

A satellite image of Earth showing a large hurricane with a distinct eye and spiral cloud bands over the Atlantic Ocean. The text is overlaid on the image.

New Jersey Air Program Response to Super Storm Sandy

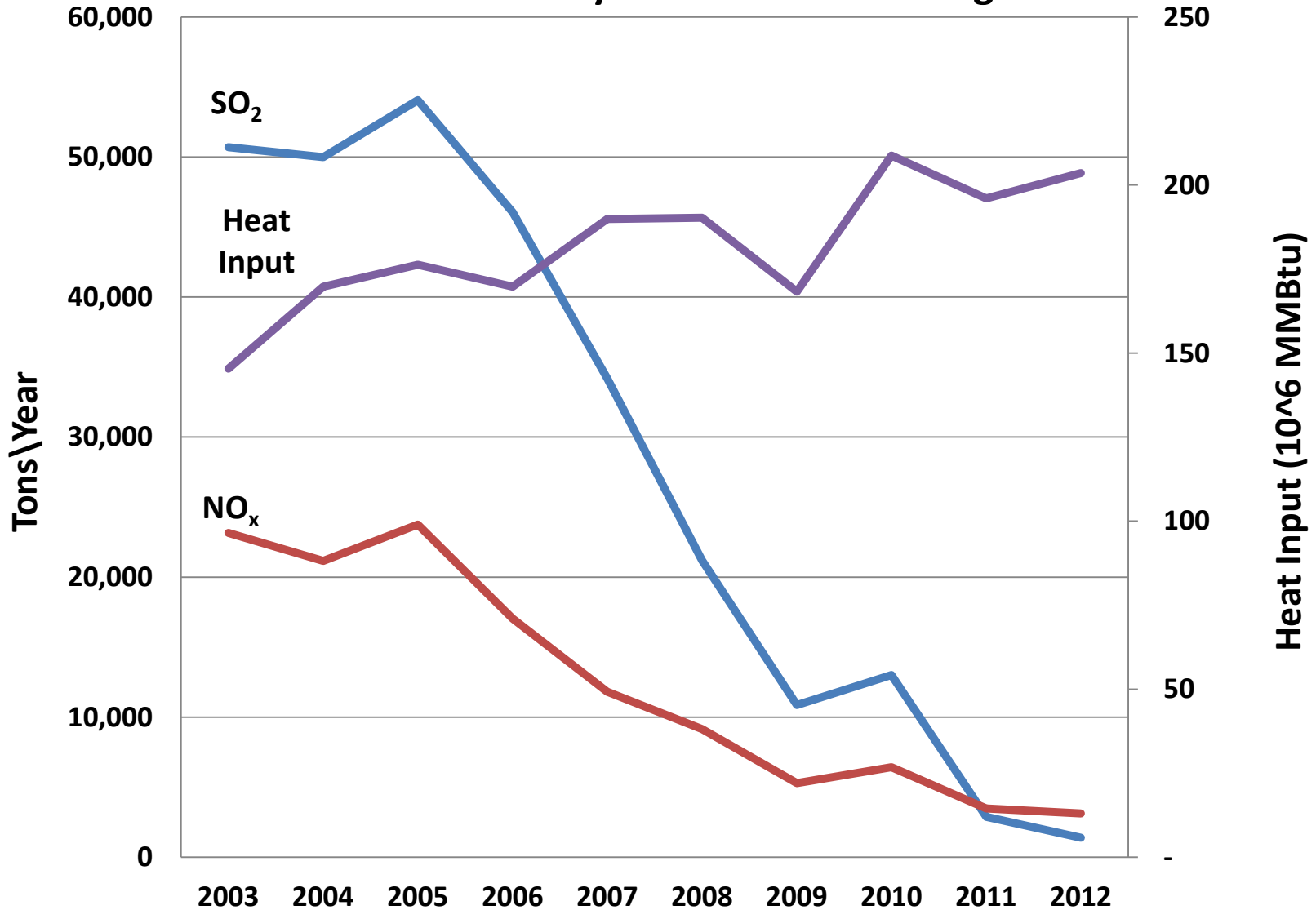
Chris Salmi

New Jersey Department of Environmental Protection

NACAA Membership Meeting

May 6, 2013

Actual SO₂ and NO_x Emissions and Heat Input from New Jersey Electrical Generating Units



from EPA Air Markets Program Data (ampd.epa.gov/ampd)

