Impacts of Super Storm Sandy

Consolidated Edison of NY, Inc.
Steam Operations

Michael Brown

East River Station

Robert Boyle

Steam Distribution

Edward Conway

59th Street Station

Gary Hugo

74th Street Complex

Christina Ho

Operations Planning

Agenda

- Overview
- Storm Facts
- System Preparation
- Steam Impacts
- Next Steps

Con Edison Overview

- Con Edison provides
  - Electricity: southern 2/3 of Westchester and all of NYC except the Rockaway Peninsula
  - Natural Gas: Bronx, Manhattan, and portions of Queens as well as the majority of Westchester
  - Steam: from the southern tip of Manhattan to 96th St on the west side and 89th St on the east side
- Steam has a total of approximately 1,700 customers
- Over 100 miles of steam mains
- Average guaranteed pressure of 125 psig

Con Edison Steam System

Station	Capacity (Mlbs/hr)	Percentage (%)
59th Street	1,380	12%
60th Street	720	6%
74th Street	2,000	17%
Brooklyn Navy Yard	920	8%
East River	5,830	51%
Ravenswood	750	6%
TOTAL	**11,600**	**100%**

NYC Impact

- City Actions
  - Evacuation was mandated for all Zone A residents
- Con Edison Steam Actions
  - Took preemptive actions in flood prone areas

Key:

	Zone A:	Potential flooding from any hurricane
	Zone B:	Potential flooding from a Category 2+ hurricane
	Zone C:	Potential flooding from a Category 3-4 hurricane hitting just south of NYC

System Preparation

Preparatory Actions

Began protecting flood prone equipment, backfilling and paving excavations, developed 24/7 staffing

