Water Utility Emergency Response – Lessons Learned from Recent Events
Advance Preparation Critical to Success

- Since 2008, we worked extensively to prepare for an event of this magnitude
- Adopted National Incident Management System (NIMS) as basis for all-hazards planning & response
- Conducted table-tops, functional, and full-scale exercises
- Resource Typed & Categorized equipment and teams per AWWA standards
- Essential Employee Shift Roster
- Emergency Contractor/Vendor Roster
- Established strong working relationships with local and state EMA
- Working Emergency Operations Center
Advance Preparation Critical to Success (cont.)

- Free tools/publications: **EPA NIMS Compliance Objectives for the Water Sector**; EPA Table-Top Exercise Tool; EPA Toolkits for Water/Wastewater.

- FEMA Emergency Management Institute online and classroom course offerings, full use of Incident Command System (ICS) forms as appropriate.

- Utilize software and technology: WebEOC Situational Awareness websites; NCDOT Traffic Information Management System; USACE/FEMA/NOAA HURREVAC software; NWS/USGS real-time river and flood monitoring.

- Review water sector after-action reports to identify our gaps.

- WaterISAC webinars, DHS Infrastructure Surveys.

- NCWaterWARN Mutual Aid Program member with NC State Re-Entry Credential issued.
Lessons Learned From Real Life Events

- Essential Employee Policy > Extended Operations Shift Roster > Incorporates Succession & 24/7 contact information
Lessons-Learned From Real Life Events (cont.)

• Water Emergency Management Plan > Tiered Critical Customer List > Notification Responsibilities Assigned > Consistent Messaging

• System maps commissioned depicting system interconnects, service-lines, pump stations, well sites

• Emergency Contractor & Vendor List > Managed by appropriate division & revised as necessary

• 800 MHz interoperable radios were purchased

• Building a functional emergency operations center which could support all-hazards response

• Began an exercise program utilizing the EPA Table-top exercise tool to identify gaps
Lessons-Learned From Other Utilities

• Train Derailments (petroleum spills)
• Coal Ash Spills - TN, NC, VA
• Chemical Spills – Elk River, WV; Hagerstown, MD
• Algal Blooms – Toledo, OH
• Ice Storms
• Severe Drought and Flooding
• Hurricanes
• HAZMAT Discharges (Charlotte Water – PCB Incident)
Lessons Learned from Other Utilities: Hurricane Sandy

- Need for local mutual aid agreement – State MOA (NCWaterWARN) would be insufficient
- Formal emergency fuel contracts
- Re-entry credentials for utility
- Generator run times & fuel capacity
- USACE Emergency Power Assessment Tool
Situational Awareness - Technology

“Information gathered from a variety of sources that when communicated can form the basis for incident management decision-making.” Homeland Security Act 2002

- DHS ICS – CERT
- WaterISAC
- InfraGard
Use of NIMS/ICS – Language of Emergency Response

• We use it because it works! Don’t have to reinvent the wheel – Existing Framework, Training, Forms

• Use Incident Action Plans to manage events and incident response

• Typing & Categorizing Teams and Equipment

• Have established relationships with local, state, and federal partners.

• Mutual Aid Programs (Local, State, and Federal)
Real Life Use of NIMS & ICS – Hurricane Matthew

• Regional Water Main Repair Event – Mutual Aid Enacted
• Activated CFPUA Emergency Operations Center
• Unified Command Established
• Public Messaging & Emergency Conservation Measures
• Staging Area for Teams & Equipment
• Unified Command daily calls to County EM, NCEM & Governor’s Office
Incident Action Plans – Our Culture

- Aligns actions with priorities and goals for response and recovery
- Useful for large complex operations and routine critical construction projects
- Use of ICS forms forces a deliberate planning process and contingency thinking
Florence Infrastructure Preparation

- Deployed and tested generators at all facilities and pump stations.
- Topped off chemical tanks, fuel tanks, and water tanks.
- Suspended manual and automatic flushing in the distribution system.
- Installed collection system bypasses at sites with historic SSO capacity-related issues.
- Replicated all IT network applications and utility data to off-site disaster recovery facility.