Overview

- Some of the Challenges
- Response
- Recovery
- Rebuild
- Recommendation

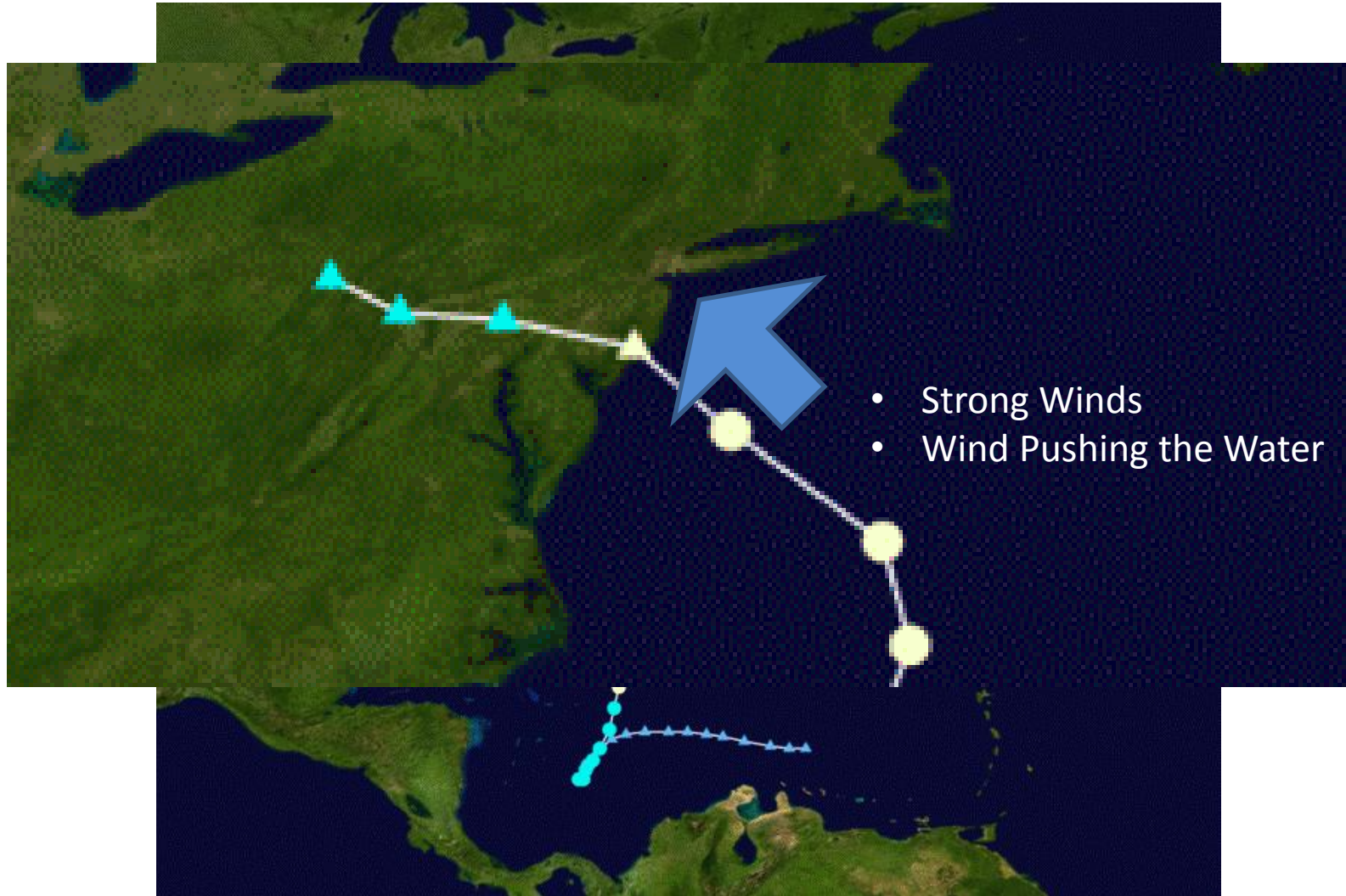
http://www.state.nj.us/nj/home/features/spotlight/hurricane_sandy.shtml

Thank You!

