rehabilitation Action Plan

• Capital Expenditures
  • $60.5 Million 6-year total for additional rehabilitation of system.

• System rehabilitation
  • Currently – $4.74 Million rehabilitating 17 miles/year
  • Action Plan – $21 Million total rehabilitating 76 miles/year in 2020

• Benefit - provides additional resources to fix system failures and extend service life of pipes.
Collection System Cleaning

• Removes roots; fats, oil, and grease; debris that cause blockages and overflows.
New Resources Needed (O&M) – Sewer Cleaning

- Current level of productivity = 6 jobs/day.
- Best Practice = 10 jobs per day.
- Assuming efficiency gains, net new resources required by 2020 = 1 FTE.

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</tr>
</thead>
<tbody>
<tr>
<td>Baseline staffing level</td>
<td>21</td>
<td>21</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Plus adds in this Action Plan</td>
<td>9</td>
<td>12</td>
<td>13</td>
<td>13</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Less efficiencies from increased productivity</td>
<td>-6</td>
<td>-9</td>
<td>-13</td>
<td>-13</td>
<td>-13</td>
<td>-13</td>
</tr>
<tr>
<td>Proposed staffing levels</td>
<td>24</td>
<td>24</td>
<td>25</td>
<td>25</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Net change from baseline</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Collection System Cleaning – Action Plan

• Capital Expenditures
  • $1.0 Million for purchase of two vactor trucks

• Amount of system on cleaning program
  • Currently – 21%
  • Action Plan – 50%

• Benefit - provides additional resources to remove system blockages causing overflows.
Summary

Managing a Performance Based Compliance Program

The **RIGHT** work,

at the **RIGHT** time,

at the **RIGHT** cost.
Protecting Seattle’s Waterways

Q&A
Seattle’s Consent Decree

– Comprised of several requirements
  – Early Action Control Programs and Measures
  – Long Term Control Plan
  – Capacity, Management, Operations, and Maintenance (CMOM) Performance Program Plan
  – Fats, Oils, and Grease Control Program Plan
  – Revised Floatable Solids Observation Program Plan