NJAW Experience with Permanent Leak Detection Equipment – Case Studies

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New Jersey American Water

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Presentation Outline

Leakage Control
- Start with a water audit

Building a Case

Leak Monitoring Case Studies
- Irvington, NJ
- Washington, NJ
- New Egypt, NJ
Water Audit Overview

System Input

Revenue Water
- Authorized Use

Non-Revenue Water
- Apparent Losses
- Real Losses (Leakage)
- Unbilled Authorized Use
Real Loss Control Actions

- Active Leakage Control
- Speed & Quality of Repairs
- Rehabilitation and Replacement
- Pressure Management
Active Leakage Control vs. Permanent Leak Monitoring

- Leakage Rate vs. Years
- Time Between Leak Monitoring (Hours)
- Reduction in Level of Leakage

American Water
Ancillary Benefits

**Operational:**

1. Identify and monitor fast growing leaks
2. Prioritize repair of high consequence leaks (hospital, highway, airport)
3. Plan workflow – reduce leak backlog in good weather

**Management:**

1. Increase management visibility
2. Optimize pipe maintenance workflow
3. Customer service improvement – proactive leak management
Calculate Value of Improved Leak Management

Savings

- Increased repair efficiency
- Reduced leak damage (liability)
- Reduced leak detection costs

Added Value

- Deferred capital investments in plants/pump stations
- Value of regulatory support/compliance
- Value of increased customer service
Non-Monetary Benefits – Triple Bottom Line

Environmental

Chlorine Pollution of Rivers Kills Fish
- California Regional Water Quality Control Board

Social

Water Main Break Floods Terminal, delays flights at New York’s JFK
- New York Times & Yahoo News
Case Study: Irvington, NJ

- Very limited proactive leak surveys
- Leak investigations and repairs are now scheduled
- System Operational in March, 2016
- First year of operation
  - 67 leaks repaired
  - 880 gallons per minute of water loss prevented
  - 90% of leaks not surfacing

System Payback in 9 months
Remember the Water Audit Drivers?

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Hills - NRW %</strong></td>
<td>27.8</td>
<td>25.2</td>
<td>20.2</td>
</tr>
<tr>
<td><strong>Short Hills - Real Losses per Service Connection (gpd/conn)</strong></td>
<td>131</td>
<td>111</td>
<td>84</td>
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<tr>
<td><strong>Short Hills - Real Losses per Service Connection per psi (gpd/conn/psi)</strong></td>
<td>1.82</td>
<td>1.54</td>
<td>1.18</td>
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<tr>
<td><strong>Irvington - Recorded Water Loss Reduction (Million Gallons)</strong></td>
<td>N/A</td>
<td>589</td>
<td>227</td>
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</tbody>
</table>

Irvington is part of the Short Hills Water System
# Irvington Non-Revenue Water Impact

<table>
<thead>
<tr>
<th>System Location</th>
<th>Approximate Length of Pipe Network Monitored (mi)</th>
<th>Primary Driver For Leak Monitoring</th>
<th>Initial Modeled Payback (Years)</th>
<th>Revised or Actual Payback Estimate (Years)</th>
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</thead>
<tbody>
<tr>
<td>Irvington, NJ</td>
<td>73</td>
<td>Reduce Water Loss &amp; Economic Return</td>
<td>3</td>
<td>0.7</td>
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<tr>
<td>Washington, NJ</td>
<td>39</td>
<td>Regulatory Driver</td>
<td>9</td>
<td>6.5</td>
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<tr>
<td>New Egypt, NJ</td>
<td>6</td>
<td>Asset Awareness at remote System</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Case Study: Washington Borough, NJ

- Located in Warren County, New Jersey
- Population ~ 6,500 people
- Current State: Annual Leak Detection Survey
- Leak Monitoring Drivers:
  - Asset awareness at a remote system
  - Reduce capital needs – defer drilling new well
  - Regulatory compliance – initial NRW of 36%
Case Study: New Egypt, NJ

• Unincorporated Census-designated place New Jersey
• Population ~ 2,500 people
• Current State: Annual Leak Detection Survey
• Leak Monitoring Drivers:
  • Asset awareness at a remote system
  • Reduce capital needs – defer drilling new well
  • Regulatory compliance – initial NRW of 45%
Summary: Review Decision Flow

1. AWWA Water Audit
2. System Specific Cost-Benefit Analysis
3. Program Review
Thank You!