- Emergency Responders
- USEPA Staff and Leadership
- State and Local Agencies
- Many, Many, Others



Sandy Storm Track



Waterway Debris Management Zones State of New Jersey

Waterway Debris Management Zones

- ZONE 1 – Metro: from Outer Bridge Crossing north to the State border
- ZONE 2 – Raritan Bay: Northern bank of Navesink River up to the Outer Bridge Crossing
- ZONE 3 – Monmouth County Coastal Tidal Streams: All of Navesink River (and tributaries) south to and including all of the Manasquan River (and all tributaries)
- ZONE 4 – Barnegat Bay North: Southern bank of Manasquan River south to the Northern border of Normandy Beach
- ZONE 5 – Mid Barnegat Bay A: Northern border of Normandy Beach to Route 37 bridge
- ZONE 6 – Mid Barnegat Bay B: Route 37 bridge to southern tip of Island Beach State Park
- ZONE 7 – Southern Barnegat Bay: Southern tip of Island Beach State Park to Route 72 bridge
- ZONE 8 – Little Egg Harbor A: Route 72 bridge to southern border of Beach Haven
- ZONE 9 – Little Egg Harbor B: Southern border of Beach Haven to southern tip of Long Beach Island
- ZONE 10 – Great Bay: Southern tip of Long Beach Island to northern tip of Brigantine Inlet
- ZONE 11 – Southern Zone: Northern border of Brigantine Inlet to the southern tip of the state

Philadelphia

Trenton

New York City

Zone 1

Zone 2

Zone 3

Zone 4

Zone 5

Zone 6

Zone 7

Zone 8

Zone 9

Zone 10

Zone 11

Legend

Waterway Debris Management Zones NJ Counties

FEMA Surge Limits
100 Year 100 Year
Low 0

NJ Municipalities

Streams (detailed)

Roads (Major)

- Interstates
- US Highways
- NJ Highways
- Toll Routes



Map Production: NJDEP/DIRM/BGIS, 1/11/2013
Map Projection: NJ State Plane, NAD83, US Feet

Map Production: NJDEP/DIRM/BGIS, 1/11/2013
Map Projection: NJ State Plane, NAD83, US Feet
Note:
1 USACE projects are representative approximate locations.
2 Intersecting Waterway to representative approximate location.
3 The NJ State Channel Inventory are representative of State Channels in New Jersey's Marine Transportation System. These files represent historically noted State Channels. They may be changed and marked: Designated and Unmarked, Undesignated and Marked, Undesignated and Unmarked.
4 FEMA Storm Surge Data created from field-verified High Water Marks (HWMs) and Storm Surge Sensor data from the USGS through 11 November 2012. HWMs and Surge Sensor data are used to reproject a water surface elevation, then subtracted from the best available DEM, to create a depth and extent boundary by state. <http://fema.maps.arcgis.com/home/item.html?id=30f95252460444307296f4d4e40>



