Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC Village of Buchanan, New York

Emissions Avoidance Study

Prepared for

Entergy Nuclear Northeast

Prepared by

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1

TABLE OF CONTENTS

LIST OF APPENDICES

1

EXECUTIVE SUMMARY

In evaluating the impact of decommissioning Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC, the potential emissions increases associated with replacement electricity generation sources need to be evaluated. TRC evaluated several different scenarios to determine the impact on the air quality in New York State and the local area. Replacement sources examined included existing fossil generating stations located in the entire state of New York, the Hudson Valley and New York City. To provide context for interpreting the projected emissions increases, the increases for each replacement scenario are expressed as percent increases relative to regional and statewide emissions, and the health and welfare effects associated with each pollutant and the groups most susceptible to them have been tabulated.

When evaluating the emission increase from sources located throughout the state, it was necessary to develop a "generation fuel mix." This consisted of the anticipated mix of coal, gas, oil etc. expected for the replacement generation sources during the years 2002 through 2005. Data from the current New York State Energy Plan, dated December 2001, serves as the basis for the existing and projected future generation fuel mix applied in the analysis

Indian Point Units 2 and 3 have an average net maximum capacity of 983.7 and 989 Megawatts (MW), respectively, based on information provided to the Independent System Operator (ISO). Based on a 90% capacity factor, the annual generating capacity of these two units is 15,552,767 Megawatt-hours (MWh), which represents approximately 10% of the state's total generation.

The first set of calculations presented assumes that the demand is met by increased operation of existing New York State fossil stations, so that a generation mix of coal, oil and natural gas in the years 2002 through 2005 replaces the generating capacity of Units 2 and 3. To establish a baseline, emissions estimates for the existing units are based on a combination of data from the US Environmental Protection Agency (EPA) utility Emissions & Generation Resource Integrated Database 2000 (EGRID2000), Version 2.0 and the US EPA Document AP-42 emission factors for stationary sources. When more than one emission factor was available, the lower emission factor was chosen. This approach represents a conservative estimate of the potential increase.

Since it is reasonable to assume that the majority of lost output would be made up by increased generation of units nearest to the New York City / Westchester load pocket, replacement by the four large fossil power stations in the Hudson Valley (Bowline Point, Lovett, Danskammer and Roseton) and the existing units in New York City was also studied. For each of these plants,

1

baseline emissions and generation were obtained from the EGRID2000 database. Data for the most recent year included in this database (1998) was utilized in this study.

The first task in this set of calculations assumed replacement by the four large plants in the Hudson Valley: Bowline Point, Lovett, Danskammer, and Roseton. These plants utilize boilers that are fired with coal, No. 6 residual oil and natural gas. These plants currently operate at capacity factors ranging from 32% to 58%. These four stations would need to operate at over 90% capacity factor in order to make up the lost generation from Indian Point 2 and 3. It has been determined that these plants are already operating more during the ozone season (May through September) based on the EGRID2000 data; thus the increased demand during the ozone season cannot be met by these four stations alone.

The next situation that was evaluated was the replacement by the 14 existing power plants in the five boroughs of New York City. The replacement demand is approximately 33% of the available generation from the New York City plants. In order to determine the generation and emissions increases, it was assumed that the total fuel and plant mix from these plants would remain constant, except for the plants that could not meet this increase. Since the current generation for all of these facilities combined is roughly equal to that of Indian Point 2 and 3, the emission rates in New York City would nearly double in order to make up the lost generation.

The final scenario of replacement by existing sources that was evaluated was the replacement by a combination of the four Hudson Valley plants and the plants located in New York City. For the purposes of this evaluation, it was assumed that half of the make-up generation would come from the four Hudson Valley Plants and the other half would come from the plants in New York City, with the increase determined by assuming that the total fuel and plant mix from these two sets of plants would remain constant, except for the plants that could not meet this increase.

The increases from each of the above-described scenarios were compared to the current emissions from the power generation industry in New York. The results are presented in the table below:

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Replacement Generation Sources	CO_2	SO_2	NO_x	PM-10	CO	VOC
New York State: 2002 Generation Mix	20.20%	23.81%	21.58%	22.69%	17.76%	17.28%
New York State: 2003 Generation Mix	20.12%	23.54%	21.42%	22.51%	17.80%	17.34%
New York State: 2004 Generation Mix	19.41%	21.10%	20.03%	21.11%	9.28%	18.36%
New York State: 2005 Generation Mix	21.05%	20.06%	20.66%	22.14%	11.66%	23.44%
Hudson Valley Power Plants	21.08%	18.77%	20.80%	52.59%	74.31%	56.97%
New York City Power Plants	18.10%	2.52%	15.02%	9.28%	17.24%	16.83%
Hudson Valley and New York City	19.83%	11.32%	18.89%	28.49%	42.02%	34.63%

Note: Total increase is compared to utility source emissions only in New York. Baseline data obtained from USEPA's EGRID2000 database (1998)

In addition to evaluating the increase in emissions, TRC prepared a matrix summarizing the potential effects and health hazards from these pollutants. Currently, Westchester County is classified as a non-attainment area for ozone. Ozone can cause lung irritation, permanent lung damage, aggravated asthma, reduced lung capacity, pneumonia and bronchitis. Persons that are most susceptible to the negative effects of ozone are those with respiratory illnesses, outdoor workers, and children. Ozone also increases the susceptibility of plants to disease, thus reducing crop and forest yields.

The entire state of New York is located in the Ozone Transport Region (OTR), which requires that new sources of NO_x and VOC be subject to Lowest Achievable Emission Rates (LAER) and emissions offsets. In essence, this massive increase in generation by existing sources is comparable to constructing one large new source without subjecting it to these current applicable regulations since the majority of these existing sources were constructed prior to the new source review requirements and were not subject to LAER and offset requirements. The increase in NO_x and VOC, the precursors to ozone, would constitute a significant setback in the area's efforts to meet progress goals toward ozone attainment status in the near future. In order to reach attainment, the area needs to further reduce emissions in the area as opposed to unnecessarily increasing these emission rates.

The attached matrix outlines the effects of all criteria pollutants and the groups that are most greatly impacted by them. As shown with carbon monoxide and ozone, these pollutants affect all people, regardless of age and current health, in addition to the vegetation in the area.

1

Regulatory Impacts and Effects of Major Air Pollutants

Pollutant	NAAQS Attainment Status for New York State	Basis for NAAQS	Most Susceptible Population Groups	Additional Impacts
SO_2	Attainment	Temporary breathing difficulty Respiratory illness Aggravates existing Heart Disease	Asthmatics, Children, Elderly, Persons with Heart or Lung Disease	Precursor to acid rain formation Visibility impairment from Sulfate Particles (PM-2.5) Aesthetics damage due to accelerated building decay Acidification of lakes due to Atmospheric Deposition Soil degradation due to Atmospheric Deposition
NO_x	Attainment	Damage to lung tissue Respiratory illnesses – Bronchitis Reduction in lung function	Children, Asthmatics, Outdoor Workers	Precursor to ground-level Ozone (Smog) Precursor to acid rain formation Water quality deterioration (Oxygen depletion) Visibility impairment
PM-10	Attainment for all Counties with exception of New York County	Aggravated Asthma Chronic Bronchitis Decreased lung function Premature Death	Persons with Heart Disease or Influenza, Asthmatics, Children, Elderly	Major cause of reduced visibility (Haze) Aesthetics damage due to stains from soot Acidification of lakes due to Atmospheric Deposition Soil degradation due to Atmospheric Deposition
CO	Attainment with exception of Metropolitan New York City (recently redesignated as attainment by USEPA, but New York State redesignation pending)	Cardiovascular effects Vision problems Reduced ability to work and learn Death (extremely high levels)	Persons with Heart or Lung Disease	
Ozone	Attainment for all counties with exceptions of New York State Metropolitan Areas and Long Island, but entire state is located within northeast Ozone Transport Region	Lung irritation (wheezing, coughing) Permanent lung damage Aggravated Asthma Reduced lung capacity Pneumonia and Bronchitis	Persons with respiratory illnesses, Children, Outdoor workers	Increases susceptibility of plants to disease Reduces crop and forest yields Aesthetics damage due to damage to leaves and trees Damages rubber and fabrics Reduced visibility
VOC	Not Applicable	Not Applicable	Not Applicable	Precursor to ground-level Ozone (Smog) Damage to plants
CO_2	Not Applicable	Not Applicable	Not Applicable	Contributes to Global Warming

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1.0 INTRODUCTION

TRC Environmental Corporation (TRC) was retained by Entergy Nuclear Operations, Inc. (Entergy Nuclear) to perform an assessment of the potential increase in emissions of criteria pollutants from non-nuclear generating assets within New York State in the event that the Indian Point 2 and 3 are decommissioned. The assessment assumed that additional non-nuclear generation would be required within the State of New York to replace the electric generating output of Indian Point Units 2 and 3 and evaluated increase in annual potential emissions for the period of 2002 through 2005.

The evaluation performed by TRC included the following activities:

- Development of a "generation fuel mix" (i.e., coal, gas, oil, etc.) assumption for use in developing the avoided emissions calculations. TRC utilized data from the current New York State Energy Plan, dated December 2001, as the basis for the existing and projected future generation fuel mix applied in the analysis.

- Estimation of projected criteria pollutant emissions for the non-nuclear generating assets which would be required to replace the electric generating output of Entergy Nuclear's Indian Point Units 2 and 3 in the event that the Indian Point Nuclear Generating Station is decommissioned. The emission calculations are based on a projected 90% capacity factor for Units 2 and 3 through the study period of 2002 to 2005. Indian Point Units 2 and 3 have an average net maximum capacity, as reported to the Independent System Operator, of 983.7 Megawatts (MW) and 989 MW, respectively. The annual generating capacity of these two units is 15,548,036 Megawatt-hours (MWh) per year at a 90% capacity factor, representing approximately 10% of the state's total generation. Calculations of replacement generation emissions were based upon the "generation fuel mix" discussed above, assuming that the lost generation would be made up by a mix of existing in-state fossil (coal/oil/gas) fired units. Emissions estimates for the existing units were based on a combination of data from a US Environmental Protection Agency (EPA) utility emissions database and the US EPA Document AP-42 emission factors for stationary sources. Replacement by the sources located in the Hudson Valley and New York City was also evaluated as an option.

- Preparation of a matrix of regulatory impacts and effects of major air pollutants.

- Evaluation of additional costs for NO_x allowances.

TRC's findings relative to the above activities are summarized on the following pages.

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2.0 DEVELOPMENT OF GENERATION FUEL MIX

For the purpose of this study, the future fuel mix information was obtained from the New York State Energy Plan, dated December 2001. This plan provides future estimates of generation by fuel type for the years 2002 through 2020. The fuel types listed include natural gas, oil, coal, nuclear and hydro, as well as "other" and net imports. The projected Gigawatt-hours (GWh) listed in the plan for 2002 through 2005 were used in this study and are summarized below:

Projected Generation – GWh

Generation Fuel	2002	2003	2004	2005
Natural Gas	24,706	25,628	34,115	54,902
Oil	24,774	24,509	19,212	9,384
Coal	29,380	29,295	28,030	17,934
Nuclear	32,563	32,559	32,662	32,558
Hydro	29,109	29,090	29,111	29,011
Other	2,866	3,004	3,150	3,283
Net Imports	18,799	19,463	18,747	19,731
TOTAL	**162,197**	**163,548**	**165,027**	**166,803**

Source: New York State Energy Plan, Table 9 – " Reference Resource Case – Generation by Fuel Type for the New York Electricity System," December 2001

Projected Generation – Percent of Total

Generation Fuel	2002	2003	2004	2005
Natural Gas	15.2%	15.7%	20.7%	33.0%
Oil	15.3%	15.0%	11.6%	5.6%
Coal	18.1%	17.9%	17.0%	10.8%
Nuclear	20.1%	19.9%	19.8%	19.6%
Hydro	17.9%	17.8%	17.6%	17.4%
Other	1.8%	1.8%	1.9%	2.0%
Net Imports	11.6%	11.9%	11.4%	11.6%
TOTAL	**100%**	**100%**	**100%**	**100%**

Source: New York State Energy Plan, Table 9 – " Reference Resource Case – Generation by Fuel Type for the New York Electricity System," December 2001

1

3.0 EMISSION CALCULATIONS

Using the projected generation mix provided above, criteria emissions were calculated for non-nuclear electricity generation, which would be required in the event that Entergy's Indian Point Nuclear Generating Station is decommissioned. As stated, all calculations for Units 2 & 3 at Indian Point are based on a 90% capacity factor. As provided by Elise N. Zoli, Esq. of Goodwin Procter, LLP, Entergy's Counsel, Units 2 and 3 have an average net maximum capacity of 983.7 MW and 989 MW.

Operating at a 90% capacity factor, Units 2 and 3 are capable of generating 15,548,036 MWh annually. This accounts for approximately 10% of the state's total generation. If Indian Point Nuclear Generating Station were to be decommissioned, there are numerous ways that the lost generation from Units 2 and 3 could be replaced. The first possibility that was examined was the replacement of Units 2 and 3 by the existing generation mix. This case yields the highest increase in emissions since it assumes older fossil fuel fired facilities, approximately 40% of which are coal, are used to replace the generating capacity of Units 2 and 3. The existing sources that are in the generation fuel mix include natural gas, oil, coal, nuclear, hydro and "other". For the purpose of this study, it was assumed that Units 2 and 3 would be replaced by natural gas, oil and coal fired facilities only. This unit mix would likely be used to replace lost generation if Indian Point 2 and 3 were not available during a low- to moderate-demand period (during mild weather). Nuclear, hydro and "other" were not included in the calculations. Hydro was not included because it is not possible to increase the capacity of existing hydropower sources. Emissions were not calculated for "other" sources, which account for less than 2% of the state's total capacity. The type of "other" sources is unknown; therefore it was not possible to develop emission factors for these sources.

Replacement by the four large fossil fuel power stations in the Hudson Valley: Bowline Point, Lovett, Danskammer and Roseton, and replacement by existing units in New York City were also studied. It is likely that the majority of the replacement generation would come from these sources. Three combinations of these plants were examined. The first possible scenario assumed that the Hudson Valley plants were the sole replacement source. The second scenario assumed that the New York City plants would replace all the lost generation. Finally, it was assumed that the Hudson Valley plants would account for half of the required generation and the New York City plants would account for the other half.

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4.0 REPLACEMENT BY EXISTING SOURCES

Emission factors were obtained from the U.S. EPA's Emissions & Generation Resource Integrated Database 2000 (EGRID2000), Version 2.0. The most recent year included in this database is 1998; therefore, this data was utilized in this study. Data provided included total net generation, total state electricity usage, net imports, total CO_2, NO_x and SO_2 emissions, and emission factors in pounds of pollutant per MWh separated by fuel type. For the remaining criteria pollutants (CO, VOC, and PM-10), emission factors were obtained from the U.S. EPA's AP-42 document. For coal-fired units, emission factors for dry-bottom pulverized bituminous coal boilers equipped with electrostatic precipitators were used. PM-10 emissions include both filterable and condensable particulates, assuming that the coal has an ash content of 10%. The majority of emission factors for coal were given in pounds of pollutant per ton of coal. Based on an assumed heating value of 12,000 Btu/lb for the coal, these factors were then converted to pound per million Btu, which was then converted to pound per MWh based on the heat rate that was obtained from the data for the other pollutants listed in the EGRID2000 database.

