Water Systems & Power Resiliency

What New York State Has Done – … and is Doing
Presentation Overview

- Proper **Planning** can Help Avert and/or Minimize Disaster-Related Consequences
- Design Standards are your Friend!

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- Carrots are Better than Sticks!
  - Examples from **Drinking Water State Revolving Fund (DWSRF) Projects**
  - Examples from DOH Involvement with Emergencies (2003 Blackout, Irene, Lee, Sandy)
Public Water Supply Emergencies and Planning in NYS Sanitary Code

NYS Sanitary Code Subpart 5-1 (Public Water Systems)
- Vulnerability Assessments/Emergency Response Plans (VA/ERPs)
- Recommended Standards for Water Works (RSWW)
Emergency Response Plans & Vulnerability Assessments

Sanitary Code: PWS Emergency Response Plans since 1990
   Included Vulnerability Analysis (e.g., Drought, Flood, Wind, Ice, Snow, Earthquake, **Power Loss**)

2002 (post 9/11) PHL Amendment:
   • Vulnerability Assessments include Terrorist Attack
   • All PWSs Serving more than 3,300 (~ 350 in NYS)
   • ERP Standardization
   • Five-Year Review/Approval Cycle
   • Emergency Contact Information Annually
Public Water Supply Emergencies Prevention and Pre-Planning Activities

NYS Sanitary Code:

1) NYS DOH must approve Water System Improvements

2) RSWW are the Design Standards for Water System Plan Reviews and Approvals

*Recommended Standards for Water Works (aka “the Ten States Standards”)*

REDUNDANCY!
Infrastructure Redundancy

Sources, Wells
Filters
Disinfection/Chlorination Equipment
Power Supply – (e.g., Generators)
Pumps
Interconnections, Interconnections, etc.
Recommended Standards, 2012

2.6 “Dedicated Standby power shall be required … so that water may be treated and/or pumped during power outages…”

3.2.1.3 [Wells] “To ensure continuous service… a standby power supply shall be provided through a dedicated portable or in-place auxiliary service power of adequate support and connectivity.”

6.6.6 [Pumps] “To ensure continuous service… a power supply shall be provided from a standby or auxiliary source.”
Redundant Power Supply - Poughkeepsie: A Tale of Two Feeds
August 2003 - Northeast Regional Blackout
Modified Existing DWSRF Project for “Million-Dollar” Generator
RSWW, Flood Protection

• RSWW 2.5: “Main switch gear electrical controls shall be located above grade in areas not subject to flooding…”

• RSWW 2.11: “…all water supply facilities and …access roads shall be protected to at least the 100 year flood elevation or maximum flood of record…”

• RSWW 3.2.4.1.d: “The top of the well casing… three feet above the 100 year flood level or the highest known flood elevation, whichever is higher…”

• RSWW 6.1.1.a “The [pump] station shall be elevated to a minimum of three feet above the 100-year flood elevation, or three feet above the highest flood…"
3 Feet Above 100-yr Flood Level
3 Feet Above 100-yr Flood Level
Design FF ~ 100 Year Flood Level
3 Feet Above 100 yr Flood Level OR the Highest Known Flood Elevation
Flood Wall – Lourdes Hospital Binghamton
Water System Interconnections

- Bi-Directional if Possible (may require special valves)
- Metered
- Inter-Municipal Agreement
Public Water System Status Post-Sandy (2012)

- Many Community Water Systems were impacted (Number unknown because of “Seamless” Response, e.g. generators)
- 62 systems issued Drinking Water Advisories (59 BWOs and three Do Not Drink)
- Long Beach, Fire Island had considerable damage
- Breezy Point (~ 5,000) PWS down three months
NYC, Post-Sandy: Gravity Design is Nice

Serves 8 Million people plus 1 Million upstate
Suffolk County Water Authority (SCWA), Post-Sandy

- Serves 1.3 M people (Second Largest)
- 615 Wells using 235 Cl/Pump Stations
- 27 Iron Removal Plants & Many GAC Units
- 55 Booster Pumps
- 43 Pressure Zones
- 116 Generators, Strategically Placed
Post-Sandy “Flood-Proof” Levels, Storm Mitigation Loan Program (SMLP)

Projected Sea Level Rise Considered, as is 100 Year Flood Plus, Sandy high water mark Plus, 500 year Flood

* Use The Most Protective *
Post-Sandy SMLP Projects

- Increased Well Elevations
- Increased Height of Pump Stations
- New and Upgraded Generators
- Conversion from Diesel to Natural Gas
- More Strategic Placement (e.g., SCWA)
- Interconnections/Consolidations
Public Water System Status
Post-Irene & Lee (2011)

- 168 Community Water Systems were impacted
- 126 systems were issued boil water orders
- Total # of customers potentially affected in these systems is 2.2 million.
- 5 weeks after the storm, approximately 12 systems still had BWO in effect
Post-Irene & Lee (2011)
Major Causes of BWO:

- No power
- No disinfection
- Well field flooded
- Water main breaks
- Loss of pressure
- Turbidity
Still Much Work To Do

- Continue with VA/ERP Reviews
- Continue with Water System Upgrades, Plan Approval Requirements (RSWW)
- DWSRF, SMLP, DWSRF, NY’s WIIA, DWSRF, Other $$
- Sanitary Survey Recommendations
- Security Recommendations
Thank You!

William M. Gilday, P.E.
Chief, Operations Section
NYS DOH Bureau of Water Supply Protection
Tower Bldg, Rm 1119
Empire State Plaza
Albany, NY 12237
518-402-7654

william.gilday@health.ny.gov
QUESTIONS ???

Type Your Questions into the Questions Panel