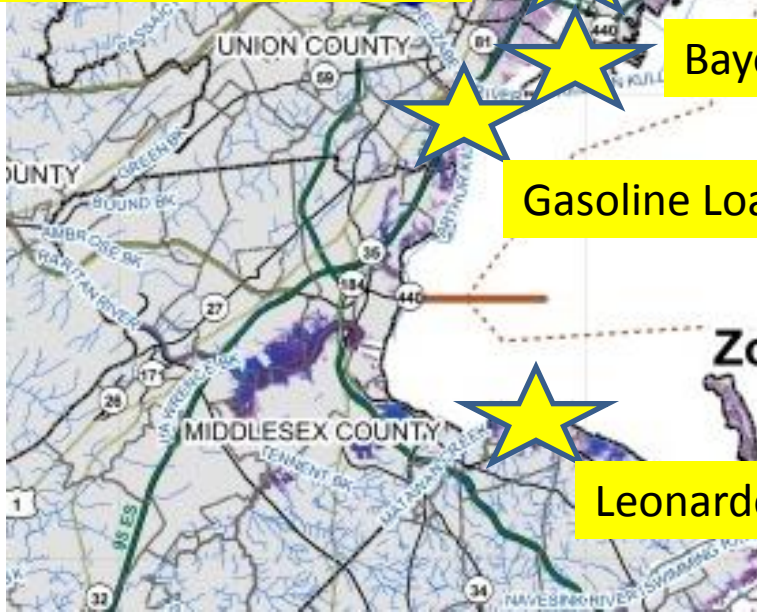


PVSC Sewage Treatment Plant

Liberty State Park



Zone 1



Bayonne Air Monitoring Site



Gasoline Loading Racks

Zone 2

Leonardo State Marina



Some of the Challenges

- Fuel shortages
- Lack of Power
 - Many Homes
 - Many for a Week
 - Some for More Than Two Weeks
 - Community Water Systems – over 400 impacted
 - Wastewater Treatment Facilities- 100 impacted
- Phone Service
- Mounds of Sand in the Shore Area
- Debris
 - On Land
 - In Water

Response

- Fuel Shortages
 - Damaged Fuel Distribution System
 - Lack of Power to Get Fuel Out of the Storage Tanks
 - Actions
 - Gasoline Waiver – allowed use of conventional gasoline
 - Odd / Even Rationing
 - Emergency Generators – allowed use of higher sulfur fuel
 - Emergency Equipment – allowed use of higher sulfur fuel in pre-2007 engines

Restoration

- No Action Assurance – 20 facilities
 - No Electricity Available
 - Air Pollution Control Equipment Damage as the result of the Storm Surge and / or the Wind
- Compliance Advisories