Began contacting customers regarding possible actions during the storm

Shut down BNY and East River Station Units

Brought other steam units online

Emergency isolations for crane collapse and UN flooding

10/24/2012

10/25/2012

10/26/2012

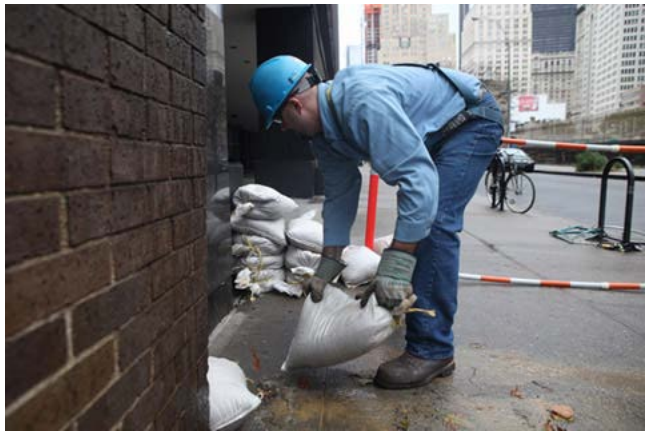
10/27/2012

10/28/2012

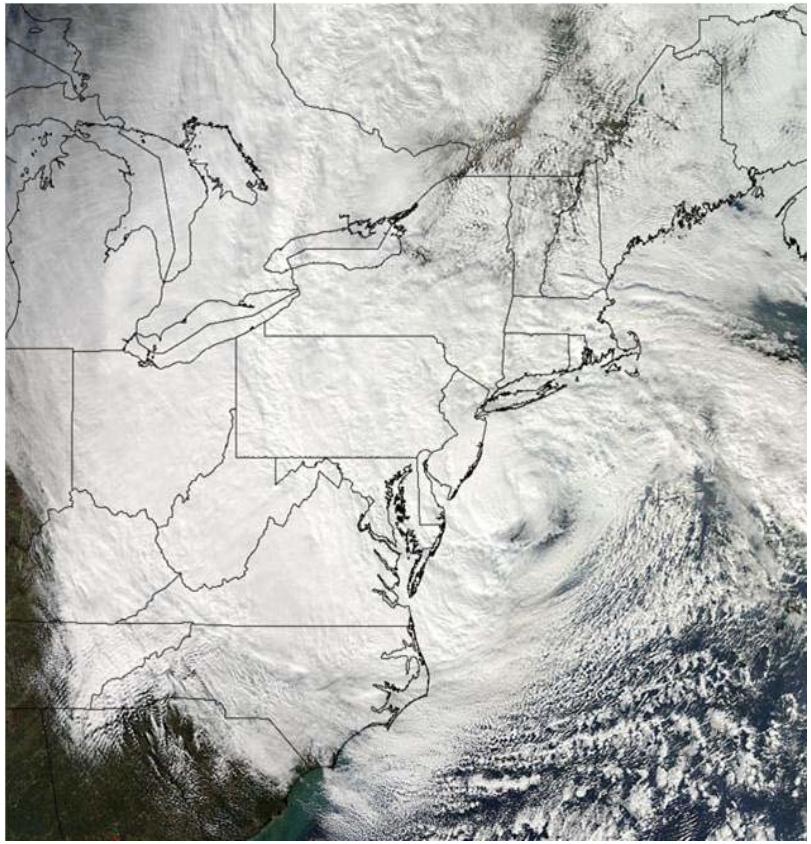
10/29/2012

Superstorm Sandy

Began isolating steam customers in flood prone areas

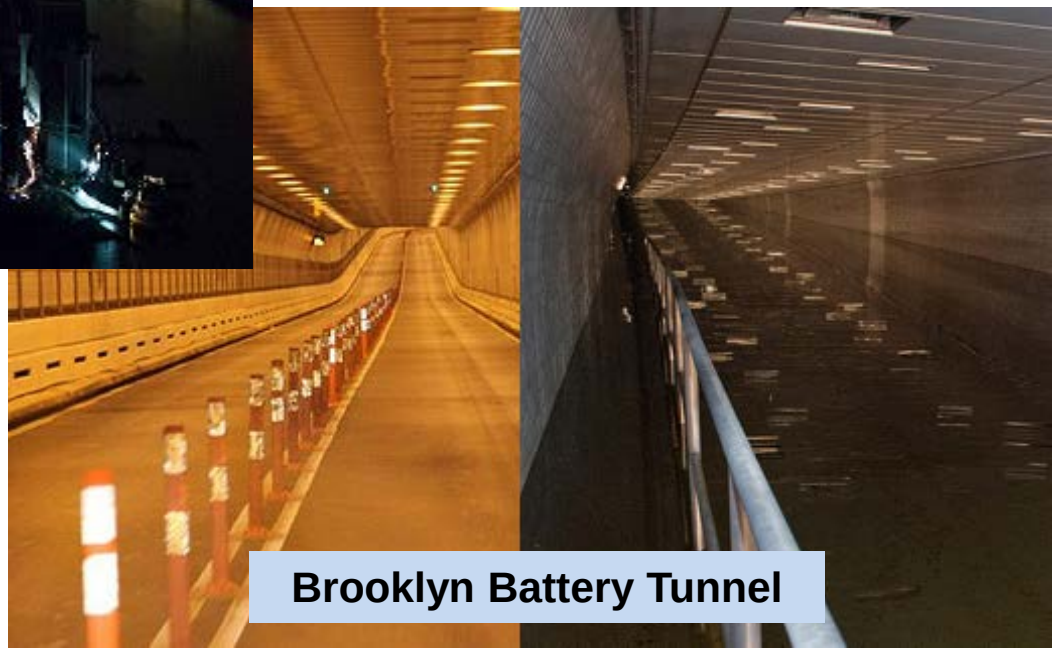


Superstorm Sandy Statistics



- Largest Atlantic storm on record spanning nearly 1,000 miles
- Sustained winds of 64 mph at LaGuardia Airport
  - Peak gusts of 90 mph on Staten Island
- Storm tide at the Battery 14.06'
  - Topped record tide by nearly 3’

Impact of Sandy - Manhattan



Brooklyn Battery Tunnel

Impact of Sandy - Manhattan

Battery Tunnel Entrance

Battery Park Underpass - FDR

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Ravenswood	750	6%
TOTAL	**1,470**	**12%**

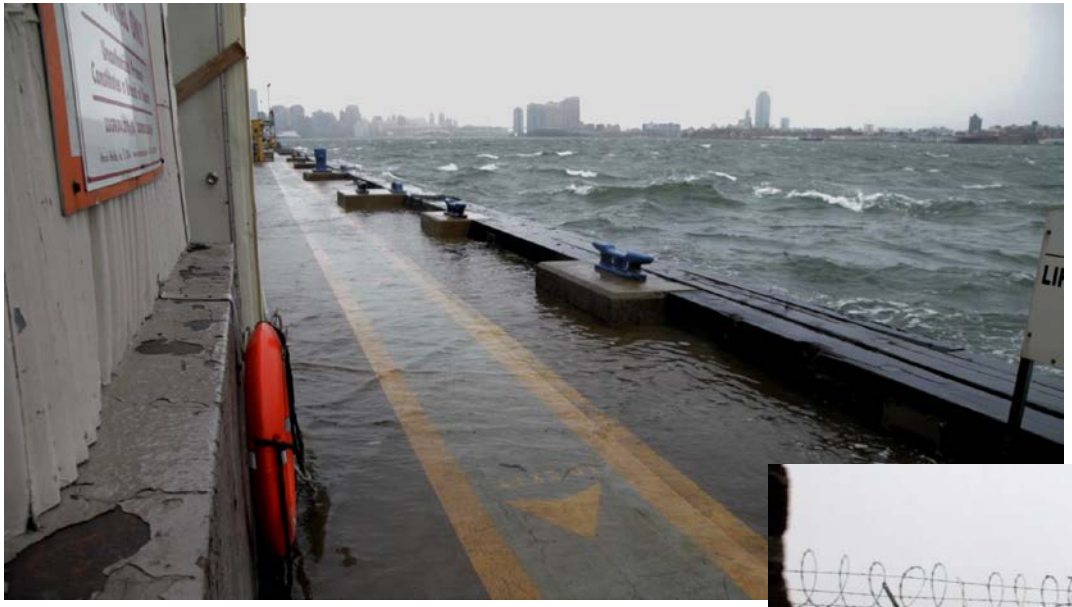
- ~ **90%** of Generating Capacity Unavailable
- **11** Electrical Networks Out
- **561** steam services affected in total