- Updated contact information for emergency contractors, CFPUA facility information, and resource inventories.
Isolated Due to Flooding & Washouts

Before

During

After
Power Supply During the Storm

- Fuel tanks were filled up before the hurricane arrived.
- Generators started on Thursday before strong tropical storm winds arrived (11:00 am Thursday).
- All facilities lost commercial power from Duke Energy during the hurricane.
- Winds in excess of 50 mph remained on all day Friday.
- By Saturday morning, most generators had run for over 48 hours.
- Maintained generators running into Sunday when refueling commenced.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Fuel Storage</th>
<th>Approximate Run-time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweeney WTP</td>
<td>20,000 gallons</td>
<td>6 days</td>
</tr>
<tr>
<td>Richardson WTP</td>
<td>10,600 gallons</td>
<td>5 days</td>
</tr>
<tr>
<td>Well sites</td>
<td>Varies</td>
<td>3 days</td>
</tr>
<tr>
<td>Northside WWTP</td>
<td>16,000 gallons</td>
<td>5 days</td>
</tr>
<tr>
<td>Southside WWTP</td>
<td>1,000 gallons</td>
<td>3 days</td>
</tr>
<tr>
<td>Pump Stations (148)</td>
<td>Varies</td>
<td>3 days</td>
</tr>
</tbody>
</table>
Power Supply During the Storm (Cont.)

• **Saturday AM to Sunday AM**
  • Contacted CFPUA’s emergency fuel supplier – unable to deliver.
  • Contacted fuel suppliers throughout NHC and surrounding areas – unable to deliver.
  • Requested assistance from NHC EOC and State EOC for fuel per established protocol.
  • Fuel supply from Raleigh secured – unable to deliver due to road closures.
  • Coordinated with Duke Power to restore power to treatment plants – started on repairs but unable to provide timeframe.

• **Sunday**
  • Generators continued to run. Water plants approaching 48 hours of fuel remaining.
  • Issued press release regarding fuel status.
  • NHC Airport Authority identified potential source of fuel – secured 2500-gallon fuel delivery for treatment plants.
  • Secured additional sources of fuel delivery for treatment plants.
  • Mounted small 100-gallon fuel tanks on CFPUA trucks to deliver fuel to remote pump stations.
  • Contractor provided a 1,000-gallon fuel truck and driver to deliver fuel – obtained fuel at emergency fuel supplier and delivered where needed.
  • LCFWASA fuel supply approaching 30 hours—fuel delivery scheduled.
Responding to Damage During the Storm

• Southside Wastewater Treatment Plant lost generator power and bypassed partially treated wastewater for several hours.

• Sweeney WTP ozone roof membrane was damaged and torn causing leaks.
  • Protected key equipment
  • Arranged temporary repair with roofing contractor
CFPUA Emergency Work at U.S. 421 Protects Raw Water Supply Main

- Extreme flooding eroded road shoulder, exposing the Lower Cape Fear Water and Sewer Authority raw water supply main.

- Crews mobilized late Friday night to stabilize the water line.

- At 3:30 am the crews successfully stabilized the water main, preventing rupture and securing water supply to the public.
Damage Assessments

- The Damage Assessment process began on Sunday. All pump stations, well sites, and treatment plants were assessed.

- Staff conducted an aerial assessment by helicopter of the raw water system.

- Except for the Sweeney roof, the system did not sustain major damage.

- Sink holes required water and sewer main repairs.

- Normal Fence and Antenna Tower Damage
• **Strengthen emergency fuel supply resiliency** - contract details with suppliers; increase on-site storage capacity; establish delivery capability redundancy.

• **Assess Richardson Plant generator** – employee safety; relocate/modify generator; install carbon monoxide meters in plant.

• **Southside WWTP Generator** – replace existing generator (already in capital plan); increase fuel storage.

• **Spare parts** – increase inventory of key spare parts.

• **Policy improvements** - essential employee/extended shift roster; sheltering; employee check-in; payroll; food service; preparing for extended operations.

• **Targeted customer notification** – investigate means to notify customer by geographic area.
After-Action Items / Lessons Learned (cont.)
Questions?

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