New
Jersey
Department of
Environmental
Protection

COMPLIANCE ADVISORY

Enforcement **Alert**

Making You Aware of Anticipated Enforcement Activities

Compliance and Enforcement

Issued: October 31, 2012

#2012-15

Emergency Diesel Generator Fueling Provisions Necessitated by Hurricane Sandy

• • •

Compliance and Enforcement

Issued: November 9, 2012

2012-19

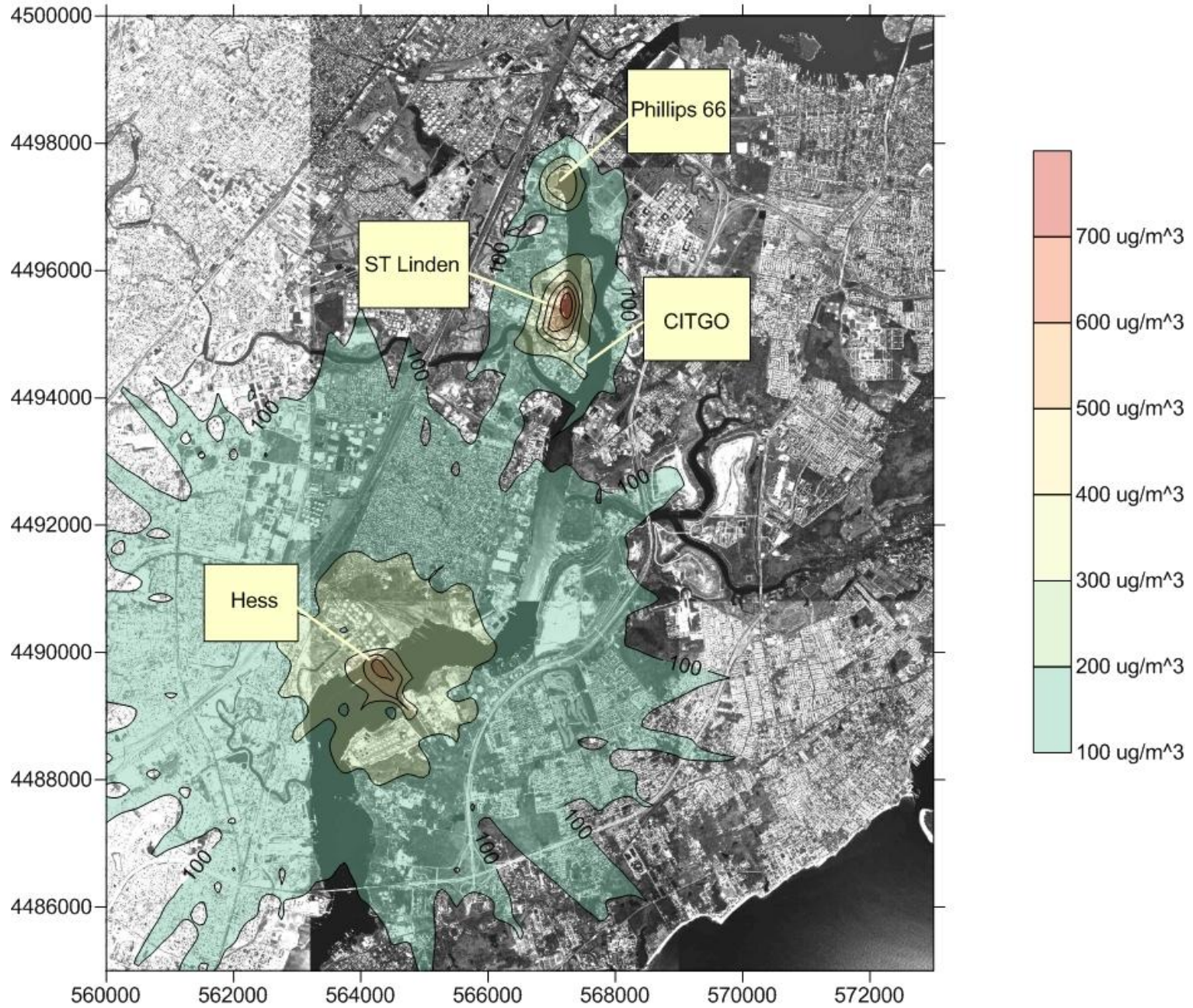
Emergency Generators and Packaged Boilers Use Provisions Necessitated by Hurricane Sandy

<http://www.state.nj.us/dep/enforcement/advisories-air.htm>

Restoration

- No Action Assurance – 20 facilities
 - Air Pollution Control Damage as the result of the Storm Surge
 - No Power
- Compliance Advisories
- Risk Assessments
 - Marine Loading Facilities
 - Operate Without Controls for Several Months
 - Sewage Sludge Incinerators
 - Increased Usage While Alternative Sludge Disposal Was Not Available

Cumulative 1-hr Benzene Impacts from Uncontrolled Gasoline Loading Compared to the 1-hour Reference Concentration of 1,300 $\mu\text{g}/\text{m}^3$