For oil and natural gas, emission factors for external combustion (boilers) and internal combustion (i.c.engines and combustion turbines) were examined, since it is unknown what the breakdown of sources is. The lowest emission factor for each pollutant was chosen to yield a conservative (low) estimate of displaced emissions. It should be noted that the range in emission factors varied mostly with fuel type, as opposed to combustion source type. After evaluating the various emission factors, those for combustion turbines were used to yield a lower increase in annual emissions. These emission factors were given in pounds of pollutant per million Btu. Based on the data provided in EGRID2000, the emission factors were converted to pounds per MWh. A summary of the estimated additional emissions related to the replacement of Indian Point by existing sources applied to the projected future generation mix is presented in the following table:

Additional Annual Emissions with Replacement Power from Generation Fuel Mix

Pollutant	2002	2003	2004	2005
CO_2 (tons)	13,941,742	13,888,209	13,396,046	14,527,670
SO_2 (tons)	75,665	74,794	67,048	63,747
NO_x (tons)	23,140	22,971	21,480	22,152
PM-10 (tons)	1,890	1,875	1,758	1,844
CO (tons)	1,145	1,148	1,201	1,508
VOC (tons)	145	146	155	197

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5.0 REPLACEMENT BY EXISTING HUDSON VALLEY AND NEW YORK CITY SOURCES

The next section of the evaluation assumed that the four large plants in the Hudson Valley, and the plants in New York City would replace the generation from Indian Point, as opposed to statewide facility-type replacement. For each of these subgroups, baseline emissions were obtained from EGRID2000. The most recent year included in this database is 1998; therefore, this data was utilized in this study. Data provided included total net generation separated by fuel type, total CO_2, NO_x and SO_2 emissions, and emission factors in pounds of pollutant per MWh separated by fuel type.

The first task assumed replacement by the four large plants in the Hudson Valley: Bowline Point, Lovett, Danskammer, and Roseton. These plants utilize boilers that are fired with No. 6 residual oil and natural gas. Lovett and Danskammer also have the ability to fire coal, and PM-10 emission factors while burning coal were obtained from the facilities' Title V permits. For the remaining criteria pollutants (CO, VOC, and PM-10), emission factors were obtained from the U.S. EPA's AP-42 document for external combustion sources. A combined emission factor for each of the pollutants was developed for each facility based on the source of generation (coal/oil/gas).

Based on the data provided in EGRID2000, it is known that these plants currently operate at capacity factors ranging from 32% to 58%. When evaluating the available generation, it was assumed that each of these plants could operate at a 90% capacity factor. Assuming a 100% capacity factor is not realistic and does not allow for necessary shutdowns required for maintenance to ensure the equipment is functioning properly. Based on the generation from 1998 provided in EGRID2000, and the total generation based on a 90% capacity factor, the combined available generation from these four plants is 15,374,598 MWh. This is only 99% of Indian Point's current generation of 15,552,767. Therefore, more than just these four plants would be required to meet the increased demand that would result from Indian Point Units 2 and 3 being decommissioned. The following tables summarize the total emission increases from increasing the operating capacity to 90% for each of these plants.

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Additional Annual Emissions with Replacement Power from Hudson Valley Plants

Plant	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)	Annual Hg (pounds)
Bowline Point	5,266,203	3,919	7,619	1,114	2,699	217	0
Lovett	1,600,331	6,606	3,237	212	292	26	26
Danskammer	1,620,126	7,651	3,536	229	207	22	70
Roseton	6,062,113	41,468	7,913	2,825	1,596	215	0
Total	**14,548,772**	**59,644**	**22,305**	**4,380**	**4,794**	**480**	**96**

Facility Specific Percent Emissions Increase from Replacement Power from Hudson Valley Plants

Plant	Annual CO_2	Annual SO_2	Annual NO_x	Annual PM-10	Annual CO	Annual VOC	Annual Hg
Bowline Point	178%	179%	178%	178%	178%	178%	0%
Lovett	71%	71%	71%	71%	71%	71%	71%
Danskammer	55%	55%	55%	55%	55%	55%	55%
Roseton	168%	168%	168%	168%	168%	168%	0%
Total	**123%**	**119%**	**112%**	**145%**	**147%**	**147%**	**58%**

As shown in the second table, the increase in the NO_x emissions during the ozone season (May – September) is not as great as the annual increase. This shows that these plants are already operating more during this season. In addition to the annual average availability of these plants being only 99% of the Indian Point demand, the increased replacement demand during the ozone season will not be able to be met by these four plants alone.

The next situation that was evaluated was the replacement by the 14 existing power plants in the five boroughs of New York City. It should be noted that the recently installed NYPA peaker turbines have not been included in this analysis, since they were installed after the most recent version of EGRID2000 was updated (1998 emissions data.

Similar to the Hudson Valley plants, emissions data was obtained from EGRID2000 for CO_2, SO_2 and NO_x. Emission factors for PM, CO, and VOC were obtained from U.S. EPA's AP-42. Emission factors for external combustion (boilers) and internal combustion (i.e. engines and combustion turbines) were examined, since facility specific emission rates are not provided by EGRID2000. The lowest emission factor for each pollutant was chosen to yield a conservative (low) estimate of displaced emissions. It should be noted that the range in emission factors varied mostly with fuel type, as opposed to combustion source type. After evaluating the various emission factors, those for combustion turbines were used to yield a lower increase in annual

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emissions. These emission factors were given in pounds of pollutant per million Btu. Based on the data provided in EGRID2000, the emission factors were converted to pounds per MWh.

The available generation from the New York City plants was again determined based on a capacity factor of 90%. The replacement demand, 15,552,767 MWh, is approximately 33% of the available generation from these plants. In order to determine how much each plant would need to increase its generation to meet the demand of Units 2 and 3 at Indian Point, it was assumed that the total fuel and plant mix from these plants would remain constant, except for the plants that could not meet this increase. The Bronx Zoo, Brooklyn Navy Yard and the JFK International Airport Cogeneration facilities were increased to their maximum generation at 90% capacity factor while the remainder of the facilities kept the same mix. The following table provides the increased emissions.

Additional Annual Emissions with Replacement Power from New York City Plants

Plant	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	3,833	1	3	0.2	0.4	0.1
Ravenswood	3,290,850	1,204	3,808	195.5	340.2	46.2
Charles Poletti	2,467,169	4,069	3,650	178.1	80.0	10.5
JFK Cogen	173,088	0	114	9.9	22.4	3.0
Far Rockaway	256,091	2	232	14.2	32.3	4.4
Astoria	3,773,229	1,785	4,947	225.8	370.6	51.1
Arthur Kill	1,021,253	7	925	56.9	129.2	17.7
East River	436,741	508	783	29.0	27.1	3.8
Waterside	277,744	3	167	15.0	34.0	5.0
Hudson Ave	1,832	4	10	0.1	0.0	0.0
Brooklyn Navy Yard	437,418	4	34	24.1	54.1	7.1
Warbasse Cogen	69,560	10	45	4.1	8.0	1.1
Gowanus	176,550	344	976	13.3	3.6	0.5
Narrows	108,814	81	412	6.9	9.8	1.4
Total	**12,494,172**	**8,020**	**16,107**	**773**	**1,112**	**142**

Once the increase in emissions was calculated, the percent increase from current generation was also calculated. Since the current generation for all of these facilities combined is 16,887,894 MWh, just slightly over the generation of Indian Point's Units 2 and 3, all of the emission rates are nearly double what they are currently. The results are summarized in the tables below.

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Facility Specific Percent Emissions Increase from Replacement Power from New York City Plants

Plant	Annual CO_2	Annual SO_2	Annual NO_x	Annual PM-10	Annual CO	Annual VOC
Bronx Zoo	39%	39%	39%	39%	39%	39%
Ravenswood	106%	106%	106%	106%	106%	106%
Charles Poletti	106%	106%	106%	106%	106%	106%
JFK Cogen	68%	0%	68%	68%	68%	68%
Far Rockaway	106%	159%	106%	106%	106%	106%
Astoria	106%	106%	106%	106%	106%	106%
Arthur Kill	106%	134%	106%	106%	106%	106%
East River	106%	106%	106%	106%	106%	106%
Waterside	106%	96%	106%	106%	106%	106%
Hudson Ave	105%	105%	105%	106%	106%	106%
Brooklyn Navy Yard	47%	64%	46%	47%	47%	47%
Warbasse Cogen	106%	107%	106%	106%	106%	106%
Gowanus	106%	106%	106%	106%	106%	106%
Narrows	106%	106%	106%	106%	106%	106%
Total	**101%**	**106%**	**105%**	**101%**	**99%**	**93%**

The final replacement scenario that was evaluated was the replacement by a combination of the four Hudson Valley plants and the plants located in New York City. For the purposes of this evaluation, it was assumed that half of the make-up generation, 7,776,383 MWh, would come from the four Hudson Valley Plants and the other half would come from the plants in New York City. As in the evaluation of the emission increase from the New York City plants only, the increase of each of the plants was determined by assuming that the total fuel and plant mix from these two sets of plants would remain constant, except for the plants that could not meet this increase. The Bronx Zoo, Brooklyn Navy Yard and Danskammer were increased to their maximum generation at 90% capacity factor while the remainder of the facilities kept the same mix. The following table provides the increased emissions:

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Additional Annual Emissions with Replacement Power from Hudson Valley and New York City Plants

Plant	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)	Annual Hg (pounds)
Bowline Point	2,005,749	1,493	2,902	424	1,028	83	0
Lovett	1,532,411	6,326	3,100	203	279	25	25
Danskammer	1,620,126	7,651	3,536	229	207	22	70
Roseton	2,451,486	16,769	3,200	1,142	646	87	0
Bronx Zoo	3,833	1	3	0.2	0.4	0.1	--
Ravenswood	1,526,271	558	1,766	90.7	157.8	21.4	--
Charles Poletti	1,144,254	1,887	1,693	82.6	37.1	49	--
JFK Cogen	125,849	0	83	7.2	16.3	2.2	--
Far Rockaway	118,773	1	108	6.6	15.0	2.1	--
Astoria	1,749,995	828	2,294	104.7	171.9	23.7	--
Arthur Kill	473,649	3	429	26.4	59.9	8.2	--
East River	202,557	235	363	13.5	12.6	1.8	--
Waterside	128,816	1	78	7.0	15.8	2.3	--
Hudson Ave	850	2	5	0.1	0.0	0.0	--
Brooklyn Navy Yard	437,418	4	34	24.1	54.1	7.1	--
Warbasse Cogen	32,262	4	21	1.9	3.7	0.5	--
Gowanus	81,883	160	453	6.2	1.7	0.2	--
Narrows	50,467	38	191	3.2	4.5	0.6	--
Total	**13,686,648**	**35,961**	**20,258**	**2,373**	**2,710**	**292**	**94**

Again, once these emissions were calculated, the percent increase for each of these plants and the combined increase was calculated. The results are presented in the following table.

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Facility Specific Percent Emissions Increase from Replacement Power from Hudson Valley and New York City Plants

Plant	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)	Annual Hg (pounds)
Bowline Point	68%	68%	68%	68%	68%	68%	0%
Lovett	68%	68%	68%	68%	68%	68%	68%
Danskammer	55%	55%	55%	55%	55%	55%	55%
Roseton	68%	68%	68%	68%	68%	68%	0%
Bronx Zoo	39%	39%	39%	39%	39%	39%	--
Ravenswood	49%	49%	49%	49%	49%	49%	--
Charles Poletti	49%	49%	49%	49%	49%	49%	--
JFK Cogen	50%	0%	50%	49%	49%	49%	--
Far Rockaway	49%	74%	49%	49%	49%	49%	--
Astoria	49%	49%	49%	49%	49%	49%	--
Arthur Kill	49%	62%	49%	49%	49%	49%	--
East River	49%	49%	49%	49%	49%	49%	--
Waterside	49%	44%	49%	49%	49%	49%	--
Hudson Ave	49%	49%	49%	49%	49%	49%	--
Brooklyn Navy Yard	47%	64%	46%	47%	47%	47%	--
Warbasse Cogen	49%	50%	49%	49%	49%	49%	--
Gowanus	49%	49%	49%	49%	49%	49%	--
Narrows	49%	49%	49%	49%	49%	49%	--
Total	**57%**	**62%**	**57%**	**58%**	**63%**	**62%**	**58%**

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6.0 COSTS FOR NO_x ALLOWANCES

Lastly, the increased costs for NO_x allowances associated with additional ozone season (May – September) NO_x emissions were evaluated. The March 2001 New York Independent System Operator report provided estimated costs for one ton of NO_x in the years 2001, 2003 and 2005. Costs for the years 2002 and 2004 were graphically interpolated. Based on the scenarios presented above, the following table shows the additional ozone season emissions and total costs for the NO_x emissions in the next four years.

It should be noted that it is likely that there is not enough generation available from the Hudson Valley plants during the ozone season to meet the lost generation of Indian Point Units 2 and 3. Data obtained from the EGRID database indicates that the ozone season NO_x emissions are nearly half of the annual emissions in some cases. Some of the New York City plants may not be able to meet the demand either. However, a combination of these plants would be available during that time and the ozone season NO_x emissions presented in the table below are based on a fraction of the annual emissions. These ozone season emissions are reasonable estimates provided the required generation was replaced by sources similar to those in the Hudson Valley and New York City.

Projected NO_x Allowance Costs

Replacement Source	NO_x tons	2002 Cost	2003 Cost	2004 Cost	2005 Cost
2002 Fuel Mix	9,725	$21,881,250	--	--	--
2003 Fuel Mix	9,657	--	$28,584,720	--	--
2004 Fuel Mix	9,062	--	--	$28,001,580	--
2005 Fuel Mix	9,411	--	--	--	$29,832,870
Hudson Valley	5,613	$12,629,250	$16,614,480	$17,344,170	$17,793,210
New York City	3,580	$8,055,000	$10,596,800	$11,062,200	$11,348,600
Hudson Valley & NYC	4,846	$10,903,500	$14,344,160	$14,974,140	$15,361,820

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7.0 POTENTIAL EFFECTS AND HEALTH HAZARDS FROM STUDIED POLLUTANTS

In addition to evaluating the increase in emissions, TRC prepared a matrix summarizing the potential effects and health hazards from these pollutants. Currently, Westchester County is classified as a non-attainment area for ozone. High levels of ozone can cause lung irritation, permanent lung damage, aggravated asthma, reduced lung capacity, pneumonia and bronchitis. Persons that are most susceptible to the negative effects of ozone are those with respiratory illnesses, outdoor worker, and children. Ozone also increases the susceptibility of plants to disease, thus reducing crop and forest yields.

The entire state of New York is located in the Ozone Transport Region (OTR), which requires that new sources of NO_x and VOC be subject to Lowest Achievable Emission Rates (LAER) and emissions offsets. These regulations are subject to facilities constructed after August 9, 1984. In essence, this massive increase in generation by existing sources is comparable to constructing one large new source without subjecting it to these current applicable regulations. The increase in NO_x and VOC, the precursors to ozone, will likely mean that the area will not reach attainment status in the near future. In order to reach attainment, the area needs to further reduce emissions in the area as opposed to unnecessarily increasing these emission rates.

