Design Guidelines (TR16) and Tools for Storm Resiliency

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CT Managers Forum
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What is TR-16?

- NEIWPCC’s most referenced and requested document – Technical Report #16
- “Guides for the Design of Wastewater Treatment Works”
- A guidance document for design and review plans for wastewater treatment plants
- Commonly used by consultants, state staff, municipalities
- Last updated in 2011
- Revision in 2016 for Storm Resiliency
Storm Resiliency Guide Development

- After Hurricane Sandy, our member states wanted us to revisit some of the TR16 design criteria and make WWTPs more resilient to storm events.

- Cannot continue the way we have in the past.

- Elevation of critical components and coastal facilities are major areas to address.

- Resiliency is going to take commitment as this is not a quick fix, long term planning is needed.
Areas to Address

- Incorporate improved design considerations.
  - Elevation of critical components
  - Pump Stations
  - Waterproofing electrical components
  - Fuel delivery

- Include the important lessons learned from facilities that have been impacted by events.

- Provide background information on programs that are available and links to access the information.
Two Pronged Approach

- Design Considerations - technical
  - Included in the revision to the 2011 TR16 Guide
  - Finalized first and distributed

- Supplemental Resiliency Guide – less technical and more procedural
  - Lessons learned, strategies and tips
  - Available resources, programs, etc.
  - Follow up standalone document to be worked into training opportunities
GUIDES FOR THE DESIGN OF WASTEWATER TREATMENT WORKS

Prepared by the New England Interstate Water Pollution Control Commission
Key Concepts in Revision

- Critical Equipment
- Backup Power Supply
- One Percent Chance of Flood Elevation
- Flood Elevation Design Considerations
- Level of Protection for New and Existing Equipment
HIGH WATER MARK
20.79 FEET (11.79 FEET ABOVE FLOOD STAGE)

MARCH 31, 2010
ON THIS DATE, DURING THE GREAT FLOOD OF 2010, WATER FROM THE PAWTUXET RIVER ROSE TO THIS LEVEL AT THIS LOCATION

FOR MORE INFORMATION, CONTACT:
NATIONAL WEATHER SERVICE TAUNTON, MA
www.weather.gov/box

NORTHEAST RIVER FORECAST CENTER
www.weather.gov/nerfc

USGS MA-RI WATER SCIENCE CENTER
ri.water.usgs.gov
In 2016, NEWPCC revised the 2011 Edition of its TR-16 Guide. “What’s New” provides all the significant changes, which concern flooding and resiliency in the face of extreme weather.

Owners of the original 2011 edition may refer to “What’s New” to read the 2016 revisions and additions in context.

“What’s New” reproduces the new and amended chapter materials, the introduction to the revised edition, and a new appendix acknowledging contributors to the revision. It does not include the updated table of contents or changes in page numbering.

In “What’s New,” “Revised” material refers to matter that was partially rewritten. “New” material has no corresponding part in the unrevised edition. Material is presented in the order in which it appears in the revised edition.
Storm Resiliency Supplement:

In last decade – many significant extreme weather events in the northeast!

- What have we learned
- What can we share
The New Normal: Frequency and significance of storms are increasing

- Rain/flooding
- Hurricanes
- Ice Storms
- Tornadoes

- More frequent and extended power losses
- WWTPs and pump stations in flood-prone areas
- Aging infrastructure – susceptible to failure
Storm Resiliency Guide Development

- After Hurricane Sandy, an opportunity identified to compile and share experiences from facilities impacted by recent extreme weather events.
- Not intended to be “Encyclopedia of Resilience.”
- Incorporates practical tips and advice collected from a regional survey of utility operators impacted by severe weather.
- Includes reference to numerous Federal programs and tool kits.
- Grouped by timeliness of implementation:
  - Prepare for…
  - Respond to…
  - Recover from…
Components of Guide

- Important lessons learned from facilities that have been impacted by events.
- Information on existing programs and tools; with links to access the information.
- Highlight opportunities to minimize disruption.
  - Contingency planning & communication
  - Generators, fuel quantity & supply chain
  - Dispersal of materials (supplies, vehicles)
  - Safe restoration of services
Step 2 – Should I buy, rent or borrow a generator?

- Many private vendors sell or rent generators. If you plan to rent a generator, set up a contract with a vendor. Since many people may need to rent generators during a power outage, know where you stand in terms of priority with your generator vendor.
- Another option is to reserve a portable generator from a rental pool during storm season.
- Join your state’s Water and Wastewater Agency Response Network (WARN) to make it easier to borrow a generator and other resources during a regional emergency.
- Investigate what your state water sector associations and local emergency management agencies can offer to help. In Florida, both the Florida Rural Water Association and the Florida Division of Emergency Management maintain generator pools for distribution as needed. A good working relationship with your local emergency manager will be critical to accessing state or federally provided generators.
- Know what “type” of generator you need. You can learn more about resource typing from AWWA’s Resiliency Manual.

### Generator Use Tips

Your utility can take basic actions to prepare for disasters that may include power loss. Below are tips for utilities using generators in emergency situations.

- For large scale “notice” incidents, such as category 3 and above hurricanes, go off the grid and use your generators in anticipation of a power outage. This can prevent operational disruptions and protect electric equipment.
- Go off the grid and switch to generators if there is poor power quality. Power fluctuations can damage equipment.
- Identify three-phase requirements. When power is restored, not all three phases may be available, which can damage three-phase equipment.
- Determine the need for protection against equipment failure caused by undervoltage or overvoltage.
- Conduct a facility-specific generator needs assessment. This can significantly reduce response time during an emergency.
- Give completed assessment forms to your local EOC or emergency management agency.
- Keep smaller generators on trailers for emergencies. The generators can be safeguarded during the incident, but easily transported to sites without power when needed.
- Keep basic maintenance supplies on hand (e.g., coolant, belts, oil, fuel filters) to quickly get a generator back in service if there is a breakdown.

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<tr>
<th>Generator</th>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>On-site (purchased)</td>
<td>• You know you have one &lt;br&gt;• Reduced time to respond</td>
<td>• Could be costly&lt;br&gt;• You perform the mainte&lt;br&gt;• The disaster that strikes could also damage your generator.</td>
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<tr>
<td>Off-site (rented or borrowed)</td>
<td>• Multiple sources to get one – EOC, WARN vendor &lt;br&gt;• Someone else performs the maintenance &lt;br&gt;• Costs less than buying</td>
<td>• Travel delays to get it &lt;br&gt;• Your utility might not be on the priority list to get a generator</td>
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GUIDES FOR THE DESIGN OF WASTEWATER TREATMENT WORKS

Preparing for Extreme Weather at Wastewater Utilities: Strategies and Tips

Free for download at
http://neiwpcc.org/tr16guides.asp