Sludge Incinerator Assessment

Table 4

Maximum Predicted Annual Cancer Risk for all HAPs

Pollutant	Maximum Annual Impact (Dorr) ^a (µg/m3)	Maximum Annual Impact (Niro) ^b (µg/m3)	Unit Risk Factor (µg/m3) ⁻¹	Maximum Incremental Cancer Risk (from Dorr)	Incremental Cancer Risk at nearest Sensitive Receptor (from Dorr)	Incremental Cancer Risk (from Niro) ^c	Maximum Combined Incremental Cancer Risk	Combined Incremental Cancer Risk at nearest Sensitive Receptor
Arsenic	2.0 x 10 ⁻⁴	1.82 x 10 ⁻⁴	4.3 x 10 ⁻³	8.6 x 10 ⁻⁷	4.3 x 10 ⁻⁷	7.8 x 10 ⁻⁷	1.6 x 10 ⁻⁶	5.6 x 10 ⁻⁷
Benzo (a) pyrene	7.0 x 10 ⁻²	4.94 x 10 ⁻²	1.1 x 10 ⁻³	7.7 x 10 ⁻⁵	3.3 x 10 ⁻⁵	5.4 x 10 ⁻⁵	1.3 x 10 ⁻⁴	4.4 x 10 ⁻⁵
Benzene	1.0 x 10 ⁻³	8.77 x 10 ⁻⁴	7.8 x 10 ⁻⁶	7.8 x 10 ⁻⁹	3.9 x 10 ⁻⁹	6.8 x 10 ⁻⁹	1.4 x 10 ⁻⁸	5.7 x 10 ⁻⁹
Beryllium	1.0 x 10 ⁻⁴	1.97 x 10 ⁻⁴	2.4 x 10 ⁻³	2.4 x 10 ⁻⁷	1.6 x 10 ⁻⁷	4.7 x 10 ⁻⁷	7.1 x 10 ⁻⁷	2.4 x 10 ⁻⁷
Cadmium	6.0 x 10 ⁻⁴	4.86 x 10 ⁻⁴	3.5 x 10 ⁻³	2.1 x 10 ⁻⁶	9.8 x 10 ⁻⁷	1.7 x 10 ⁻⁶	3.8 x 10 ⁻⁶	1.2 x 10 ⁻⁶
Chromium VI	5.0 x 10 ⁻⁵	2.02 x 10 ⁻⁴	1.2 x 10 ⁻²	6.0 x 10 ⁻⁷	2.3 x 10 ⁻⁷	2.4 x 10 ⁻⁶	3.0 x 10 ⁻⁶	3.9 x 10 ⁻⁷
Lead	2.0 x 10 ⁻³	5.6 x 10 ⁻³	1.2 x 10 ⁻²	2.4 x 10 ⁻⁵	1.2 x 10 ⁻⁵	6.7 x 10 ⁻⁵	9.1 x 10 ⁻⁵	1.3 x 10 ⁻⁴
Nickel	5.0 x 10 ⁻³	3.4 x 10 ⁻³	2.4 x 10 ⁻⁴	1.2 x 10 ⁻⁶	5.6 x 10 ⁻⁷	8.1 x 10 ⁻⁷	2.0 x 10 ⁻⁶	7.2 x 10 ⁻⁷
2,3,7,8-TCDD	2.5 x 10 ⁻⁹	1.79 x 10 ⁻⁹	3.7 x 10 ⁻¹	9.2 x 10 ⁻³	3.7 x 10 ⁻³	6.6 x 10 ⁻³	1.5 x 10 ⁻¹	4.8 x 10 ⁻²

^a Assumes the Dorr-Oliver operates 1536 hours per year.

^b Assumes the Niro incinerator operates for 8760 hours a year.

^c Obtained from the August 1991 summary memorandum

Table 5

Dorr-Oliver Maximum Predicted Long-Term Non-Carcinogenic Inhalation Risk

Pollutant	Maximum Annual Impact (µg/m3)	Reference Concentration (µg/m3)	Hazard Quotient
Mercury	0.002	0.3	0.01
Hydrogen Chloride	0.08	20	0.004

Table 6

Dorr-Oliver Maximum Predicted Short-term Non-Carcinogenic Risk for all HAPs

Pollutant	Averaging Time	Maximum Short-term Impact (Dorr)(µg/m3)	Reference Concentration (µg/m3)	Hazard Quotient (Dorr)
Arsenic	4-hour	0.02	0.19	0.11
Benzene	6-hour	0.08	1300	6.1 x 10 ⁻³
Hydrogen Chloride	1-hour	14.2	2100	0.006
Lead	24-hour	0.21	0.1	2.12
Mercury	1-hour	0.52	1.8	0.29
Nickel	1-hour	1.0	6	0.18

Restoration

- No Action Assurance – 20 facilities
 - Air Pollution Control Damage as the result of the Storm Surge
 - No Power
- Compliance Advisories
- Risk Assessments
 - Marine Loading Facilities
 - Sewage Sludge Incinerators
- Odor – Restart of Waste Water Treatment Plants
- Debris Management
 - Woody Waste
 - Demolition
 - Odor at Landfills Accepting Wall Board
 - Wet Debris
 - Asbestos

Rebuilding

- HUD Grant - \$6 Billion
 - Delegation of Federal Determinations
 - NEPA
 - General Conformity

Recommendation

- Be Prepared
 - Identify Critical Infrastructure
 - Obtain Contact Information
 - Backup Power Generation Needs
 - Fuel Needs
 - Establish Mechanisms for Utilities to Report Restoration of Power Distribution Network

Come Visit New Jersey!