The matrix outlines the effects of all criteria pollutants and the groups that are most greatly impacted by them. As shown with carbon monoxide and ozone, these pollutants affect all people, regardless of age and current health, in addition to the vegetation in the area.

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Regulatory Impacts and Effects of Major Air Pollutants

Pollutant	NAAQS Attainment Status for New York State	Basis for NAAQS	Most Susceptible Population Groups	Additional Impacts
SO_2	Attainment	Temporary breathing difficulty Respiratory illness Aggravates existing Heart Disease	Asthmatics, Children, Elderly, Persons with Heart or Lung Disease	Precursor to acid rain formation Visibility impairment from Sulfate Particles (PM-2.5) Aesthetics damage due to accelerated building decay Acidification of lakes due to Atmospheric Deposition Soil degradation due to Atmospheric Deposition
NO_x	Attainment	Damage to lung tissue Respiratory illnesses – Bronchitis Reduction in lung function	Children, Asthmatics, Outdoor Workers	Precursor to ground-level Ozone (Smog) Precursor to acid rain formation Water quality deterioration (Oxygen depletion) Visibility impairment
PM-10	Attainment for all Counties with exception of New York County	Aggravated Asthma Chronic Bronchitis Decreased lung function Premature Death	Persons with Heart Disease or Influenza, Asthmatics, Children, Elderly	Major cause of reduced visibility (Haze) Aesthetics damage due to stains from soot Acidification of lakes due to Atmospheric Deposition Soil degradation due to Atmospheric Deposition
CO	Attainment with exception of Metropolitan New York City	Cardiovascular effects Vision problems Reduced ability to work and learn Death (extremely high levels)	Persons with Heart or Lung Disease	
Ozone	Attainment for all counties with exceptions of New York State Metropolitan Areas and Long Island	Lung irritation (wheezing, coughing) Permanent lung damage Aggravated Asthma Reduced lung capacity Pneumonia and Bronchitis	Persons with respiratory illnesses, Children, Outdoor workers	Increases susceptibility of plants to disease Reduces crop and forest yields Aesthetics damage due to damage to leaves and trees Damages rubber and fabrics Reduced visibility
VOC	Not Applicable	Not Applicable	Not Applicable	Precursor to ground-level Ozone (Smog) Damage to plants
CO_2	Not Applicable	Not Applicable	Not Applicable	Contributes to Global Warming

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APPENDIX A

EMISSION AVOIDANCE CALCULATIONS

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Entergy - Indian Point
Emission Avoidance Study

Emission Prices - $/ton

2001	841
2002	***2250***
2003	2960
2004	***3090***
2005	3170

2001, 2003 and 2005 were obtained from NYISO document
Bold and Italic - graphically interpolated

Replacement Source	Ozone NOx (tons)	2002 Cost	2003 Cost	2004 Cost	2005 Cost
2002 Generation Fuel Mix	9,725	$21,881,250	--	--	--
2003 Generation Fuel Mix	9,657	--	$28,584,720	--	--
2004 Generation Fuel Mix	9,062	--	--	$28,001,580	--
2005 Generation Fuel Mix	9,411	--	--	--	$29,832,870
Hudson Valley Plants*	5,613	$12,629,250	$16,614,480	$17,344,170	$17,793,210
New York City Plants*	3,580	$8,055,000	$10,596,800	$11,062,200	$11,348,600
Hudson Valley & NYC Plants*	4,846	$10,903,500	$14,344,160	$14,974,140	$15,361,820

* NOTE: It is unclear whether the necessary generation is available during the ozone season from these sources. These ozone season emissions are based on assuming that the generation is available, and the mix of the plants is the same on an annual basis.

TRC Environmental Corp. Costs of NOx Allowances Page 1 of 1

1

Entergy - Indian Point
Emission Avoidance Study

1998 Data - E-Grid

Capacity 38,519 MW
Heat Input 933,615,646 MMBtu
Generation 144,795,255 (MWh)

Fuel	Fuel Mix %	MWh
Coal	17.0%	24,401,936
Oil	10.4%	14,939,368
Gas	29.7%	42,689,444
Nuclear	21.8%	31,313,708
Other Fossil	0.4%	587,139
Biomass	1.3%	1,803,829
Hydro	19.5%	28,065,751
TOTAL	**100.0%**	**143,801,175**

Indian Point - Units 2 & 3	
MWh	15,552,767
% of Total	10.8%

		FOSSIL		COAL		OIL		GAS	
Pollutant	tons	output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu
Annual CO_2	69,010,726	1658.57	151.68	2295.74	202.42	1753.03	150.88	1234.69	118.36
Annual SO_2	317,766	7.57	0.69	19.06	1.68	7.94	0.68	0.43	0.04
Annual NO_x	107,232	2.56	0.23	4.87	0.43	2.55	0.22	1.15	0.11
Ozone NO_x	50,339	2.52	0.21	4.88	0.41	2.54	0.21	1.23	0.11
PM-10*				0.48	0.042	0.14	0.012	0.069	0.0066
CO*				0.23	0.020	0.038	0.0033	0.16	0.015
VOC*				0.028	0.0024	0.005	0.00041	0.022	0.0021
Annual Hg	1,156	0.014	0.0012	0.044	0.0039				

* Emissions are based on AP-42 emission Factors. Particulate emissions include condensables and filterables. Output-based factors for PM-10, CO and VOC are calculated based on heat rate for each fuel type derived from the above data. Natural gas and oil factors based on comparing combustion turbine and boiler factors and selecting the lower factor.

TRC Environmental Corp. Baseline Data Page 1 of 1

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Entergy - Indian Point
Emission Avoidance Study

Emission Prices - $/ton

2001	841
2002	***2250***
2003	2960
2004	***3090***
2005	3170

2001, 2003 and 2005 were obtained from NYISO document
Bold and Italic - graphically interpolated

Replacement Source	Ozone NOx (tons)	2002 Cost	2003 Cost	2004 Cost	2005 Cost
2002 Generation Fuel Mix	9,725	$21,881,250	--	--	--
2003 Generation Fuel Mix	9,657	--	$28,584,720	--	--
2004 Generation Fuel Mix	9,062	--	--	$28,001,580	--
2005 Generation Fuel Mix	9,411	--	--	--	$29,832,870
Hudson Valley Plants*	5,613	$12,629,250	$16,614,480	$17,344,170	$17,793,210
New York City Plants*	3,580	$8,055,000	$10,596,800	$11,062,200	$11,348,600
Hudson Valley & NYC Plants*	4,846	$10,903,500	$14,344,160	$14,974,140	$15,361,820

* NOTE: It is unclear whether the necessary generation is available during the ozone season from these sources. These ozone season emissions are based on assuming that the generation is available, and the mix of the plants is the same on an annual basis.

TRC Environmental Corp. Costs of NOx Allowances Page 1 of 1

1

Entergy - Indian Point
Emission Avoidance Study

Generation Fuel	In Percent of Total			
	2002	2003	2004	2005
Natural Gas	15.2%	15.7%	20.7%	32.9%
Oil	15.3%	15.0%	11.6%	5.6%
Coal	18.1%	17.9%	17.0%	10.8%
Nuclear	20.1%	19.9%	19.8%	19.5%
Hydro	17.9%	17.8%	17.6%	17.4%
Other	1.8%	1.8%	1.9%	2.0%
Net Imports	11.6%	11.9%	11.4%	11.8%
TOTAL	100.0%	100.0%	100.0%	100.0%

Note: Above Percentages Calculated from given Generation Fuel Mix

Emission Factors Obtained from E-Grid - 1998 data (and AP-42 for PM-10, CO and VOC)

		COAL		OIL		GAS	
Pollutant	tons	output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu
Annual CO_2	69,010,726	2295.74	202.42	1753.03	150.88	1234.69	118.36
Annual SO_2	317,766	19.06	1.68	7.94	0.68	0.43	0.040
Annual NO_x	107,232	4.87	0.43	2.55	0.22	1.15	0.11
Ozone NO_x	50,339	4.88	0.41	2.54	0.21	1.23	0.11
PM-10*	NA	0.48	0.042	0.14	0.012	0.069	0.0066
CO*	NA	0.23	0.020	0.038	0.003	0.16	0.015
VOC*	NA	0.028	0.0024	0.0048	0.00041	0.022	0.0021
Annual Hg	1,156	0.044	0.0039	0	0	0	0

Assume Replacement by existing Natural Gas, Oil and Coal fired sources.

2002 Generation Fuel Mix

	Unit #2	Unit #3	Total
Net Output (MW)	983.7	989	1972.7
Capacity Factor (%)	90%	90%	90%
12-month Net Generation (MWh)	7,755,491	7,797,276	15,552,767
Annual CO_2 (tons)	6,952,142	6,989,599	13,941,742
Annual SO_2 (tons)	37,731	37,934	75,665
Annual NO_x (tons)	11,539	11,601	23,140
Ozone NO_x (tons)	4,849	4,876	9,725
PM-10	942	947	1,890
CO	571	574	1,145
VOC	73	73	145
Annual Hg (tons)	64	64	128

2003 Generation Fuel Mix

	Unit #2	Unit #3	Total
Net Output (MW)	983.7	989	1972.7
Capacity Factor (%)	90%	90%	90%
12-month Net Generation (MWh)	7,755,491	7,797,276	15,552,767
Annual CO_2 (tons)	6,925,448	6,962,761	13,888,209
Annual SO_2 (tons)	37,297	37,497	74,794
Annual NO_x (tons)	11,455	11,516	22,971
Ozone NO_x (tons)	4,815	4,841	9,657
PM-10	935	940	1,875
CO	573	576	1,148
VOC	73	73	146
Annual Hg (tons)	63	63	126

2004 Generation Fuel Mix

	Unit #2	Unit #3	Total
Net Output (MW)	983.7	989	1972.7
Capacity Factor (%)	90%	90%	90%
12-month Net Generation (MWh)	7,755,491	7,797,276	15,552,767
Annual CO_2 (tons)	6,680,028	6,716,018	13,396,046
Annual SO_2 (tons)	33,434	33,614	67,048
Annual NO_x (tons)	10,711	10,769	21,480
Ozone NO_x (tons)	4,519	4,543	9,062
PM-10	877	881	1,758
CO	599	602	1,201
VOC	77	78	155
Annual Hg (tons)	59	59	118

2005 Generation Fuel Mix

	Unit #2	Unit #3	Total
Net Output (MW)	983.7	989	1972.7
Capacity Factor (%)	90%	90%	90%
12-month Net Generation (MWh)	7,755,491	7,797,276	15,552,767
Annual CO_2 (tons)	7,244,319	7,283,350	14,527,670
Annual SO_2 (tons)	31,788	31,959	63,747
Annual NO_x (tons)	11,046	11,106	22,152
Ozone NO_x (tons)	4,693	4,718	9,411
PM-10	919	924	1,844
CO	752	756	1,508
VOC	98	99	197
Annual Hg (tons)	63	63	126

TRC Environmental Corp. Emissions - Current EFs Page 1 of 1

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Entergy - Indian Point
Emission Avoidance Study

	Coal Generaton (MWh)	Oil Generation (MWh)	Gas Generation (MWh)	Total Generation (MWh)	Capacity (MW)	Capacity Factor	Heat Rate (Btu/kWh)
Bowline Point	0	1,018,218	2,503,152	3,521,370	1,242	0.324	12,880
Lovett	1,618,392	86	454,188	2,072,666	449.1	0.527	11,745
Danskammer	2,514,449	264	220,461	2,735,174	537.4	0.581	10,891
Roseton	0	3,228,349	429,265	3,657,614	1,242	0.336	12,592

	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)
Bowline Point	2,957,361	2,193	4,273	2,358	0
Lovett	2,259,440	9,324	4,570	2,096	36.2
Danskammer	2,950,904	13,938	6,444	2,811	127.2
Roseton	3,614,561	24,729	4,714	2,181	0

	CO_2 Rate (lbs/MWh)	CO_2 Rate (lbs/MMBtu)	SO_2 Rate (lbs/MWh)	SO_2 Rate (lbs/MMBtu)	Annual NO_x Rate (lbs/MWh)	Annual NO_x Rate (lbs/MMBtu)	Ozone Season NO_x Rate (lbs/MWh)	Ozone Season NO_x Rate (lbs/MMBtu)	Hg Rate (lbs/GWh)	Hg Rate (lbs/Bbtu)
Bowline Point	1,679.66	130.41	1.25	0.10	2.43	0.19	2.48	0.19	0	0
Lovett	2,180.23	185.63	9.00	0.77	4.41	0.38	4.29	0.36	0.0175	0.0015
Danskammer	2,157.74	198.11	10.19	0.94	4.71	0.43	4.57	0.42	0.0465	0.0043
Roseton	1,976.46	156.96	13.52	1.07	2.58	0.20	2.58	0.20	0	0

	PM Rate (lbs/MWh)	PM Rate (lbs/MMBtu)	CO Rate (lbs/MWh)	CO Rate (lbs/MMBtu)	VOC Rate (lbs/MWh)	VOC Rate (lbs/MMBtu)
Bowline Point	0.36	0.028	0.86	0.069	0.069	0.0054
Lovett	0.289	0.025	0.40	0.034	0.036	0.0031
Danskammer	0.31	0.028	0.28	0.025	0.029	0.0027
Roseton	0.92	0.073	0.520	0.0412	0.0700	0.00542

	COAL Input lbs/MMBtu	NO. 6 OIL Input lbs/MMBtu	GAS Input lbs/MMBtu
Pollutant			
PM-10*	0.042	0.082	0.0054
CO*	0.020	0.036	0.082
VOC*	0.0024	0.0054	0.0054
Annual Hg	0.0039	--	--

* Emissions are based on AP-42 emission Factors. Particulate emissions include condensables and filterables. Output-based factors for PM-10,

TRC Environmental Corp. HV Emission Factors Page 1 of 1

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Entergy - Indian Point
Emission Avoidance Study

Indian Point Generating Capacity	
Unit 2 (MW)	983.7
Unit 3 (MW)	989
Total (MW)	1972.7
Capacity Factor	90%
12-month Net Generation (MWh)	15,552,767

Current Emissions

	Current Generation (MWh)	Available Generation (MWh)*	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	3,521,370	6,270,558	2,957,361	2,193	4,273	2,358	0	626	1,516	122
Lovett	2,072,666	1,468,038	2,259,440	9,324	4,570	2,096	36	300	412	37
Danskammer	2,735,174	1,501,688	2,950,904	13,938	6,444	2,811	127	417	377	40
Roseton	3,657,614	6,134,314	3,614,561	24,729	4,714	2,181	0	1,684	952	128
TOTAL	**11,986,824**	**15,374,598**	**11,782,266**	**50,184**	**20,002**	**9,447**	**163**	**3,027**	**3,256**	**327**

*** Assuming a 90% capacity factor for necessary shutdowns.**

Replace Emissions - Scenario 1

	Percent Replaced	Increased Generation (MWh)	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	40.3%	6,270,558	5,266,203	3,919	7,619	1,960	0	1,114	2,699	217
Lovett	9.4%	1,468,038	1,600,331	6,606	3,237	794	26	212	292	26
Danskammer	9.7%	1,501,688	1,620,126	7,651	3,536	865	70	229	207	22
Roseton	39.4%	6,134,314	6,062,113	41,468	7,913	1,995	0	2,825	1,596	215
TOTAL	**99%**	**15,374,598**	**14,548,772**	**59,644**	**22,305**	**5,613**	**96**	**4,380**	**4,794**	**480**

