INDIAN POINT VS. THE HUDSON

Impacts of Nuclear Reactors on the Hudson River

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Abusing Our Waters webinar
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Indian Point – the basics

Two Operating Reactors, One Closed

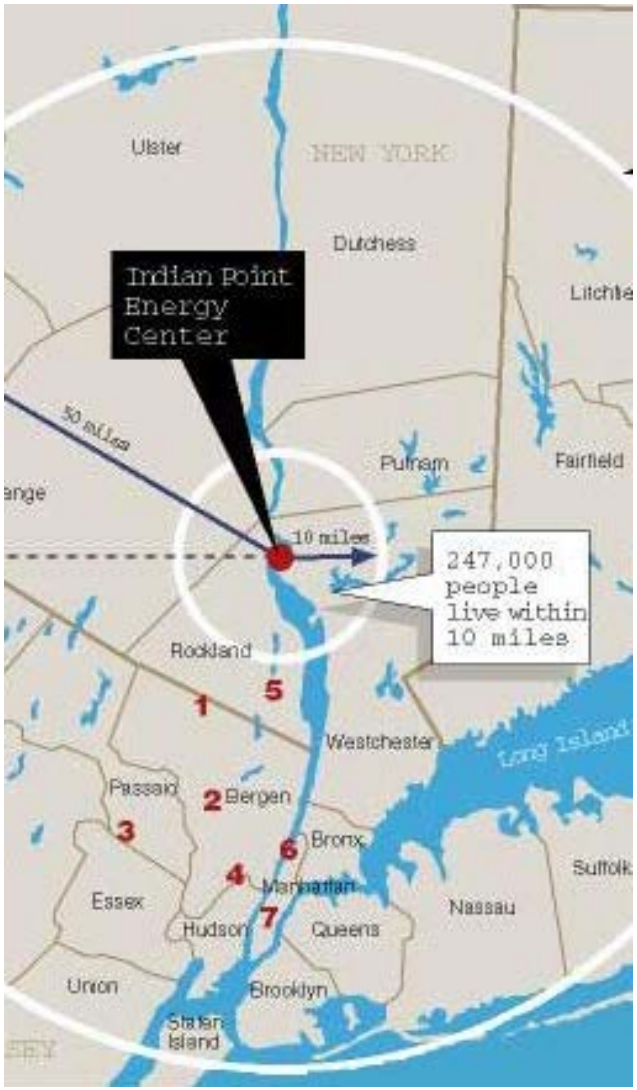
- Indian Point 1 (1962-1974)
- Indian Point 2 (1973) and 3 (1975)

25 miles from New York City

- 247,000 in Evacuation Zone
- 17 million residents in 50-mile radius

Operational Details

- Westinghouse PWRs (4-loop design)
- 2,069 MW generating capacity
- 1,500 tons of irradiated fuel
- Once-Through Cooling System
  - Hudson River = Water Source and Ultimate Heat Sink



Multiple Issues of Concern

Earthquake Risk

Evacuation

Aging-Related Degradation

Spectra Natural Gas Pipeline

High-Density Fuel Pools

Fuel Pool Leaks

Security/Terrorism

Fire Safety and other exemptions

Systemic Mismanagement

Aquatic Life and Drinking Water Impacts

Challenges to Continued Operation

NRC Relicensing

- NYS Attorney General and Riverkeeper
- Both reactors now operating on expired licenses

NYS Dept. of Environmental Conservation Permits

- State Pollutant Discharge Elimination System (SPDES)
- Water Quality Certificate (Clean Water Act § 401)
- Entergy must mitigate impacts on Hudson River

NYS Dept. of State

- Denied Coastal Zone Management certification
- Case before New York Court of Apeals