Impact of Sandy
NY Harbor Closure

- New York Harbor closed for nearly 3 days due to debris
- Transport of fuel oil and gasoline hindered by closure
  - Generating station fuel affected
  - Fleet vehicles affected

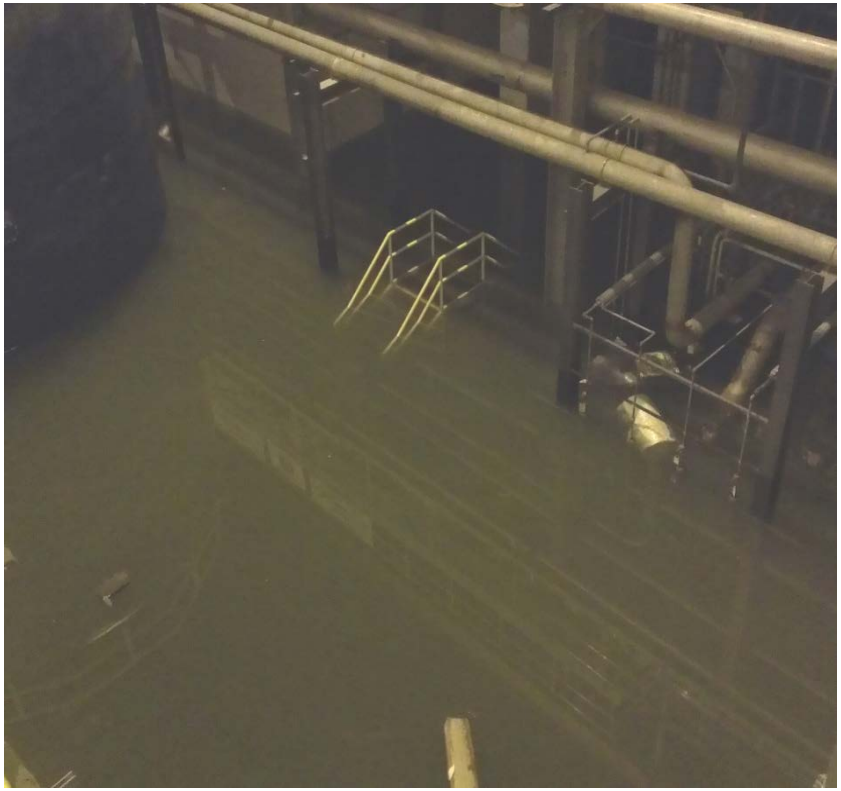
Impact of Sandy
14th Street Near East River