Increased Emissions - Scenario 1

	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	178%	179%	178%	83%	0%	178%	178%	178%
Lovett	71%	71%	71%	38%	71%	71%	71%	71%
Danskammer	55%	55%	55%	31%	55%	55%	55%	55%
Roseton	168%	168%	168%	91%	0%	168%	168%	168%
TOTAL	**123%**	**119%**	**112%**	**59%**	**58%**	**145%**	**147%**	**147%**

TRC Environmental Corp. HV Emission Calcs Page 1 of 1

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Entergy - Indian Point
Emission Avoidance Study

	Oil Generation (MWh)	Gas Generation (MWh)	Total Generation (MWh)	Capacity (MW)	Capacity Factor	Heat Rate (Btu/kWh)
Bronx Zoo	1,957	19,529	21,486	3.80	0.648	7,553
Ravenswood	620,133	3,102,402	3,722,535	2,310	0.184	13,210
Charles Poletti	2,247,830	390,380	2,638,210	883.0	0.341	11,373
JFK Cogen	0	569,591	569,591	121.1	0.537	7,684
Far Rockaway	0	359,190	359,190	100.0	0.410	11,317
Astoria	863,747	3,398,031	4,261,778	1,150.6	0.423	12,991
Arthur Kill	0	1,237,781	1,237,781	928.0	0.152	13,129
East River	259,283	231,769	491,052	356.3	0.157	11,795
Waterside	1,074	507,733	508,807	199.8	0.291	8,427
Hudson Ave	2,547	0	2,547	48.9	0.006	8,590
Brooklyn Navy Yard	12,742	1,788,404	1,801,146	336.6	0.611	8,500
Warbasse Cogen	6,868	60,780	67,648	37.8	0.204	16,064
Gowanus	114,743	0	114,743	688.0	0.019	18,182
Narrows	26,377	65,003	91,380	393.1	0.027	17,404

	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)
Bronx Zoo	9,720	2	8	3	0
Ravenswood	3,104,337	1,140	3,586	2,602	0
Charles Poletti	2,327,340	3,835	3,446	1,695	0.0
JFK Cogen	253,407	0	167	69	0.0
Far Rockaway	241,576	1	220	97	0.0
Astoria	3,559,363	1,676	4,676	2,191	0.0
Arthur Kill	963,372	5	874	829	0.0
East River	411,987	480	738	334	0.0
Waterside	262,004	3	158	62	0.0
Hudson Ave	1,747	3	10	4	0.0
Brooklyn Navy Yard	924,051	7	73	26	0.0
Warbasse Cogen	65,618	9	42	18	0.0
Gowanus	166,544	324	921	384	0.0
Narrows	102,647	77	388	162	0.0

	CO_2 Rate (lbs/MWh)	CO_2 Rate (lbs/MMBtu)	SO_2 Rate (lbs/MWh)	SO_2 Rate (lbs/MMBtu)	Annual NO_x Rate (lbs/MWh)	Annual NO_x Rate (lbs/MMBtu)	Ozone Season NO_x Rate (lbs/MWh)	Ozone Season NO_x Rate (lbs/MMBtu)
Bronx Zoo	904.75	119.79	0.17	0.02	0.76	0.10	0.76	0.10
Ravenswood	1,667.86	126.26	0.61	0.05	1.93	0.15	1.97	0.15
Charles Poletti	1,764.33	155.13	2.91	0.26	2.61	0.23	2.59	0.23
JFK Cogen	898.78	115.80	0.00	0.00	0.59	0.08	0.59	0.08
Far Rockaway	1,345.12	118.86	0.01	0.00	1.22	0.11	1.11	0.10
Astoria	1,670.37	128.58	0.79	0.06	2.19	0.17	2.04	0.16
Arthur Kill	1,556.61	118.56	0.01	0.00	1.41	0.11	1.51	0.11
East River	1,677.98	142.26	1.95	0.17	3.01	0.25	2.29	0.26
Waterside	1,029.87	122.22	0.01	0.00	0.62	0.07	0.61	0.07
Hudson Ave	1,357.06	159.65	2.64	0.31	7.50	0.88	3.75	0.88
Brooklyn Navy Yard	1,026.07	120.71	0.01	0.00	0.08	0.01	0.07	0.01
Warbasse Cogen	1,939.98	120.76	0.27	0.02	1.25	0.08	1.25	0.08
Gowanus	2,902.90	159.65	5.66	0.31	16.05	0.88	8.87	0.88
Narrows	2,246.60	129.08	1.68	0.10	8.50	0.49	4.44	0.49

	PM Rate (lbs/MWh)	PM Rate (lbs/MMBtu)	CO Rate (lbs/MWh)	CO Rate (lbs/MMBtu)	VOC Rate (lbs/MWh)	VOC Rate (lbs/MMBtu)
Bronx Zoo	0.05	0.007	0.11	0.014	0.015	0.0019
Ravenswood	0.10	0.007	0.17	0.013	0.023	0.0018
Charles Poletti	0.13	0.011	0.06	0.005	0.007	0.0007
JFK Cogen	0.05	0.007	0.12	0.015	0.015	0.0021
Far Rockaway	0.07	0.007	0.17	0.015	0.023	0.0021
Astoria	0.10	0.008	0.16	0.013	0.023	0.0018
Arthur Kill	0.09	0.007	0.20	0.015	0.027	0.0021
East River	0.11	0.009	0.10	0.009	0.015	0.0012
Waterside	0.06	0.007	0.13	0.015	0.019	0.0021
Hudson Ave	0.10	0.012	0.03	0.003	0.003	0.0004
Brooklyn Navy Yard	0.06	0.007	0.13	0.015	0.017	0.0021
Warbasse Cogen	0.11	0.007	0.22	0.014	0.030	0.0019
Gowanus	0.22	0.012	0.06	0.003	0.007	0.0004
Narrows	0.14	0.008	0.20	0.012	0.028	0.0016

Pollutant	NO. 2 OIL input lbs/MMBtu	GAS input lbs/MMBtu
PM-10*	0.012	0.0066
CO*	0.0033	0.015
VOC*	0.00041	0.0021

* Emissions are based on AP-42 emission Factors. Particulate emissions include condensables and filterables. Output-based factors for PM-

TRC Environmental Corp. NYC Emission Factors Page 1 of 1

2

Entergy - Indian Point
Emission Avoidance Study

Indian Point Generating Capacity	
Unit 2 (MW)	983.7
Unit 3 (MW)	989
Total (MW)	1972.7
Capacity Factor	90%
12-month Net Generation (MWh)	15,552,767

Current Emissions

	Current Generation (MWh)	Available Generation (MWh)	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	21,486	8,473	9,720	2	8	3	0.6	1.1	0.2
Ravenswood	3,722,535	14,485,563	3,104,337	1,140	3,586	2,602	184.4	320.9	43.5
Charles Poletti	2,638,210	4,323,362	2,327,340	3,835	3,446	1,695	168.0	75.5	9.9
JFK Cogen	569,591	385,161	253,407	0	167	69	14.6	33.2	4.4
Far Rockaway	359,190	429,210	241,576	1	220	97	13.4	30.5	4.2
Astoria	4,261,778	4,809,552	3,559,363	1,676	4,676	2,191	213.0	349.6	48.2
Arthur Kill	1,237,781	6,078,571	963,372	5	874	829	53.6	121.9	16.7
East River	491,052	2,318,017	411,987	480	738	334	27.4	25.5	3.6
Waterside	508,807	1,066,416	262,004	3	158	62	14.2	32.1	4.7
Hudson Ave	2,547	382,981	1,747	3	10	4	0.1	0.0	0.0
Brooklyn Navy Yard	1,801,146	852,608	924,051	7	73	26	50.8	114.2	15.0
Warbasse Cogen	67,648	230,367	65,618	9	42	18	3.9	7.5	1.0
Gowanus	114,743	5,309,449	166,544	324	921	384	12.5	3.4	0.4
Narrows	91,380	3,007,820	102,647	77	388	162	6.5	9.2	1.3
TOTAL	**15,887,894**	**43,687,552**	**12,393,712**	**7,561**	**15,307**	**8,476**	**763**	**1,125**	**153**

Replaced Emissions

	Percent Replaced	Increased Generation (MWh)	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	0.054%	8,473	3,833	1	3	1	0.2	0.4	0.1
Ravenswood	25.4%	3,946,194	3,290,850	1,204	3,808	980	195.5	340.2	46.2
Charles Poletti	18.0%	2,796,720	2,467,169	4,069	3,650	913	178.1	80.0	10.5
JFK Cogen	2.5%	385,161	173,088	0	114	29	9.9	22.4	3.0
Far Rockaway	2.4%	380,771	256,091	2	232	53	14.2	32.3	4.4
Astoria	29.0%	4,517,836	3,773,229	1,785	4,947	1,162	225.8	370.6	51.1
Arthur Kill	8.4%	1,312,150	1,021,253	7	925	250	56.9	129.2	17.7
East River	3.3%	520,556	436,741	508	783	150	29.0	27.1	3.8
Waterside	3.5%	539,377	277,744	3	167	41	15.0	34.0	5.0
Hudson Ave	0.017%	2,700	1,832	4	10	1	0.1	0.0	0.0
Brooklyn Navy Yard	5.5%	852,608	437,418	4	34	8	24.1	54.1	7.1
Warbasse Cogen	0.46%	71,712	69,560	10	45	11	4.1	8.0	1.1
Gowanus	0.78%	121,637	176,550	344	976	136	13.3	3.6	0.5
Narrows	0.62%	96,870	108,814	81	412	54	6.9	9.8	1.4
TOTAL	**100%**	**15,552,767**	**12,494,172**	**8,020**	**16,107**	**3,580**	**773**	**1,112**	**142**

Increased Emissions

	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	39%	39%	39%	24%	39%	39%	39%
Ravenswood	106%	106%	106%	38%	106%	106%	106%
Charles Poletti	106%	106%	106%	54%	106%	106%	106%
JFK Cogen	68%	0%	68%	41%	68%	68%	68%
Far Rockaway	106%	159%	106%	55%	106%	106%	106%
Astoria	106%	106%	106%	53%	106%	106%	106%
Arthur Kill	106%	134%	106%	30%	106%	106%	106%
East River	106%	106%	106%	45%	106%	106%	106%
Waterside	106%	96%	106%	67%	106%	106%	106%
Hudson Ave	105%	105%	105%	32%	106%	106%	106%
Brooklyn Navy Yard	47%	64%	46%	29%	47%	47%	47%
Warbasse Cogen	106%	107%	106%	64%	106%	106%	106%
Gowanus	106%	106%	106%	35%	106%	106%	106%
Narrows	106%	106%	106%	33%	106%	106%	106%
TOTAL	**101%**	**106%**	**105%**	**42%**	**101%**	**99%**	**93%**

TRC Environmental Corp. NYC Emission Calcs Page 1 of 1

1

Entergy - Indian Point
Emission Avoidance Study

Indian Point Generating Capacity	
Unit 2 (MW)	983.7
Unit 3 (MW)	989
Total (MW)	1972.7
Capacity Factor	90%
12-month Net Generation (MWh)	15,552,767

Current Emissions

	Current Generation (MWh)	Available Generation (MWh)*	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	3,521,370	6,270,558	2,957,361	2,193	4,273	2,358	0	626	1,516	122
Lovett	2,072,666	1,468,038	2,259,440	9,324	4,570	2,096	36	300	412	37
Danskammer	2,735,174	1,501,688	2,950,904	13,938	6,444	2,811	127	417	377	40
Roseton	3,657,614	6,134,314	3,614,561	24,729	4,714	2,181	0	1,684	952	128
TOTAL	11,986,824	15,374,598	11,782,366	50,184	20,002	9,447	163	3,027	3,256	327

	Current Generation (MWh)	Available Generation (MWh)	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	21,486	8,473	9,720	2	8	3	0.6	1.1	0.2
Ravenswood	3,722,535	14,485,563	3,104,337	1,140	3,586	2,602	184.4	320.9	43.5
Charles Poletti	2,638,210	4,323,362	2,327,340	3,835	3,446	1,695	168.0	75.5	9.9
JFK Cogen	569,591	385,161	253,407	0	167	69	14.6	33.2	4.4
Far Rockaway	359,190	429,210	241,576	1	220	97	13.4	30.5	4.2
Astoria	4,261,778	4,809,552	3,559,363	1,676	4,676	2,191	213.0	349.6	48.2
Arthur Kill	1,237,781	6,078,571	963,372	5	874	829	53.6	121.9	16.7
East River	491,052	2,318,017	411,987	480	738	334	27.4	25.5	3.6
Waterside	508,807	1,066,416	262,004	3	158	62	14.2	32.1	4.7
Hudson Ave	2,547	382,981	1,747	3	10	4	0.1	0.0	0.0
Brooklyn Navy Yard	1,801,146	852,608	924,053	7	71	26	50.8	114.2	15.0
Warbasse Cogen	67,648	230,367	65,618	9	42	18	3.9	7.5	1.0
Gowanus	114,743	5,309,449	166,544	324	921	384	12.5	3.4	0.4
Narrows	91,380	3,007,820	102,647	77	388	162	6.5	9.2	1.3
TOTAL	15,887,894	43,687,552	12,393,712	7,561	15,307	8,476	763	1,125	153

	Current Generation (MWh)	Available Generation (MWh)*	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
TOTAL	27,874,718	59,062,150	24,175,978	57,745	35,309	17,922	163	3,790	4,380	480

Replaced Emissions - half replacement by Hudson Valley Plants, half from NYC plants

	Percent Replaced	Increased Generation (MWh)	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	15.4%	2,388,279	2,005,749	1,493	2,902	746	0	424	1,028	83
Lovett	9.0%	1,405,733	1,532,411	6,326	3,100	760	25	203	279	25
Danskammer	9.7%	1,501,688	1,620,126	7,651	3,536	865	70	229	207	22
Roseton	16.0%	2,480,683	2,451,486	16,769	3,200	807	0	1,142	646	87
TOTAL	50.0%	7,776,383	7,609,771	32,239	12,738	3,178	94	1,999	2,159	217

	Percent Replaced	Increased Generation (MWh)	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	0.054%	8,473	3,833	1	3	1	0.2	0.4	0.1
Ravenswood	11.8%	1,830,215	1,526,271	558	1,766	454	90.7	157.8	21.4
Charles Poletti	8.3%	1,297,098	1,144,254	1,887	1,693	423	82.6	37.1	4.9
JFK Cogen	1.8%	280,044	125,849	0	83	21	7.2	16.3	2.2
Far Rockaway	1.1%	176,599	118,773	1	108	25	6.6	15.0	2.1
Astoria	13.5%	2,095,338	1,749,995	828	2,294	539	104.7	171.9	23.7
Arthur Kill	3.9%	608,565	473,649	3	429	116	26.4	59.9	8.2
East River	1.6%	241,430	202,557	235	363	70	13.5	12.6	1.8
Waterside	1.6%	250,159	128,816	1	78	19	7.0	15.8	2.3
Hudson Ave	0.008%	1,252	850	2	5	1	0.1	0.0	0.0
Brooklyn Navy Yard	5.5%	852,608	437,418	4	34	8	24.1	54.1	7.1
Warbasse Cogen	0.21%	33,260	32,262	4	21	5	1.9	3.7	0.5
Gowanus	0.36%	56,414	81,883	160	453	63	6.2	1.7	0.2
Narrows	0.29%	44,928	50,467	38	191	25	3.2	4.5	0.6
TOTAL	50%	7,776,383	6,076,877	3,722	7,528	1,668	374	551	75

