



**Department
of Health**

Bureau of Water Supply
Protection

Water Systems & Power Resiliency

US EPA – ASDWA Webinar

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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!

- 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

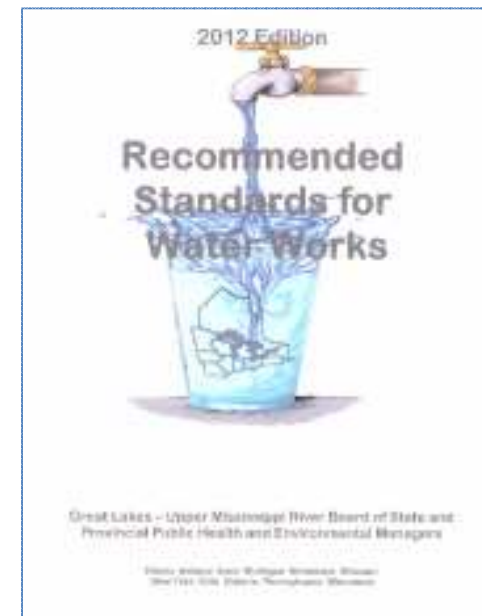
Prevention and Pre-Planning Activities

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

CHG&E



Con-Ed

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!

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QUESTIONS ???

Type Your Questions
into the Questions
Panel