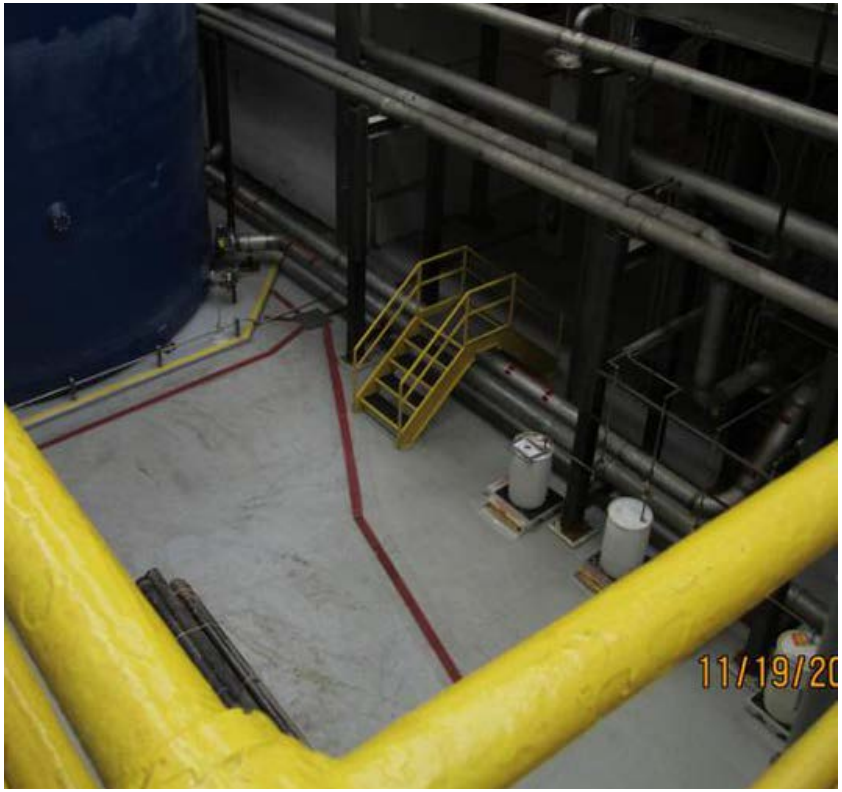
Impact of Sandy
East River Station Dock



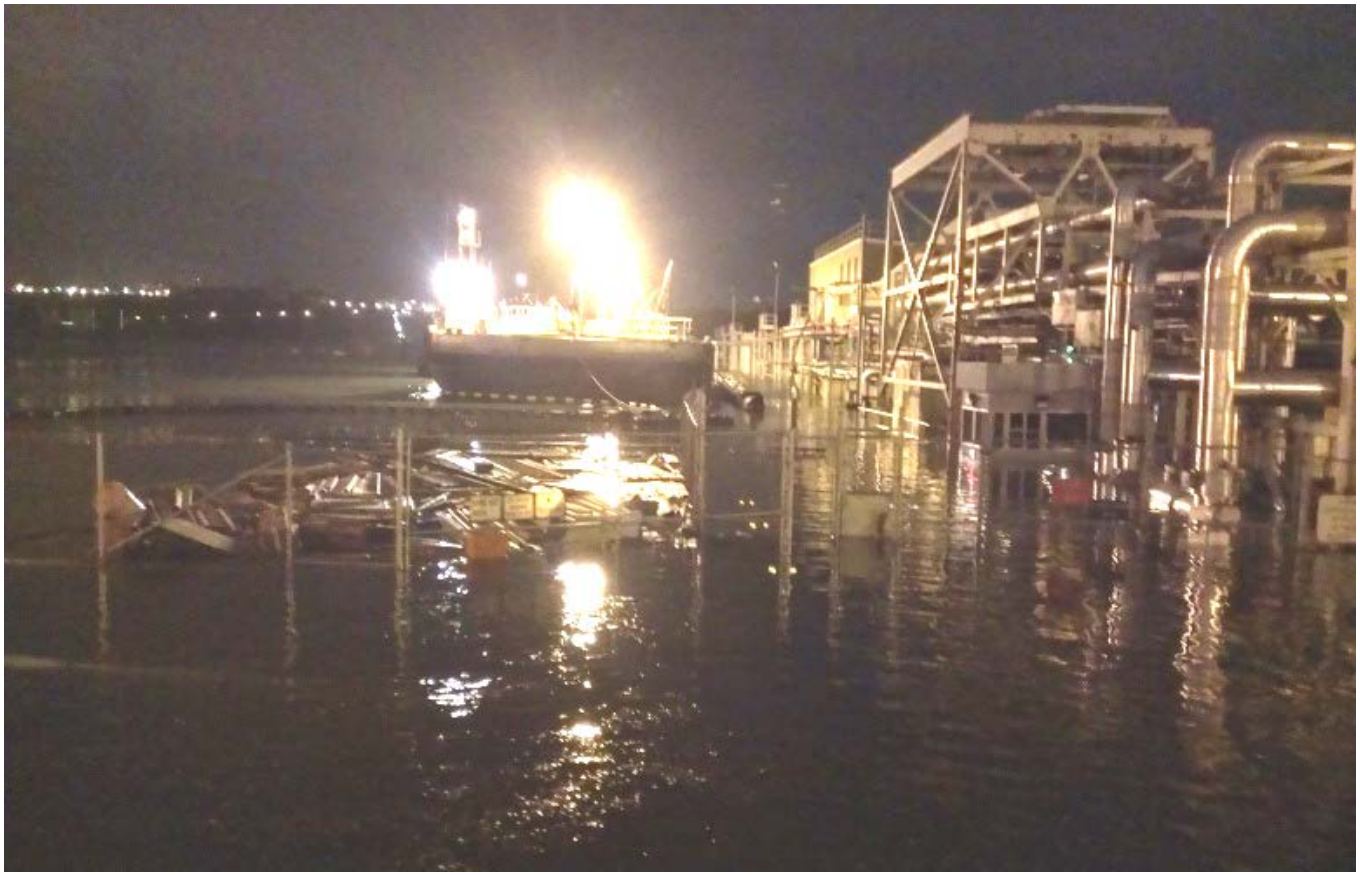
Impact of Sandy

Basement – 59th Street Station



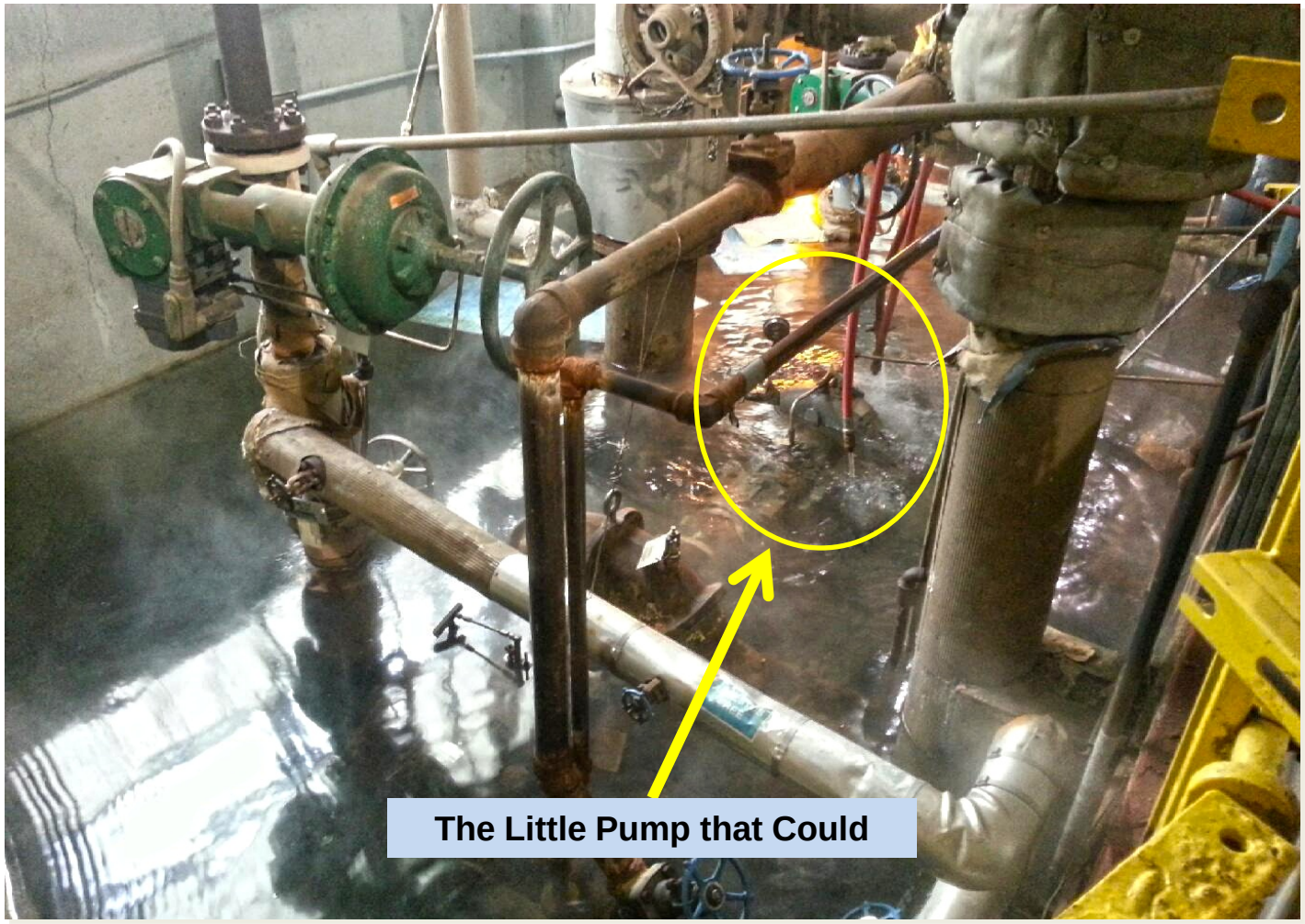


Impact of Sandy
Pier 98 – 59th St Station