	Percent Replaced	Increased Generation (MWh)	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
TOTAL	100%	15,552,767	13,686,648	35,961	20,258	4,846	94	2,373	2,710	292

Increased Emissions

	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_x (tons)	Ozone Season NO_x (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	68%	68%	68%	32%	0%	68%	68%	68%
Lovett	68%	68%	68%	36%	68%	68%	68%	68%
Danskammer	55%	55%	55%	31%	55%	55%	55%	55%
Roseton	68%	68%	68%	37%	0%	68%	68%	68%
Bronx Zoo	39%	39%	39%	24%	--	39%	39%	39%
Ravenswood	49%	49%	49%	17%	--	49%	49%	49%
Charles Poletti	49%	49%	49%	25%	--	49%	49%	49%
JFK Cogen	50%	0%	50%	30%	--	49%	49%	49%
Far Rockaway	49%	74%	49%	26%	--	49%	49%	49%
Astoria	49%	49%	49%	25%	--	49%	49%	49%
Arthur Kill	49%	62%	49%	14%	--	49%	49%	49%
East River	49%	49%	49%	21%	--	49%	49%	49%
Waterside	49%	44%	49%	31%	--	49%	49%	49%
Hudson Ave	49%	49%	49%	15%	--	49%	49%	49%
Brooklyn Navy Yard	47%	64%	46%	29%	--	47%	47%	47%
Warbasse Cogen	49%	50%	49%	30%	--	49%	49%	49%
Gowanus	49%	49%	49%	16%	--	49%	49%	49%
Narrows	49%	49%	49%	16%	--	49%	49%	49%
TOTAL	57%	62%	57%	27%	58%	58%	63%	62%

TRC Environmental Corp. HV&NYC Emission Calcs Page 1 of 1

1

Entergy - Indian Point
Emission Avoidance Study

Baseline Statewide Emissions and Calculated Increases Under Different Generation Replacement Source Assumptions

Source	CO_2	SO_2	NO_x	PM-10	CO	VOC
NY Statewide - All Sources[a]	248,241,000	688,000	723,000	767,000	3,337,000	753,000
NY Statewide - Utilities Only[b]	69,010,726	317,766	107,232	8,328	6,450	842
2002 Generation Mix	13,941,742	75,665	23,140	1,890	1,145	145
2003 Generation Mix	13,888,209	74,794	22,971	1,875	1,148	146
2004 Generation Mix	13,396,046	67,048	21,480	1,758	599	155
2005 Generation Mix	14,527,670	63,747	22,152	1,844	752	197
Hudson Valley	14,548,772	59,644	22,305	4,380	4,794	480
New York City	12,494,172	8,020	16,107	773	1,112	142
Hudson Valley and New York City	13,686,648	35,961	20,258	2,373	2,710	292

(a) based on USEPA Emission Trends Report (baseline year = 1998)
(b) based on USEPA's E-GRID database (baseline year = 1998)

Percent Increase in NY Statewide Emissions from All Sources

Source	CO_2	SO_2	NO_x	PM-10	CO	VOC
2002 Generation Mix	5.62%	11.00%	3.20%	0.25%	0.03%	0.02%
2003 Generation Mix	5.59%	10.87%	3.18%	0.24%	0.03%	0.02%
2004 Generation Mix	5.40%	9.75%	2.97%	0.23%	0.02%	0.02%
2005 Generation Mix	5.85%	9.27%	3.06%	0.24%	0.02%	0.03%
Hudson Valley	5.86%	8.67%	3.09%	0.57%	0.14%	0.06%
New York City	5.03%	1.17%	2.23%	0.10%	0.03%	0.02%
Hudson Valley and New York City	5.51%	5.23%	2.80%	0.31%	0.08%	0.04%

Percent Increase in NY Statewide Utility Emissions

Source	CO_2	SO_2	NO_x	PM-10	CO	VOC
2002 Generation Mix	20.20%	23.81%	21.58%	22.69%	17.76%	17.28%
2003 Generation Mix	20.12%	23.54%	21.42%	22.51%	17.80%	17.34%
2004 Generation Mix	19.41%	21.10%	20.03%	21.11%	9.28%	18.36%
2005 Generation Mix	21.05%	20.06%	20.66%	22.14%	11.66%	23.44%
Hudson Valley	21.08%	18.77%	20.80%	52.59%	74.31%	56.97%
New York City	18.10%	2.52%	15.02%	9.28%	17.24%	16.83%
Hudson Valley and New York City	19.83%	11.32%	18.89%	28.49%	42.02%	34.63%

TRC Environmental Corp. Statewide increases Page 1 of 1

1

1

Entergy - Indian Point
Emission Avoidance Study

Emission Prices - $/ton

2001	841
2002	***2250***
2003	2960
2004	***3090***
2005	3170

2001, 2003 and 2005 were obtained from NYISO document
Bold and Italic - graphically interpolated

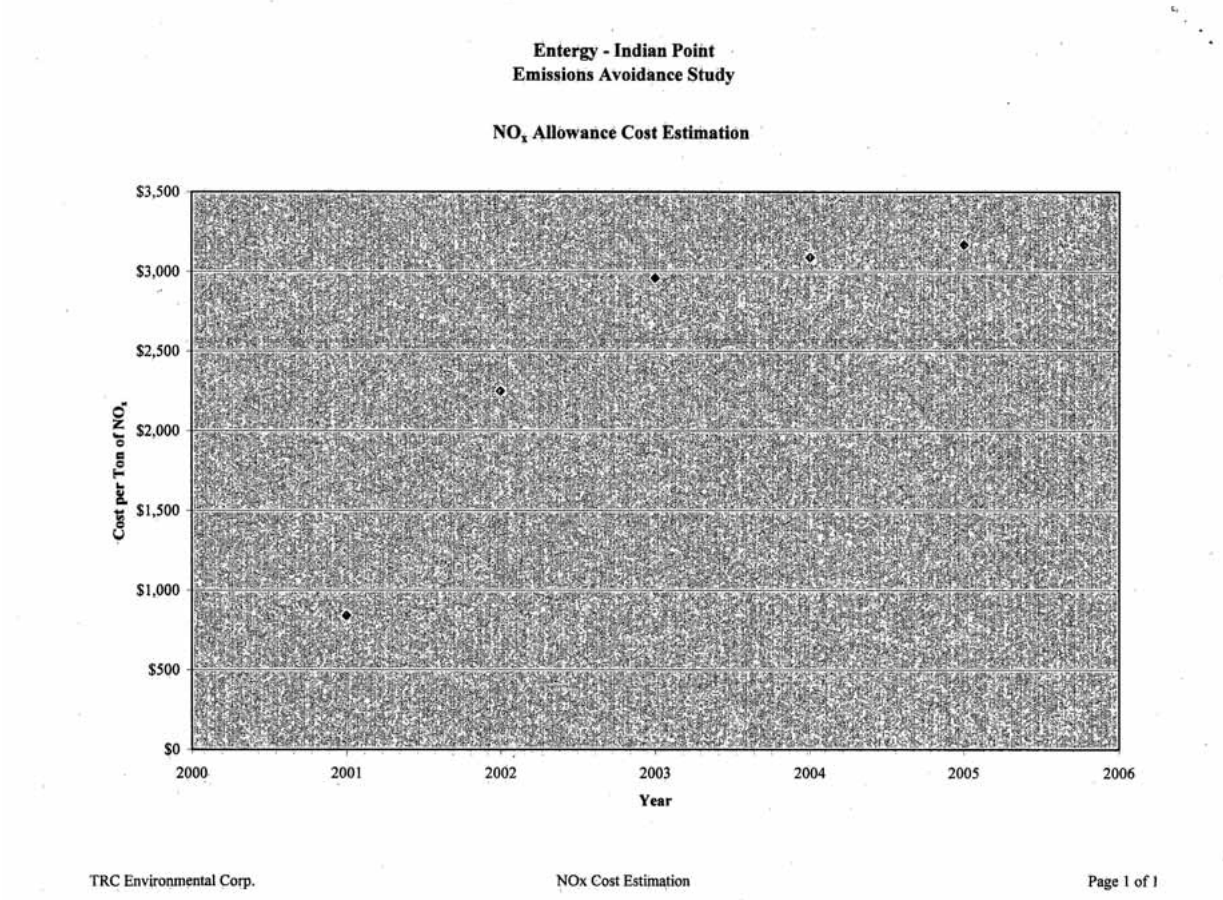
Replacement Source	Ozone NOx (tons)	2002 Cost	2003 Cost	2004 Cost	2005 Cost
2002 Generation Fuel Mix	9,725	$21,881,250	--	--	--
2003 Generation Fuel Mix	9,657	--	$28,584,720	--	--
2004 Generation Fuel Mix	9,062	--	--	$28,001,580	--
2005 Generation Fuel Mix	9,411	--	--	--	$29,832,870
Hudson Valley Plants*	5,613	$12,629,250	$16,614,480	$17,344,170	$17,793,210
New York City Plants*	3,580	$8,055,000	$10,596,800	$11,062,200	$11,348,600
Hudson Valley & NYC Plants*	4,846	$10,903,500	$14,344,160	$14,974,140	$15,361,820

* NOTE: It is unclear whether the necessary generation is available during the ozone season from these sources. These ozone season emissions are based on assuming that the generation is available, and the mix of the plants is the same on an annual basis.

TRC Environmental Corp. Costs of NOx Allowances Page 1 of 1

2

1


Entergy - Indian Point
Emissions Avoidance Study
NO_x Allowance Cost Estimation
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
Cost per Ton of NO_x
2000
2001
2002
2003
2004
2005
2006
Year
TRC Environmental Corp.
NOx Cost Estimation
Page 1 of 1

2

Final Draft

Economic Benefits of Indian Point Energy Center

A Study by the Nuclear Energy Institute

1

Contents

1

1
2

Executive Summary

The Indian Point Energy Center in Buchanan, N.Y., is an integral part of the local economy. The plant provides jobs and makes purchases that stimulate the local economy directly and indirectly. Among the tangible benefits that the plant provides to the area are jobs, taxes, economic output and labor income, together with contributions to the local community. And there are other intangible benefits to the region, such as clean air and low, stable electricity prices. Indian Point's economic impact reaches beyond the local community to the state and even the national level.

The total economic impact of the Indian Point plant on Westchester, Orange, Rockland, Putnam and Dutchess counties for 2002 was $763.3 million. Indian Point's total impact on New York state's economy for the same period was $811.7 million and $1.5 billion for the U.S. economy. The plant's total economic impact includes direct effects, which comprise the value of plant output, as well as secondary effects resulting from plant operation.

In 2002, the Indian Point Energy Center employed 1,683 people (including Entergy Nuclear Northeast's headquarters in White Plains). Eighty percent live in the five-county area surrounding the plant, including an estimated 302 employees in Westchester County, 646 in Dutchess County and 249 in Orange County. In addition, these jobs pay salaries that are on par with the high average salaries of Westchester County and are on average 12 percent higher than salaries in Rockland and Putnam counties, and 45 percent higher than average salaries in Orange and Dutchess counties.

The economic activity generated by Indian Point creates another 1,200 jobs in the five-county region. Given the combination of employees at the plant and secondary jobs created by Indian Point's economic activity, the plant is responsible for 2,500 jobs in Westchester, Orange, Rockland, Putnam and Dutchess counties.

The main expenditure of the Indian Point plant in the local area is employee compensation. During the study period, Indian Point paid $126.6 million in compensation to employees living in the five counties near the plant and an additional $19.3 million to employees in New York state who reside outside these counties. Additionally, the economic activity created by the Indian Point plant accounted for $44.8 million in employee compensation in the surrounding five counties and an additional $65.2 million in other areas of the state. Together, the direct and indirect compensation from the plant accounts for $171.4 million in labor income in the five counties and an additional $39.7 million in other areas of New York state.

The Indian Point plant makes substantial purchases in the region. In 2002, the plant made $287.7 million in purchases, including $54.9 million in New York state and $16.8 million in Westchester, Orange, Rockland, Putnam and Dutchess counties. Economic activity generated by the Indian Point plant also led to $113.3 million in increased economic production in the five counties and $48.4 million throughout the rest of New York state.

In 2002, the Indian Point plant paid $25.3 million in taxes to entities within Westchester County. This represented approximately 87.6 percent of total tax revenues in the village of Buchanan and 93 percent of the total tax revenues of the Hendrick Hudson Central School District. Further, the economic activity generated by Indian Point contributed another $24.4 million in state and local taxes, through increased income, property and sales taxes. By combining the direct and indirect taxes, the Indian Point plant accounts for $49.7 million in state and local tax payments.

In addition to the direct economic benefits provided by Indian Point, the plant generated 15.7 billion kilowatt-hours (kWh) of electricity in 2002, approximately 11 percent of New York state's electricity needs. This low-cost electricity helped keep energy prices in New York state

3

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affordable. A 2002 study, *Electricity System Impacts of Nuclear Shutdown Alternatives*, estimates that if Indian Point were shut down, wholesale electricity prices in the downstate New York area would increase between 13 percent and 25 percent. The report was prepared by General Electric Systems Energy Consulting and National Economic Research Associates.

Indian Point also plays a vital role in maintaining regional air quality. Estimates indicate that in the absence of Indian Point, the state's nitrous oxide emissions would be 19 percent higher and sulfur dioxide emissions would be 11 percent higher because fossil-fueled power plants would offset Indian Point's electricity production. Additionally, carbon dioxide emissions, which have been linked to global warming, would be 20 percent higher.

Indian Point also is an integral part of the community, with civic involvement that ranges from participating in numerous charitable organizations to investing in the area's infrastructure through major donations to government, hospitals and schools. Without Indian Point, many smaller charities and local organizations would suffer disproportionately, given their dependence on the company and plant employees for both volunteers and financial resources.

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Section 1: Introduction

This economic study, conducted by the Nuclear Energy Institute[1] (NEI), examines the economic, fiscal and community benefits—together with other benefits—provided by the Indian Point plant, which is owned by Entergy[2]. Benefits analyzed include those to the five counties within the plant community: Westchester, Orange, Rockland, Putnam and Dutchess. Impacts throughout both New York state and the United States are also reviewed. The study draws on detailed data from the plant to assess these benefits.

Although this study focuses primarily on the benefits to the local community, state and national impacts also are calculated. These include direct impacts—such as people employed by the plant, plant expenditures within the community, and corporate tax payments—and indirect impacts, such as jobs created indirectly by plant expenditures in the local economy. The study also includes other benefits provided by the plant, such as reliable, low-cost electricity, the benefits of a clean-air source of electricity and other contributions to the local community.

Entergy and NEI cooperated in developing this study. Entergy provided data on Indian Point employment, operating expenditures and tax payments, as well as guidance on particular details specific to the local area and the plant. NEI coordinated the project and applied Impact Analysis for Planning (IMPLAN), a nationally recognized economic model to estimate the direct and indirect impacts of the plant on the local community. The methodology employed in this study was developed by RTI International, a nonprofit research organization in Research Triangle Park, N.C. This is the third such study that NEI has undertaken with a member company.

