Impact of Catastrophic Events (Physical & Cyber events)
Lessons Learned, Best Practices & Transformations

(2) Case Studies – Irene, Super Storm Sandy

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New Jersey American Water
Sr Director Operations – Coastal Region
New Jersey Operations Overview

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Water Systems</td>
<td>32</td>
</tr>
<tr>
<td>No. of Sewer Collection Systems</td>
<td>4</td>
</tr>
<tr>
<td>Average System Delivery</td>
<td>330 MGD</td>
</tr>
<tr>
<td>Customers</td>
<td>647,000 (90% residential)</td>
</tr>
<tr>
<td>Population Served</td>
<td>2.5 Million</td>
</tr>
<tr>
<td>Municipalities Served</td>
<td>189 Municipalities in 18 Counties</td>
</tr>
<tr>
<td>Bulk Water Customers</td>
<td>47</td>
</tr>
<tr>
<td>Surface Water Treatment Plants</td>
<td>7 (combined capacity of 350 MGD) 73% of supply</td>
</tr>
<tr>
<td>Reservoirs</td>
<td>5</td>
</tr>
<tr>
<td>Wells</td>
<td>170 (combined capacity of 110 MGD) 21% of supply</td>
</tr>
<tr>
<td>Tanks</td>
<td>241</td>
</tr>
<tr>
<td>Operating Centers</td>
<td>11</td>
</tr>
<tr>
<td>Water &amp; Sewer Mains</td>
<td>8,600 Miles</td>
</tr>
<tr>
<td>Valves</td>
<td>170,000</td>
</tr>
<tr>
<td>Hydrants</td>
<td>45,000</td>
</tr>
</tbody>
</table>
Impact of Catastrophic Events
(Physical & Cyber events)

• Lessons Learned from Hurricane’s Irene & Sandy

• Best Practices & Transformations

• Assuring resiliency

• Improvements in communications & utility coordination to responding to events. (GIS)
Impact of Catastrophic “Black Swan Events”
Lessons Learned: Invaluable Items

- GIS Modeling
- EAM
- IT
- System Maintenance & Investment
- Planning & Communication
- Consolidation & Shared Resources
- Floodwalls & Training
- Social Media
- Valve Inspection & Easement Maintenance
- Supply Chain Resources
- Asset Sharing
Transformation & Best Practices

Resilient Assets
- GPS Assets
- Raise Critical Equipment & Floodwalls
- Expand Standby Power & Fuel Storage
- Establish a High Risk Asset Register

Prepared Business
- Conduct After Action Reviews “AAR”
- Train Employees on “NIMS”
  - Conduct Drills
  - “Interdependent” Utility Drills
- Inspect all Crossings
- Know your Customers

Enhanced Partnerships
- Enhance Relationship with Regulators, OEM’s, Utilities, & Purveyors
- Keep Lines of Communication Open (Social Media)
Improvements in communications & utility coordination
1. Maintain an Accurate Inventory of Control System Devices and Eliminate Any Exposure of this Equipment to External Networks
2. Implement Network Segmentation and Apply Firewalls
3. Use Secure Remote Access Methods
4. Establish Role-Based Access Controls and Implement System Logging
5. Use Only Strong Passwords, Change Default Passwords, and Consider Other Access Controls
6. Maintain Awareness of Vulnerabilities and Implement Necessary Patches and Updates
7. Develop and Enforce Policies on Mobile Devices
8. Implement an Employee Cybersecurity Training Program
9. Involve Executives in Cybersecurity
10. Implement Measures for Detecting Compromises and Develop a Cybersecurity Incident Response Plan

https://www.waterisac.org/cybersecuritymeasures
Policy Support

Recognize IT Investment & Expenses
GIS / EAM

Encourage Aging Infrastructure Replacement & System Maintenance

Stimulate Resiliency Planning & Investment

Support System Consolidation & Shared Services
Thank You

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