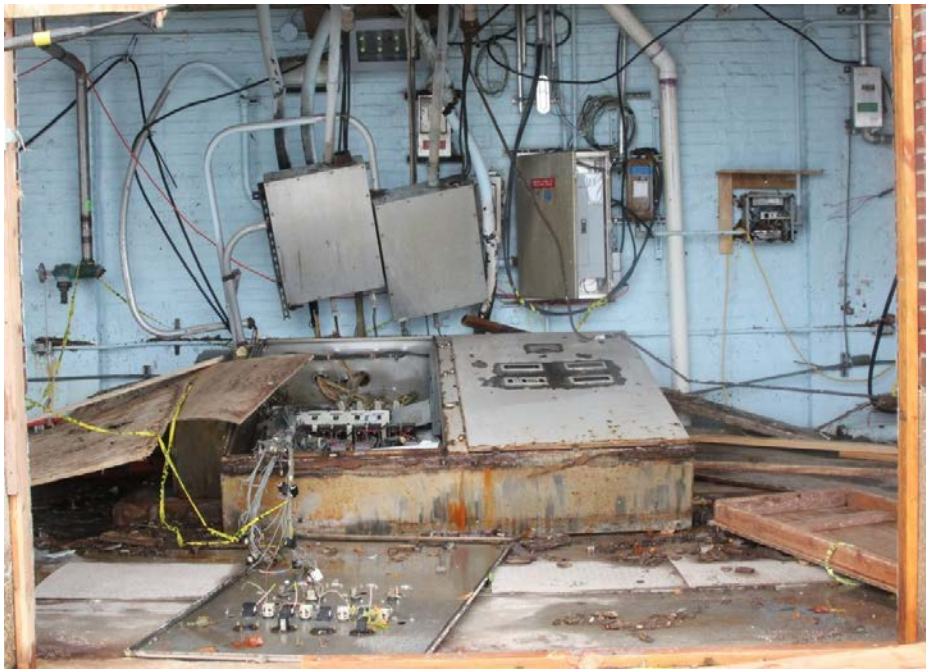
Impact of Sandy
Flood Protection Before High Tide

Impact of Sandy
Ravenswood Steam Station



Impact of Sandy
Equipment Damage

- 1 UPS
- 7 Compressed Air Systems
- 11 Breakers/Transformers
- 40 Valves
- 215 Instruments/Panels