This report includes the following sections:

- Section 2 provides background on the Indian Point plant, including plant history, performance, cost, employment, taxes and local area details, such as total employment and earnings.
- Section 3 examines the economic and fiscal impacts of the plant on the local, state and national levels.
- Section 4 provides data on benefits not captured by the model.
- Section 5 outlines recent trends in the nuclear industry as a whole, especially in cost, performance and safety.
- The final section discusses the methodology used in the study, including the economic modeling software employed as part of this effort.

[1] The Nuclear Energy Institute is the nuclear energy industry's policy organization. Additional information about nuclear energy is available on NEI's Web site at *http://www.nei.org*.

[2] Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC are the respective owners of Indian Point 2 and Indian Point 3. Entergy Nuclear Operations Inc. is the operator of both units.

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Section 2: The Indian Point Energy Center

This section provides background information on the Indian Point plant and the surrounding counties of Westchester, Orange, Putnam, Rockland and Dutchess, including a brief history of the plant, as well as information on its performance, employment and taxes. This section also includes local area details, such as total employment, earnings, local tax collections and regional electricity costs for the village of Buchanan, the five counties surrounding the plant and New York state.

2.1 History and Information

Indian Point Energy Center is on the east bank of the Hudson River, about 25 miles north of New York City. The plant lies within Buchanan, a village of more than 2,000 residents. Buchanan is in the town of Cortlandt, which is inhabited by about 29,000 people. Cortlandt is part of Westchester County, home to roughly 920,000.

Indian Point was built by Consolidated Edison Co., the New York City metropolitan area's primary utility. Indian Point 1, a 275-megawatt pressurized water reactor, began producing electricity in 1962.

Two more reactors were added at Indian Point in 1974 and 1976. Indian Point 1 was permanently shut down in 1974 because revised Nuclear Regulatory Commission requirements for upgrading the emergency core cooling system and the price of fuel oil for the oil-fired system heaters made continued operation no longer cost effective. The Unit 1 technology differed from reactors built in the 1970s, such as Indian Point 2 and 3. Unit 1 is currently in decommissioning and is being kept in long-term, safe storage until Units 2 and 3 cease to operate. At that time, the three reactors will be dismantled concurrently.

Today, all three of the Indian Point reactors are owned by Entergy, which bought Indian Point 3 from the New York Power Authority in 2000, and purchased Units 1 and 2 from Con Edison in 2001. Today, Entergy operates 10 reactors in six states.

Indian Point 2's license allows it to operate until 2013, while Indian Point 3 can continue to operate until 2015. Entergy has announced that it plans to submit license renewal applications for some of its Northeast plants starting in 2005.

Table 2-1. The Indian Point Energy Center at a Glance

Unit	Capacity (MW)	Commercial Operation Year	Year of License Expiration	Reactor Type
Unit 1	275	1962	In Decommissioning	PWR
Unit 2	984	1974	2013	PWR
Unit 3	994	1976	2015	PWR

PWR = pressurized water reactor; MW = megawatts

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Economic Benefits of Indian Point Energy Center

Indian Point Energy Center and Surrounding Area

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In 2000, Indian Point 3 had its best year of operations, with a capacity factor of 100 percent. Capacity factor measures the amount of electricity produced vs. the maximum amount achievable if the plant generates power around the clock. Indian Point 2 had its best year in 2001, with a capacity factor of 94 percent.

Indian Point benefits the people of Buchanan, the surrounding counties and New York state in several ways. It is a major source of inexpensive, reliable electricity for the state and the New York Power Pool (NYPP), and it provides hundreds of jobs and significant economic benefits to the cities and towns of the surrounding counties.

2.2 Generation

The Indian Point Energy Center generated 15.7 million megawatt-hours (MWh) in 2001 and 16 million MWh in 2002. This was roughly 11 percent of the electricity generated in the state of New York, enough for 1.5 million homes. Efficient electricity production at the plant was driven by a high capacity factor for each reactor. Indian Point 2's capacity factor averaged 92 percent in 2001 and 2002; Indian Point 3 averaged 96 percent for those two years.

These levels of performance have made Indian Point an integral part of the New York power system. Without the low-cost electricity provided by the Indian Point plant, power prices in the state would increase significantly, and electricity reliability would decrease substantially.

A study conducted by General Electric Power Systems Energy Consulting and National Economic Research Associates concluded that the reliability of the New York electric system would be degraded and power prices would increase, if Indian Point were to shut down. The study used a model called GE-MAPS, designed to estimate local reliability and cost.

The study found that a shutdown of the Indian Point plant would reduce the reserve margin on the New York electric system from 14.5 percent, already a low reserve level, to 8.4 percent. The New York State Reliability Council estimates that an 18 percent reserve requirement is necessary to ensure adequate electricity supply. Low reserve margins substantially increase the probability of periods of high prices, emergency operating procedures by system operators and power curtailments.

The study also found that a shutdown of the Indian Point plant would result in higher electricity prices for customers in New York. This effect would be the greatest for customers in the downstate region. On-peak wholesale electricity prices could increase between 13 percent and 25 percent, with prices for Con Edison customers increasing 20 percent. These price increases would lead to increased consumer expenditures on electricity of $800 million to $1 billion per year during the next three to four years. This increase in expenditures would put a drain on the economy, in addition to the economic loss associated with the plant's closure.

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Table 2-2. New York Power Pool Generation (2001)

Generation Source	Generation Million MWh	Percentage of Generation
Natural Gas	42.27	30%
Other Nuclear	22.67	16%
Coal	22.60	16%
Hydro	20.02	14%
Indian Point	**15.70**	**11%**
Oil	15.84	11%
NYPP Total	139.10	100%

Source: Platts

2.3 Employment

In addition to providing reliable electricity to New York, Indian Point is also a major source of employment for the residents of Buchanan and the surrounding area. In 2002, the Indian Point plant and Entergy's White Plains office employed 1,683 people, of which 1,355 reside within the five surrounding counties of Westchester, Orange, Putnam, Rockland and Dutchess. The plant employs 302 people from Westchester County, of which 22 reside in the village of Buchanan. Indian Point employees from Buchanan represent one of every 50 working people from the village. Of the four remaining counties, the plant employs 646 people from Dutchess County, 249 people from Orange County, 113 people from Putnam County, and 45 people from Rockland County.

Table 2-3. Employment by County

	Indian Point/White Plains Office		City/County Total*	
County	Employees	Average Earnings	Employed Work Force	Average Earnings
Westchester	302	$95,783	432,600	$100,776
Dutchess	646	$93,691	130,793	$64,805
Orange	249	$94,764	151,744	$63,175
Putnam	113	$94,964	48,932	$83,620
Rockland	45	$90,644	135,262	$84,456
Other Metro Area†	322	$103,345	5,491,406	$71,442

** Census 2000*

† This area encompasses New York City, Northern New Jersey and Long Island, N.Y, part of the New York-New Jersey-Connecticut-Pennsylvania Consolidated Metropolitan Statistical Area as defined by the U.S. Census Bureau. This chart does not reflect employees who reside outside the five-county local area and Other Metro Area.

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Jobs provided by the Indian Point plant also are typically higher paying than most jobs in the area. Employees at Indian Point earned on average about $95,000 in 2002, including salary and overtime. This is almost 50 percent higher than the average salary in New York state, which is about $64,000 a year. Plant employees residing in the village of Buchanan had average earnings of $84,574, about 5 percent higher than average earnings in the village. Indian Point employees from four of the five counties surrounding the plant had higher average earnings than the average salaries in the counties in which they reside.

In addition to the jobs provided by Indian Point, the plant also spends a large amount of money in the local community. In the one-year period of this study, the Indian Point plant made $11.1 million worth of purchases in Westchester County and an additional $6 million in Dutchess, Orange, Putnam and Rockland counties.

Table 2-4. Top Ten Cities/Towns by Total Employees

City/Town	County	Indian Point/ White Plains Office		City/County Total*	
		Employees	Average Earnings	Employed Work Force	Average Earnings
Wappingers Falls	Dutchess	183	$94,871	2,534	$48,599
Poughkeepsie	Dutchess	109	$93,784	20,105	$63,440
Hopewell Junction	Dutchess	99	$100,651	1,430	$68,394
Fishkill	Dutchess	71	$98,795	8,055	$64,145
Beacon	Dutchess	69	$79,123	6,089	$53,593
Peekskill	Westchester	63	$88,913	10,963	$58,838
Newburgh	Orange	57	$81,047	13,731	$67,739
Cortlandt Manor	Westchester	36	$95,875	19,052	$94,147
Middletown	Orange	24	$94,690	10,852	$51,708
Buchanan	Westchester	22	$84,574	1,112	$80,473

** Census 2000*

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Table 2-5. Top Ten Cities/Towns by Percent of Employed Work Force

City/Town	County	Percentage of Employed Work Force	Indian Point/ White Plains Office		City/County Total*	
			Employees	Average Earnings	Employed Work Force	Average Earnings
Wappingers Falls	Dutchess	7%	183	$94,871	2,534	$48,599
Verplanck	Westchester	5%	16	$82,607	308	$54,551
Hopewell Junction	Dutchess	4%	99	$100,651	2,610	$68,394
Cold Spring	Putnam	2%	22	$82,311	983	$80,058
Buchanan	Westchester	2%	22	$84,574	1,112	$80,473
Beacon	Dutchess	1%	69	$79,123	6,089	$53,593
Brewster	Putnam	1%	14	$101,028	1,263	$53,740
Fishkill	Dutchess	1%	71	$98,795	8,055	$64,145
Peekskill	Westchester	1%	63	$88,913	10,963	$58,838
Walden	Orange	1%	16	$98,581	2,876	$52,825

** Census 2000*

2.4 Plant and Local Area Taxes

Indian Point also makes substantial tax payments to local jurisdictions, in addition to benefits derived from employment and direct purchases. In 2002, Indian Point paid approximately $25 million in local property tax payments. The largest taxes paid by Indian Point were to the local school district. The plant paid more than $20 million in taxes to Hendrick Hudson Central School District, accounting for approximately 93 percent of tax payments to the district. The plant also paid $2.7 million to the village of Buchanan, 88 percent of taxes paid to the village; and $569,000 to the Verplanck Fire District, 31 percent of taxes paid to the district.

Table 2-6. Property Taxes Paid by Entergy for Indian Point

Location	Property Tax Paid by Entergy	Total Property Tax Collected*	Percent Paid by Entergy
Westchester County	$1,963,000	$351,138,011	0.6%
Town of Cortlandt	$378,000	$38,252,876	1%
Village of Buchanan	$2,665,000	$3,041,628	88%
Verplanck Fire District	$175,000	$569,288	31%
Hendrick Hudson Central Schools	$20,154,000	$21,667,759	93%
Total Taxes Paid	$25,335,000	$414,669,562	6%

** Source: Westchester County Tax Commissioner*

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2.5 Summary

The performance of the Indian Point plant mirrors the performance of the nuclear industry as a whole. Indian Point provides reliable electricity generation and keeps power prices affordable in downstate New York. The plant also offers well-paid employment to Westchester and surrounding counties and a large tax base to Westchester County and the local jurisdictions around the plant. However, these are only the direct economic benefits of the plant. As illustrated in the next section, the secondary effects on the local and regional economies are as large as the direct benefits.

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Section 3: Economic and Fiscal Impacts

The economic and fiscal effects of Indian Point go well beyond employee benefits, purchases of goods and services, salaries, taxes, and wages. They also reflect the strong stimulus that Indian Point's large wage and salary payments provide to key measures of economic activity—the value of electricity production, employment and labor income—in the local and state economies.

Indian Point's spending lifts economic activity throughout the local and state economies, as well as tax payments related to economic activity. This multiplier effect is felt throughout the local and state economies—by the private sector in the form of increased sales and employment and by the public sector through increased tax revenues to support public services.

Estimates of these effects were developed by applying the IMPLAN model to expenditure data provided by Entergy, owner of the Indian Point plants. (For more information on IMPLAN, see Section 6.)

3.1 Plant Expenditures in Westchester, Rockland, Orange, Putnam and Dutchess Counties

Indian Point and White Plains office expenditures for products and services (including labor) in Westchester, Rockland, Putnam, Orange and Dutchess counties totaled $143.4 million for 2002. Spending within the local area represents approximately 30 percent of Indian Point's total spending of $448.8 million and approximately three-quarters of the $200.8 million of spending in New York state.

The expenditure totals for the local area were provided by Entergy and are shown in Table 3-1. The 10 sectors receiving the largest amount of Entergy spending are listed in the table according to the amount spent in the local area. The categories are chosen from among 528 IMPLAN sectors and are listed largely according to the IMPLAN description for each. Total compensation, which includes benefits, salaries and wages, is listed separately.

Similar expenditure totals for New York state and the United States are presented in Tables 3-2 and 3-3, respectively. Expenditure totals for the local area are included in the totals for New York state in Table 3-2, and for the United States in Table 3-3.

By far, the largest expenditures made by Entergy in the local area were for labor. Total compensation for labor services was $126.6 million—approximately 90 percent of Entergy's expenditures in the study area. This reflects the fact that most of Indian Point's expenditures for labor services (wages, salaries and employee benefits) are made locally. Naturally, this share for the five counties surrounding Indian Point is much larger than that of New York state and the United States.

Building services represented the largest non-labor expenditures in the local area at $3.7 million. This sector includes all of the maintenance activities performed at the plant by outside contractors. Most of these services relate to the maintenance of plant facilities, such as janitorial services, landscaping, pest control and plumbing. Although these are non-labor expenses, the activities are typically labor intensive and thus mainly represent personnel costs and local jobs.

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The next largest non-labor expenditures in the local area were for water supply and sewerage. This sector includes the payments to local utilities for the use of water by the plant. Payments for water supply represented $1.8 million in expenditures during the study period.

Most local expenditures in Table 3-1 were for services. The prevalence of the service sectors reflects the outsourcing of jobs by the plant in the local area. Seven of the top-10 plant expenditure categories are for services.

Table 3-1. Entergy Expenditures in Westchester, Putnam, Orange, Rockland and Dutchess Counties (2002)

Description	Amount
Services to Buildings	$3,671,485
Water Supply and Sewerage Systems	$1,891,035
Business Services	$1,397,407
Equipment Rental and Leasing	$1,247,140
Communications Equipment	$953,571
Management and Consulting Services	$700,440
Electrical Equipment	$582,643
Maintenance and Repair of Facilities	$562,843
Computer and Data Processing Services	$494,230
Hotels and Lodging Places	$430,813
Other	$4,900,312
Subtotal	$16,831,919
Total Compensation[a]	$126,582,858
TOTAL	$143,414,778

[a] *Total compensation includes wages, salaries and fringe benefits based on data provided by Indian Point. Employees at Entergy Nuclear Northeast's White Plains office are also included.*

3.2 Plant Expenditures in New York

In 2002, Entergy expenditures for products and services (including labor) in New York state totaled $200.8 million. This total includes $143.4 million spent in the local area and $57.4 million spent in other New York counties. Spending within the state represents approximately 45 percent of Entergy's total spending of $448 million.

Entergy's total spending in New York state is presented in Table 3-2. Total compensation is the largest category at $145.9 million and represents about 70 percent of the total. This is slightly lower than the share of total compensation for spending in the local area, indicating relatively more spending on products and services in other New York counties, compared to the five-county region surrounding the plant.