Indian Point's Water Consumption

Once-Through Cooling System

- Largest industrial water user in NYS

2-2.5 billion gallons/day

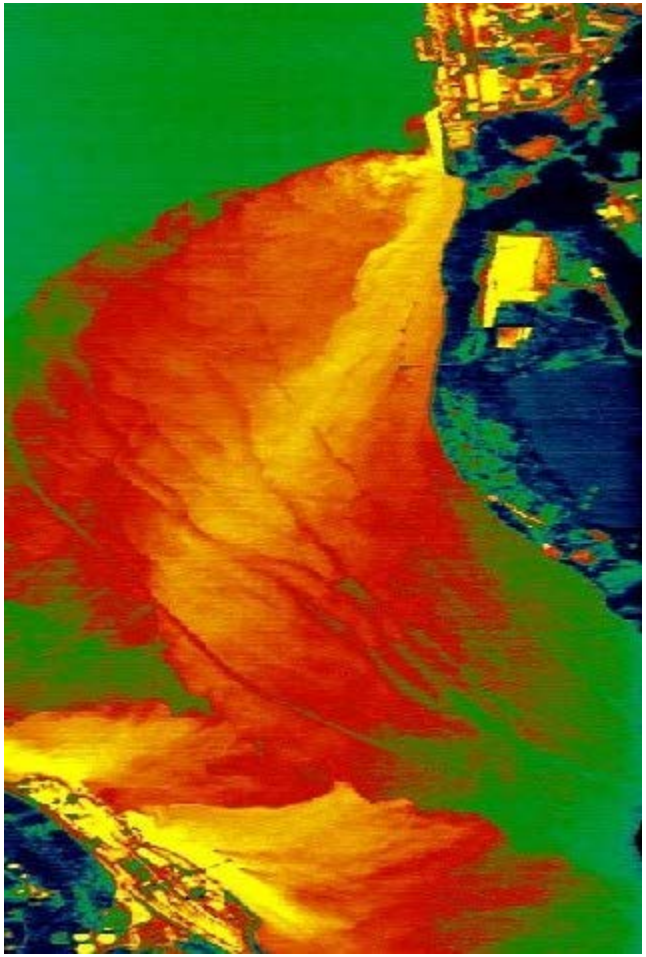
- 840,000 gallons/minute per reactor
- More than twice New York City's water consumption

Destroys 1.2 billion organisms per year

- Fish, eggs, and larvae
- Endangered species: Shortnose and Atlantic Sturgeon

DEC: Indian Point causes "significant mortality at all life stages"

Thermal Pollution



Massive discharges of waste heat

- 30 billion BTUs/hour
- Equals one Hiroshima bomb per 2 hours

Heats water to unsafe levels

- Exceeds 90F in summer months

Temps over 85F unsafe

- Fatal to most Hudson River fish species
- Phytoplankton decline – bottom of food chain
- Oxygen levels lower in warm water
- Fish metabolisms increase with temperature

Drinking Water Impacts

Routine Releases

- 20,000+ curies of tritium (gaseous and liquid)

Fuel Pool Leaks

- February: tritium at 14.8 million pCi/l – 740 times drinking standard
- Sr-90, Cs-137, Ni-63 also detected

Hudson River sources

- Primary source for 5 communities, incl. Poughkeepsie and Hyde Park
- Emergency source for New York City

Croton Reservoir System

- Provides up to 30% of NYC water supply
- Largest reservoir 8 miles east of Indian Point

Water Permit Enforcement

2003 DEC SPDES Permit

- Conditioned on mitigating harm
- Best Technology Available (BTA) standard
  - Closed-cycle cooling system
  - Forced protective outages until CCCS implemented
- Factors in “economically achievable” cost standard

Litigation at DEC over BTA requirement

- 2009: Entergy applies for Water Quality Certification
- 2010: NYS DEC denies WQC
- 2013: ALJ ruling requires DEC to analyze BTA alternative
- 2014: Hearings on DEC BTA alternative
- 2015: Final briefs filed in December

Mitigation Options Under Review

DEC Preferred Option

- Closed-Cycle Cooling System(Cooling Towers)
  - Benefit: 93%-98% reduction in fish mortality
- Cost = $1.1 to 1.5 billion ($58-$79 million/yr.)

Entergy's Proposed Option

- Cylindrical Wedge-Wire Screens
  - Benefit: unknown – unprecedented application
- Cost = $250 million

DEC Alternative Option

- Forced protective outages (42 to 92 days/year)
  - "Hybrid" option: IP2 cooling tower + IP3 forced outages
  - Benefit: 87%-98% reduction in entrainment; 90-92% in impingement
- Cost = $1.8 to $2.5 billion ($93-$127 million/yr.)

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