- 302 Pump Motors



Field Obstacles

Restoration Logistics

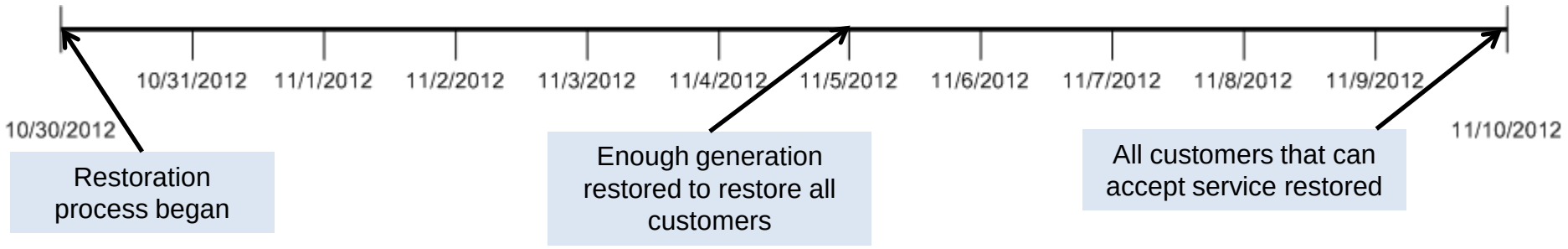
- Corporate Emergency Response Center
- Restoration Prioritization
- Assistance from:
  - Construction Services
  - Engineering
  - Gas
  - Contractors