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The largest non-labor expenditure was for state and local electric utilities. This expenditure represents payments for electric services from the New York Independent System Operator. These are largely services relating to the transmission of Indian Point's electricity onto the electricity grid and the plant's usage of electricity.

The next largest category—motors and generators—represents the purchase of components and services related to maintaining the plant's electric power generators. Entergy spent $8.8 million on this category.

Building services remains an important category in the state. Building services was the third-highest category in the New York top-10 list. Service industries continue to make up a large portion of the expenditures in the state.

Table 3-2. Entergy Expenditures in New York State (2002)

Description	Amount
State and Local Electric Utilities	$12,717,135
Motors and Generators	$8,849,534
Services to Buildings	$4,276,761
Management and Consulting Services	$3,657,723
Other Business Services	$2,794,127
Communications Equipment-NEC[a]	$2,698,937
Water Supply and Sewerage Systems	$2,086,842
Computer and Data Processing Services	$1,500,439
Equipment Rental and Leasing	$1,375,224
Electrical Equipment-NEC	$1,060,884
Other	$13,888,903
Subtotal	$54,906,510
Total Compensation[b]	$145,933,436
TOTAL	$200,839,946

[a] *NEC = Not Elsewhere Classified*

[b] *Total compensation includes wages, salaries and fringe benefits based on data provided by Indian Point. Employees at Entergy Nuclear Northeast's White Plains office are also included.*

3.3 Plant Expenditures in the United States

In 2002, Entergy expenditures for products and services (including labor) purchased in the United States totaled $357.1 million. Apart from expenditures of $159.4 million in New York state, $197.7 million was spent elsewhere in the United States. Much of that amount was for specialized products and services unique to the nuclear industry.

U.S. expenditures are detailed in Table 3-3. Total compensation ($161.2 million) is the largest category, representing about one-third of the total. Total compensation as a share of the U.S. total

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is much lower because plant employees live mostly in New York state (and particularly in the local area), whereas spending on products and non-labor services is concentrated outside the state.

The largest spending for products and non-labor services was for maintenance and repair of facilities ($57.5 million). This result is not unique to Indian Point, since specialized maintenance and repair spending is typically the largest component of expenditures at other nuclear plants, reflecting the strong emphasis on these activities to maintain plants properly and ensure high availability rates and capacity factors.

The second largest non-labor spending category was management and consulting services. As is typical in the nuclear industry, Indian Point relies on highly specialized contractors and consultants to analyze the plant and its operations to ensure consistent performance. The third largest sector—uranium, radium and vanadium ores—represents fuel expenses for the plant. Indian Point's fuel is purchased outside New York state. At the national level, services are an important part of Entergy's expenditures. Six of the top 10 expenditures made nationally are for services.

Table 3-3. Indian Point Expenditures in the United States (2002)

Description	Amount
Maintenance and Repair of Other Facilities	$57,532,646
Management and Consulting Services	$35,390,076
Uranium-Radium-Vanadium Ores	$30,224,443
Engineering-Architectural Services	$15,951,100
State and Local Electric Utilities	$12,720,334
Federal Government Enterprises	$10,606,775
Computer and Data Processing Services	$10,380,878
Motors and Generators	$10,159,757
Services to Buildings	$9,666,271
Insurance Agents and Brokers	$8,894,087
Other	$86,169,119
Subtotal	$287,695,487
Total Compensation[a]	$161,202,683
TOTAL	$448,898,170

[a] *Total compensation includes wages, salaries and fringe benefits based on data provided by Indian Point and includes employees at Entergy Nuclear Northeast's White Plains office.*

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3.4 Taxes Paid and Accrued

A summary of taxes paid by Entergy on behalf of Indian Point in 2002 is presented in Table 3-4. Corporate income taxes were not included in the data because those taxes are paid at the corporate level and not explicitly by the Indian Point plant.

Local taxes in this table refer to the towns and districts in the study area. Property taxes paid in the local area ($25.3 million) represent almost 70 percent of the taxes paid by the plant. These include payments to local school districts and fire districts. Property taxes are paid to Westchester County, the town of Cortlandt, the village of Buchanan, the Hendrick Hudson Central School District and the Verplank Fire District. By far, the largest payments are made to the Hendrick Hudson School District, which accounts for approximately 80 percent of the property tax payments.

In addition to property taxes, Indian Point also paid payroll taxes to the state and federal governments totaling nearly $10 million. The plant also contributes to the profits of Entergy, which pays state and federal corporate income taxes. However, these taxes are not quantified in this study.

Table 3-4. Taxes Paid by Indian Point (2002)

Federal Payroll Tax[a]	$9,794,398
State and Local Taxes	$25,479,732
Property Tax	$25,335,000
Payroll Tax[a]	$144,732
Total Taxes Paid	$35,274,130[b]

[a] *The division of payroll taxes between federal and state is based on the average distribution from IMPLAN data.*

[b] *Excludes federal income taxes paid by Indian Point.*

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Table 3-5. Impact of Indian Point Energy Center on Local, State and National Economies

	Direct	Indirect[a]	Induced[b]	Total
Local Area				
Output	$650,000,000	$26,523,396	$86,764,515	$763,287,899
Labor Income	$126,583,000	$10,913,021	$33,942,648	$171,438,669
Employment	1,355	280	918	2,553
New York State				
Output	$650,000,000	$54,621,790	$107,125,921	$811,747,691
Labor Income	$145,933,008	$22,632,196	$42,535,089	$211,100,309
Employment	1,559	488	1,132	3,179
United States				
Output	$650,000,000	$382,945,230	$491,311,999	$1,524,257,225
Labor Income	$161,202,704	$175,593,811	$173,867,555	$510,664,071
Employment	1,683	4,190	5,125	10,998

[a] *Indirect impacts measure the effects on input suppliers of expenditures by Indian Point.*

[b] *Induced impacts measure the effects produced by the change in household income that results from Indian Point expenditures.*

3.5 Economic Impacts by Geographic Area

Summary economic impacts for each of the three geographic areas—the local area, New York state and the United States—are presented in Table 3-5. The three economic impact variables are:

- output—the value of production of goods and services, measured in 2002 dollars
- labor income—the earnings of labor, measured in 2002 dollars
- employment—measured in jobs provided.

These economic impacts are divided into their direct and secondary effects. The direct effects reflect the industry sector and geographical distribution of Entergy spending without any subsequent spending effects. The secondary, or "ripple," effects include subsequent spending effects, which can be further divided into indirect and induced. Indirect effects reflect how Indian Point spending patterns alter subsequent spending patterns among suppliers. Induced effects reflect how changes in labor income influence the final demand for goods and services, which then has an impact on all sectors producing basic, intermediate and final goods and services.

The direct effects are based on the estimated value of Indian Point revenues of $650 million for 2002. Revenues were estimated using generation figures from Indian Point and the average price of power from Entergy's nuclear reactors in the Northeast. The average price of power was obtained from Entergy's annual report.

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These revenues, which are spent, distributed, invested or paid as taxes, reflect the total output of products and services associated directly with Indian Point and the White Plains office. This total includes the expenditures for products and services (including labor) itemized in Tables 3-1, 3-2 and 3-3.

Nationwide, the direct employment (1,683 jobs) is the average Indian Point employment level over this period. Eighty-one percent of these jobs are filled by workers residing in the local area. Of the remaining 328 jobs, 204 are filled by residents of New York state outside the local area, and the remainder are filled by residents of other states. As Table 3-5 indicates, direct effects are typically the largest contributor to total effects for each of the measures of economic impact and for local area and New York. State ripple effects are the largest contributor to total effects in the United States.

Induced effects are larger than indirect effects for the state and local economies, because there is more spending on labor income, which causes induced effects, than on goods and services, which causes indirect effects. Indirect effects are more important as a share of the total at the national level.

A helpful way of measuring the ripple effects is by using multipliers. Multipliers show the ratio of the plant's "total economic impact" to its "direct economic impact" and can be measured for each geographic region. Multipliers essentially measure how many dollars are created in the economy for every dollar spent by the plant.

In terms of output, Indian Point's direct impact for the local area is $650 million, while its total impact is $763.3 million (*see Table 3-5*). Thus, the multiplier for Indian Point's output for the local area is 1.17. This indicates that for every dollar of output from the Indian Point plant, the local area economy produces $1.17. Using the same formula, the output multiplier is 1.25 for the state and 2.35 for the United States. This means for every dollar of Indian Point output, the state economy produces $1.25 and the U.S. economy produces $2.35.

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Table 3-6. Indian Point's Impact on the Most Affected Industries in Westchester, Rockland, Orange, Putnam and Dutchess Counties

Industry Description	Output	Labor Income	Employment
Electric Services	$650,931,840	$126,764,472	1,357
Owner-Occupied Dwellings	$9,180,758	-	0
Wholesale Trade	$5,997,007	$2,528,002	39
Doctors and Dentists	$5,638,043	$3,317,516	57
Services to Buildings	$4,704,194	$1,969,959	99
Real Estate	$4,536,372	$615,432	19
Hospitals	$4,324,430	$2,614,840	61
Banking	$4,087,369	$789,038	16
Eating and Drinking	$3,367,526	$1,366,463	79
Insurance Carriers	$3,083,332	$1,117,537	17
Other	$67,437,028	$30,355,410	809
TOTAL	$763,287,899	$171,438,669	2,553

3.6 Economic Impacts by Local Industry

Indian Point impacts virtually every sector of the economy. The direct effects are concentrated in a few sectors, but the ripple effects—especially the induced effects—increase the dispersion of total effects across other sectors. The largest ripple effects in the local region are in service industries used by plant employees. The sectors most affected vary by geographic area. Table 3-6 presents the 10 sectors most affected by the plant in the local area, based on total output.

The sector most affected in terms of total output is the electric services sector because this includes electricity produced by the plant. Thus, all direct effects are included in this sector. It is the largest sector based on total output in the New York and U.S. economies, as shown in Tables 3-7 and 3-8, respectively.

The most affected sectors based on total output are not always the most affected sectors based on other impact measures (i.e., labor income and employment). A striking example of this is the second most affected sector, the real-estate values sector, also known as the owner-occupied dwellings sector.

This is not a traditional business-industry sector, and thus there are no impacts on labor income or employment. Instead, it is a special sector developed by the U.S. Department of Commerce's Bureau of Economic Analysis that estimates what homeowners would pay in rent if they rented rather than owned their homes. In essence, it creates an industry based on home ownership.

The sole product (or output) of this industry is home ownership, purchased entirely by personal consumption expenditures out of household income. In effect, this sector captures increases in

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housing values due to increased labor resulting from the plant. Rental costs are included in the real estate category in Table 3-6.

The owner-occupied dwellings sector is influenced by the large number of employees at the plant. These employees require housing and this additional demand leads to increased output from the housing sector. This affect also leads indirectly to increased local tax revenues, since increases in housing raise local property tax revenues.

The third most affected sector is wholesale trade, which represents the intermediate buying and selling of goods purchased by the plant and its employees. This section is large because purchased goods are typically distributed through a wholesaler, so this category is involved in most of the expenditures by Entergy, its employees and its suppliers.

As Table 3-6 indicates, many of the most affected local industries are related to services required by the plant's workers, such as doctors and dentists, real estate, hospitals, banking, and restaurants, in addition to the owner-occupied dwellings category. Further, building services, a large direct expenditure of the plant, remains an important component of the plant's local impacts.

Overall, the IMPLAN model estimates that 1,196 people are employed in the local area as a result of spending by Entergy and its employees.

Table 3-7. Impact of Indian Point Energy Center on the Most Affected Industries In New York

Industry Description	Output	Labor Income	Employment
Electric Services	$650,115,648	$145,958,992	1,559
Owner-Occupied Dwellings	$10,401,062	$0	0
Wholesale Trade	$8,240,323	$3,467,725	58
Management and Consulting Services	$7,861,060	$4,310,168	69
Real Estate	$6,062,534	$822,511	25
Hospitals	$5,925,414	$3,687,267	77
Doctors and Dentists	$5,819,619	$3,397,659	61
Eating and Drinking	$5,401,403	$2,204,015	125
Banking	$5,225,686	$1,008,842	11
Services to Buildings	$4,854,570	$2,213,714	83
Other	$101,840,372	$44,029,416	1,111
TOTAL	$811,747,691	$211,100,309	3,179

3.7 Economic Impacts by State Industry

Table 3-7 uses the same sectors as Table 3-6 to illustrate effects of the plant on New York state. Again, electric services and owner-occupied dwellings are the most affected sectors in terms of total output.

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The entries in Table 3-7 for the most affected industries in New York are similar to those in the five counties surrounding the plant. The primary exception is the inclusion of management and consulting services among the top-10 sectors affected in the state. These services, which are highly specialized, tend to have offices located outside the study area or outside the state.

As with local impacts, the most affected state categories are primarily related to purchases by plant employees for services. Many of these services, such as restaurants, doctors and dentists, and real estate, are owned and operated by local small business owners.

The IMPLAN model estimates that 1,620 jobs (in addition to those at the plant) are created in the state of New York as a result of Indian Point. In other words, for every person employed at the Indian Point plant, another person is employed in the state.

Table 3-8. Impact of Indian Point Energy Center on the Most Affected U.S. Industries

Industry Description	Output	Labor Income	Employment
Electric Services	$650,026,176	$161,209,200	1,683
Management and Consulting Services	$73,699,360	$36,913,264	772
Maintenance and Repair Other Facilities	$43,311,992	$27,672,752	646
Owner-Occupied Dwellings	$38,156,280	$0	0
Wholesale Trade	$32,882,724	$13,798,861	259
Real Estate	$32,344,150	$4,384,204	169
Computer and Data Processing Services	$30,098,628	$22,451,376	257
Banking	$25,652,060	$4,952,178	102
Engineering-Architectural Services	$24,950,872	$11,228,860	247
Communications-Except Radio and TV	$22,292,954	$5,518,133	69
Other	$550,842,029	$222,535,243	6,793
TOTAL	$1,524,257,225	$510,664,071	10,998

3.8 Economic Impacts by U.S. Industry

Table 3-8 illustrates the plant's economic impact on the United States. Electric services, maintenance and management and consulting services are the most affected sectors in terms of total output nationwide.

The 10 most affected sectors (on the basis of output) in the United States are similar to the 10 most affected sectors in the local area and in New York state. The main difference is the appearance of specialized engineering and computer services. These services are often highly specialized to the nuclear industry and are performed by a limited number of firms in the country. Consequently, the services are typically purchased from out-of-state contractors.

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3.9 Tax Impacts

Entergy spending has effects on tax payments that extend beyond the taxes paid directly on the plant. This spending has direct impacts on income and value creation, which in turn affects taxes paid on that income and value. Similarly, the ripple effects of Indian Point spending on other spending and economic activity leads to additional income and value creation, which leads to additional taxes paid. These additional or "induced" effects on tax payments, presented in Table 3-9, are much larger than the taxes paid directly.

Given its expenditures and tax payments, Indian Point is responsible for an estimated $49.6 million in state and local tax expenditures. Most of these tax impacts result from local property taxes paid by the plant and induced by its spending, and state income taxes paid by its employees. Additionally, the plant and its indirect and induced effects account for an estimated $165.9 million in federal tax revenue.

