Agenda

1. Plant Location and Background
2. Hurricane Sandy Storm Surge
3. Hurricane Sandy Damage
4. Electrical Distribution System
5. Electrical Repairs
6. Discussion and Questions
Bay Park STP Location
Bay Park STP Background

• Owned and Operated by The Nassau County Department of Public Works (NCDPW).

• 70-mgd Bay Park STP located in East Rockaway, New York. Serves a Population of 550,000.

• Conventional secondary treatment for the southwestern portion of Nassau County.

• Separate Sewer System
Bay Park STP Overview
Bay Park STP
Process Flow Diagram

- Pre-chlorination
- Screenings
- Grit
- Primary Sludge
- Gravity Belt Thickening
- Anaerobic digestion
- Combined Heat and Power
- Centrifuge dewatering
- Biosolids Residual
- Secondary Sludge
- Hypochlorite disinfection
- Effluent
- Heat
- Electricity
Topography & Sandy Storm Surge
Hurricane Sandy Storm Surge
New York Battery

Additional Wave Height

Wind and Pressure

Sandy Storm Tide: 13.8 feet
Irene Storm Tide: 9.5 feet
Monday High Tide: 4.7 feet
Mean Sea Level
Hurricane Sandy Damage

Bay Park STP Flood Zones

- Basement and Tunnel Flooding due to Surcharged Storm and Plant Drain Systems
- 3 - 7 foot Tidal Surcharge above ground Elevation
First High Tide Looking North
First High Tide Looking East
Effluent Screening & Disinfection Building
Effluent Service Water Pumps

Cooling Water for Generators

Process Water for Thickening and Dewatering
Main Building Basement Areaway
Galleries & Tunnels
Raw Sewage Pump Station
The Morning After Sandy
Emergency Repair Timeline

10:00 p.m.
Bay Park Complete Offline
10/29

5:57 a.m.
Conveyance Restored
- Raw sewage pumping
- Settling
- Temporary tide pumps
- Chlorination
11/01

10/29

Process Air Blowers
11/06

11/12

Temporary Sludge Dewatering

11/15

Dechlorination

11/18

Sludge Digestion
11/20

Tide Pumps
11/21

FST, RAS and WAS Pumping
11/26

Sludge Thickening

12/15

Full Permit Compliance
Oct 2012 - Dec 2012
Electrical Distribution System

• The Bay Park STP operates its own Power Generation Facility

• Average power is 5500kW

• Four Generators rated at 3600kW, 2,400V, 3 phases, 60Hz each

• Fueled by diesel, natural gas and digester gas.

• Power is distributed via underground duct banks through unit substations, switchgear, motor control centers (MCCs), distribution panels, and lighting panels.
The Long Island Power Authority (LIPA) provides service rated at 3750kVA.

Provides minimal standby power in the event the Power Generation Facility is not available.

Supplementing the LIPA service, the plant has three 1,000kW, 2400V, 60Hz diesel powered Caterpillar emergency standby generators.
Auxiliary Caterpillars
Electrical Distribution System

• Power Generation Facility’s four main engines to the 2400V Main Switchgear.

• Power is Distributed throughout the Plant at 2400V.

• Six (6) Unit Substations which step down the voltage to the equipment utilization voltage of 480V, 3-phase.

• 2400V Switchgear in the Operations Building - PA Blowers.
Electrical Distribution System Assessment

- Lower Portions of Electrical Equipment was submerged.
- Evidence of Saltwater intrusion and corrosion.
- 1600 amp Circuit Breakers
- Vertical and Grounding Bus Bars
- 120V Transformer Cooling Fans
- Lighting Transformer
- Control Panels
- Duct bank system
Bldg 10
MCC damaged 2.5ft Seawater
Unit Substation 5
Unit Substation 4 -
Evidence of seawater infiltration through internal conduit
Final Clarifier Collector LCS
Polymer Feed Pump
Electrical System Emergency Repair

- De-terminated and Grounded all Power Cables
- Implemented Stringent LOTO Procedure (1 – Key)
- Installed Necessary Temporary Systems
- Cleaned, Heated and Dried All Substations and MCCs
- Megger Tested all Power and Control Cable
- Bypassed Damaged Instrumentation and LCSs (Established SOPs)
- Cleaned and Baked Motors
- Purchased Replacement Motors
- Replaced Cables or Ran Temporary Feeds
Assets are divided into “tiers” based on their relative level of criticality and impact.

- **Tier 1**: Assets Essential for Conveyance
- **Tier 2**: Assets Essential for Solids Handling
- **Tier 3**: Assets Essential for Treatment
- **Tier 4**: Other Plant Services

**Decision Making Process**

Replace or Repair

Cost & Schedule
Temporary Generators
Temporary Generators
Temporary Tide Pumps
Temporary Sludge Dewatering
Final Clarifier Collector and Scum Drives