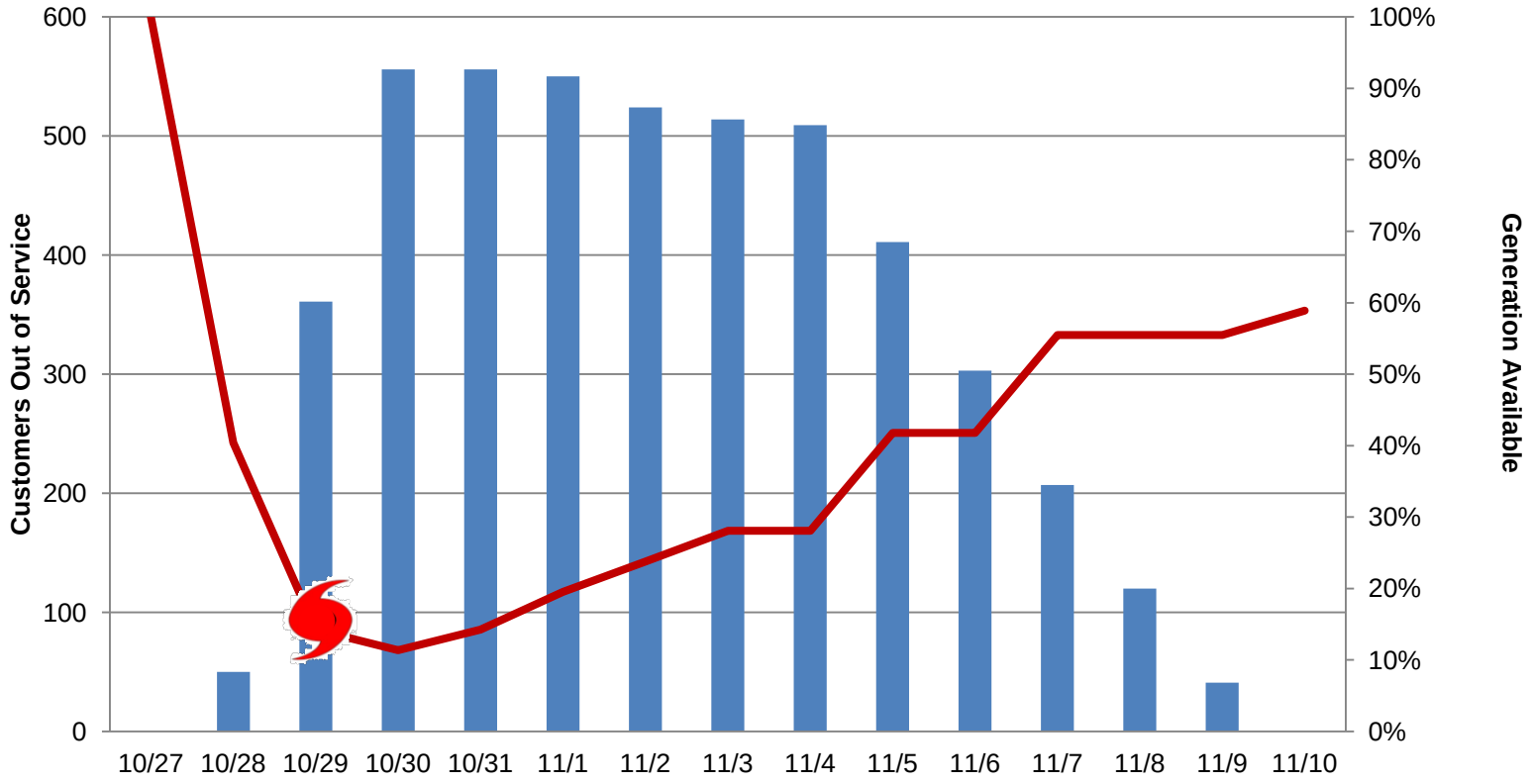
Category	Isolated Customers
Category 1 & 2 Flood Zones (pre-emptive)	130
Below 14th Street	236
Below 42nd Street (no electric)	142
Load Curtailment	53

Restoring the Distribution System

- Average of 60 Supplemental Crews per day supporting pumping operations
- Millions of gallons pumped from over 1,000 structures
- SD crews completed 48 MSOs
- Approximately 30 miles of mains returned to service

Restoration of the Steam System

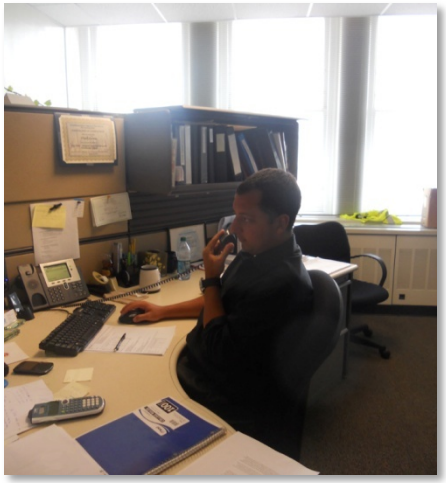




Steam Communications

Prior to, During, and After the Storm

- Initiated customer communications campaign on October 26 to warn of the potential impact of the storm
- Approximately 20 updates sent during the storm to impacted customers
- Over 700 phone calls and emails were sent and responded to by steam representatives



Restoring the Steam System
W Hotel Financial District

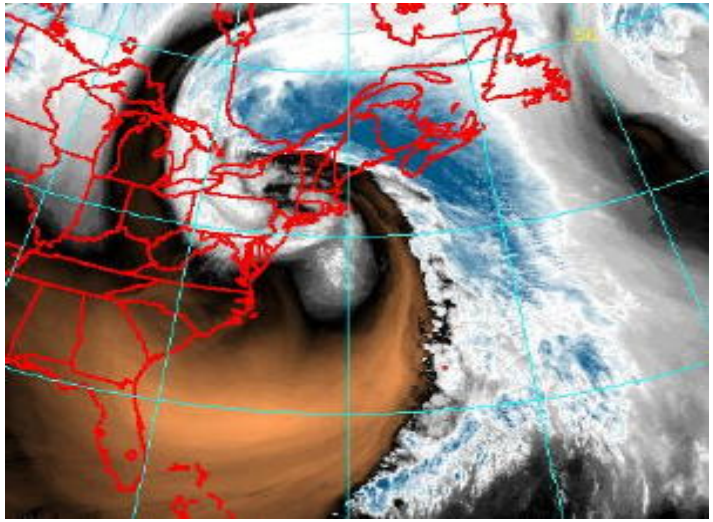
Steam Impacts from Climate Change

Potential For:

Higher Seasonal Average Temperatures

- Changing profile for heating demand

Increased Frequency and Severity of Storm Events



Rising Sea Level

- Greater frequency and regularity of flooding of infrastructure

Estimated Financial Impact
Steam

- $35 million for Restoration for Steam
- $165 million for Storm Hardening
  - Sealing intake and discharge tunnels
  - Compartmentalizing facilities
  - Raising and installing moats
  - Relocating equipment
  - Installing flood pumps

Immediate Measure – Seal Perimeter

Before

After

Immediate Measure – Install Flood Gate

Before

After

Immediate Measure – Upgrade Moat Wall

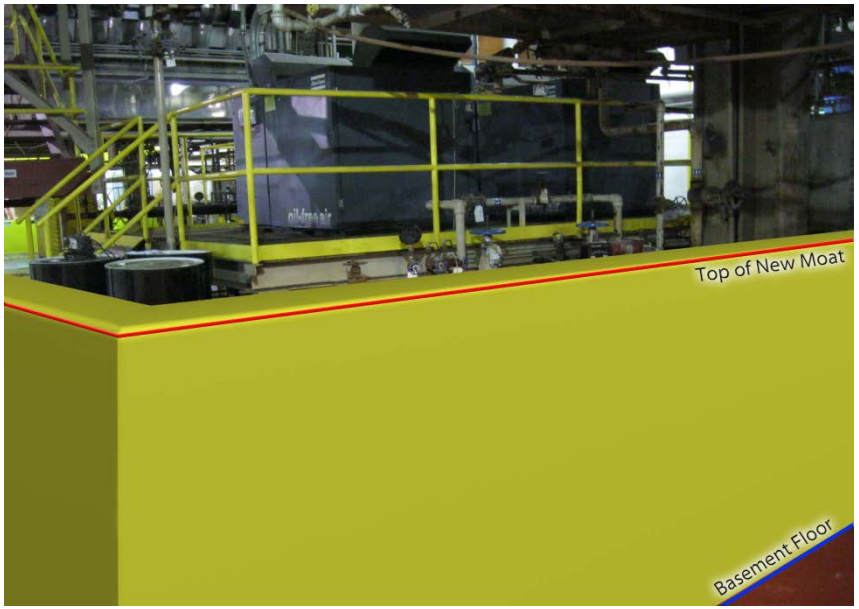
Before

After

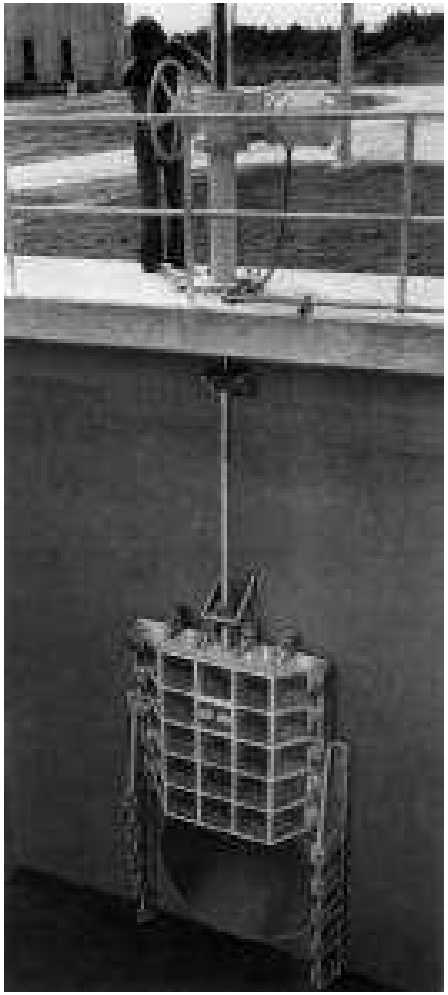
Immediate Measure
Compartmentalize Station

Before

After



Typical Sluice Gates Design



Summary – Immediate and Long-Term Plan

- Evacuation and system de-energizing plans to be practical and safe
- New Design Flood Guidance/Values - protect equipment to higher elevations
- Immediate Measures implemented by June, 2013
- Permanent Measures implemented by 2014 - 2016
- Consider all EH&S issues associated with “Hardening Measures”

This is just cool

Any Questions?