These results can be used to compute tax multipliers, but not for each line item. Line-item tax multipliers cannot be computed because some taxes are not paid by Entergy. Table 3-9 does not include taxes accrued by Indian Point.

Table 3-9. Tax Impacts of Economic Activity Induced by Indian Point

	Total Tax Impact[a]
Federal Government	$165,885,884
Payroll Tax	$56,174,168
Personal Taxes	$55,963,509
Corporate/Business Taxes	$53,748,207
State and Local Government	$49,696,707
Payroll Tax	$327,951
Personal Taxes	$11,063,126
Corporate/Business Taxes	$38,305,630
Total Taxes	$215,582,591

[a] *The total tax impact includes taxes directly paid by Indian Point and the taxes paid by other entities as a result of the economic activity created by Indian Point expenditures.*

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3.10 Summary

The Indian Point Energy Center has substantial economic and fiscal impacts locally and in New York. When compared with their respective economies, the relative impacts of Indian Point are highest for the local area and next highest for New York state. The plant's job-creation impact (direct and indirect) of 2,553 is a significant number of jobs deriving from a single establishment. These impacts are greater in absolute terms at the national level than at the state level, and similarly are greater at the state level than at the county level.

As is the case with other nuclear plants, Indian Point buys specialized products and services from national and international markets. The state and local economic and fiscal effects are great, in large part because of the buying power created by Indian Point's high wages, salaries and benefits, which are spent on goods and services provided locally and in nearby areas.

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Section 4: Additional Benefits Provided by Indian Point

Since buying the Indian Point Energy Center in 2001, Entergy has continued the plant's long-standing tradition of playing an integral role in the community. This involvement ranges from participating in numerous charitable organizations to investing in community infrastructure through major donations to governments, hospitals and schools. Without Entergy and its employees, many smaller charities and local organizations would suffer disproportionately, because of their dependence on the site for both volunteers and financial resources. In addition, Entergy provides direct financial aid, equipment and training to local jurisdictions, counties and the state for emergency planning purposes.

4.1 Introduction

Indian Point and Entergy have a long tradition of community involvement. Company leaders support volunteerism and promote the sharing of financial and intellectual talent in the local area. Civic involvement is an integral part of Entergy's corporate mission, which the company views as an investment in its communities.

Entergy's community investments take many forms, such as grants to community organizations, employee gift matches and volunteerism. Because local problems are best solved through local solutions, Entergy relies on employees who are part of the community and are knowledgeable about their area's unique needs. These employees serve on local contributions committees that make funding decisions.

The mission of the Indian Point local contributions committee is to participate in community events, support local schools and charities, and encourage volunteerism among employees and their families. In addition, the Indian Point local contributions committee helps identify community problems and mobilizes site resources to help solve them.

The committee has approved contributions to such groups as the Brooklyn Children's Museum, Orange County Amateur Radio Club, Haldane Central School District, Careers for People With Disabilities, the Blue Mountain Middle School and town of Fishkill Volunteer Cadet Program. Hillcrest School, African American Men of Westchester, Association for Pupil Transportation, McQuade Children's Services, Westchester Youth Dance Ensemble and the American Cancer Society have also received support from the committee.

Entergy's corporate giving programs include a variety of open, community partnership, employee matching and environmental stewardship grants. The Entergy Charitable Foundation is a private foundation dedicated to building stronger communities through a special focus on low-income initiatives, as well as educational and literacy programs.

In 2002, Entergy and the Entergy Charitable Foundation on a national basis funded more than 3,000 grant requests totaling approximately $10 million in cash contributions. In New York state, Indian Point and Entergy donated $290,000 in 2002 and $1.2 million in 2003. The beneficiaries included educational institutions, social services agencies, charitable organizations, and environmental, civic and governmental organizations. Among the groups receiving donations were the Juvenile Diabetes Research Foundation, the Alzheimer's Disease and Related Disorder Association of Central New York, Hendrick Hudson Free Library and the Research Foundation on Behalf of the State University of New York. Other recipients included Apropos Housing Opportunities and Management, Hudson Valley Hospital Center, American Red Cross,

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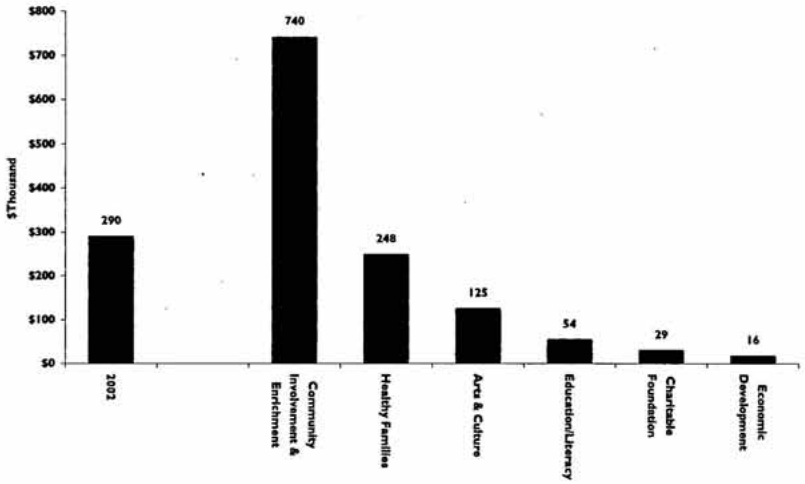
Westchester Arts Council and the city of White Plains, N.Y., Public Safety Division. Entergy's donations provide valuable benefits to the residents of southeastern New York.

Figure 4-1.
2003 Contributions by Entergy to Local Organizations by Program



Description of Contributions:

Open Grants
Entergy Open Grants focus on improving communities as a whole through the support of health and social service agencies, the arts and culture, and community improvement/enrichment programs. Typical grant awards range from $500 to $5,000.

Community Partnership Grants
Entergy partners with community leaders to identify and support local nonprofit organizations that are working to build stronger, more productive communities. Entergy's Community Partnership grants assist churches, schools and other nonprofit groups in their grassroots efforts to improve or support education and literacy, community enrichment, healthy families, arts, and cultural activities. The maximum award is $1,000.

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Entergy Charitable Foundation
The Entergy Charitable Foundation supports programs that provide innovative and measurable ways to positively affect low-income families and help them break the cycle of poverty. Typical grants range from $2,500 to $5,000.

United Way Campaigns
In 2002, Entergy matched employee gifts to the United Way campaign dollar-for-dollar. Entergy's employee, retiree and corporate gifts to the United Way in 2002 totaled almost $4 million. Indian Point and White Plains employees contributed $35,000 to local United Way agencies, with a $55,000 corporate match.

Matching Educational Gifts
Education is the key to the future—both for individuals and for society as a whole. That's why Entergy provides dollar-for-dollar matches to employee, board member and retiree contributions to high schools, colleges and universities.

Community Connectors Grants
When the needs are great and resources scarce, volunteerism is essential to help fill the gap. Entergy's Community Connectors program is designed to celebrate and honor its employees' commitment to volunteerism. Through Community Connectors, Entergy employees log and redeem their volunteer hours for grants to the nonprofit organization of their choice. An individual can earn up to $250, and a team can earn $500 per year.

Community Power Scholarships
With the cost of higher education skyrocketing, Entergy established the Community Power Scholarship program for children of employees. Although academic performance is a consideration, the scholarship program is unique because it focuses on the applicant's community involvement. In 2003, a total of 20 scholarships, for $5,000 each, were awarded.

Power of America Scholarships
In the aftermath of Sept. 11, 2001, Entergy helped lead an industrywide effort to provide scholarships for the children of the victims. Entergy contributed $500,000 as seed money to start the fund, which currently stands at more than $3.1 million. In 2003, 35 scholarships, for $1,000 each, were awarded.

4.2 Social Services

Entergy is one of the largest charitable contributors in the region. The company's charitable efforts include offering multiyear grants to Hudson Valley Hospital to substantially increase the facility's emergency room and emergency preparedness capabilities, as well as providing significant funding for the Westchester Arts Council. Entergy contributions helped the Westchester County Chapter of the American Red Cross launch the Emergency Planning and Preparedness Academy for training first-responders in the region. Entergy is a recognizable force in charitable giving.

In 2003, Entergy copied its successful fuel fund program from its southern region and initiated the Heartshare Energy Assistance Program in the Northeast—an employee-sponsored subsidy that supports elderly or disabled persons in their efforts to pay the ever-increasing cost of cooling and heating their homes.

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4.3 Education

Public education is an important part of Indian Point's commitment to the communities surrounding the site. One of the most successful programs in the plant's history has been the Energy Institute—a two-week continuing education seminar for local high school teachers run by the State University of New York at Oswego. This annual, multidimensional course covers a wide range of energy options and issues beyond just learning about nuclear energy. Teachers learn new techniques for instructing students on the latest alternative forms of energy by using hands-on experimentation and exploring the subject through the use of active debate.

Started as a sponsorship under the prior ownership of Indian Point 3, the Energy Institute has grown into a partnership of equals under Entergy's direction. This interactive learning experience presents attendees with a comprehensive overview of energy issues, including (but not limited to) nuclear power. Although Entergy takes a hands-off approach to the development of course content by the college, the company takes an active role in providing nuclear engineers, who present the science of nuclear energy in an informative and relaxed forum.

Many Indian Point employees also use their knowledge of nuclear engineering, occupational safety and radiation as invited speakers at various educational forums.

4.4 Environmental Protection

In addition to the economic benefits that Indian Point provides to the local area, the plant also plays a vital role in preserving air quality in New York, particularly the Hudson Valley and New York City. Nuclear power does not produce any air pollution in the process of generating electricity. If Indian Point no longer operated, its electricity production would need to be replaced by existing fossil-fired power plants in the region, which would increase the region's air pollution.

A 2002 study by TRC Environmental Corp. found that if Indian Point were closed, the state's carbon dioxide emissions would increase by 20 percent. Carbon dioxide has been identified by many scientists as a contributor to global climate change. The study also estimates that without Indian Point, nitrous oxide emissions would be 19 percent higher in the state. Nitrous oxide has been linked to respiratory illness and is a precursor to ozone depletion and acid rain.

Westchester County is designated as a non-attainment area for ozone by the U.S. Environmental Protection Agency. Without the Indian Point plant, Westchester County would have severe difficulty meeting its ozone goals. Ozone has been linked to lung illness and leads to smog and reduced visibility.

In the absence of Indian Point, sulfur dioxide levels would be 11 percent higher in New York state. Sulfur dioxide is a precursor to acid rain and has been linked to respiratory illness.

The study also estimates that in the absence of Indian Point, carbon monoxide levels would be 42 percent higher, particulate matter emissions would be 28 percent greater, and emissions of volatile organic compounds would be 35 percent higher. These emissions have similar health and environmental impacts as nitrogen oxide and sulfur dioxide.

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4.5 Civic/Government

Indian Point employees represent a cross-section of civic participation and volunteer positions within government agencies, law enforcement, emergency medical services, hazardous material squads and fire departments. Following the Sept. 11 attacks, Indian Point personnel were called upon to assist regional fire, police and emergency services departments in responding to the event. Some employees went immediately to join fellow volunteers in assisting with rescue efforts, others helped with coordination of relief plans. When breathing apparatus for rescue workers ran out, emergency workers turned to Indian Point, because the site had one of the largest inventories of breathing equipment in the region. In addition to the loan of equipment, several Indian Point workers provided training on the equipment to rescue workers, who were using assisted breathing gear for the first time.

Local Celebrations

Besides charitable contributions, Entergy is a supporter of two premier local celebrations. The New York Power Authority has a longstanding tradition of supporting Peekskill Celebration, and when Entergy purchased Indian Point 3 from the authority in 2000, the company continued as a major sponsor of this important event. The company also supports the highlight of the multi-day event—the Saturday night fireworks show. Additionally, Entergy provides volunteers to help guide the development and execution of the celebration.

Likewise, Harborfest is the crowning jewel of Oswego County's yearlong community event calendar. As one of the largest employers in the county, Entergy provides financial and volunteer resources to event coordinators when planning this celebration. Hundreds of local businesses depend on this multi-day event for revenue, and Entergy is proud to assist those businesses through its sponsorship of Harborfest.

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Section 5: Nuclear Industry Trends

U.S. nuclear power plant performance reached an all-time high in 2002, the fifth consecutive record-setting year. The nuclear energy industry has steadily improved performance and cost, while also improving plant safety. The nuclear energy industry is a model of industrial safety. Power plant performance is commonly measured by capacity factor, which expresses the amount of electricity actually produced by a plant, compared with the maximum achievable. U.S. nuclear power plants achieved a capacity factor of 91.9 percent in 2002. Total electricity production for U.S. nuclear power plants reached new heights in 2002. At the same time, production costs for those plants have been among the lowest of any baseload fuel source.

5.1 Nuclear Industry Performance

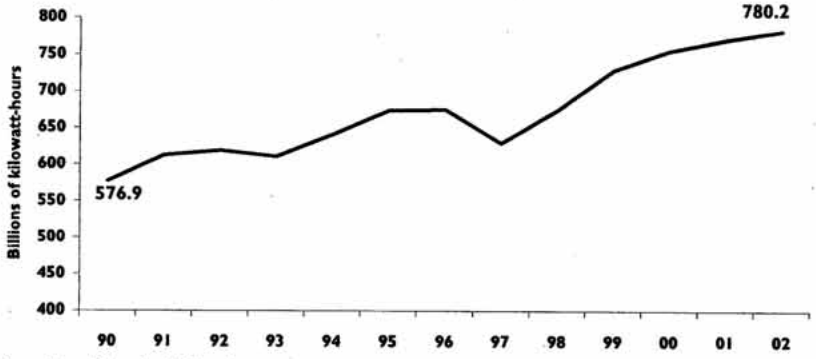
U.S. nuclear power plants have increased their output and improved their performance significantly over the past 10 years. Nuclear energy represents about 20 percent of all electricity generated in the United States. In 2002, nuclear power generated 780 billion kilowatt-hours (kWh) of electricity. Since 1990, the industry has increased total output equivalent to 26 new, large nuclear plants. The increase in output has been achieved without building any new plants.

In 2002, U.S. nuclear plants operated at an average capacity factor of 91.9 percent. Overall capacity factors for U.S. nuclear power plants increased dramatically over the past decade. By contrast, the average industry capacity factor was 60 percent in the late 1980s.

One of the key reasons for these increased capacity factors has been the shortening of refueling outage times.

Figure 5-1. U.S. Nuclear Industry Net Electricity Generation

(35% increase from 1990 to 2002)



Source: Energy Information Administration

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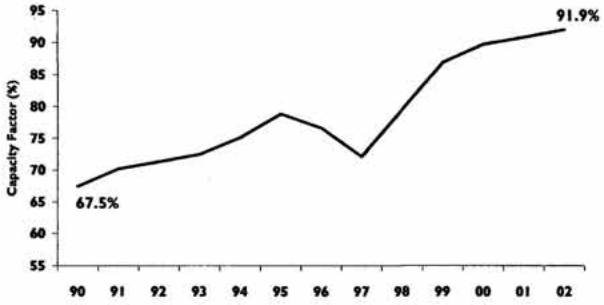
Nuclear plants need to shut down to refuel approximately every 18 to 24 months. Refueling represents one of the major determinants of nuclear plant availability. In the past 10 years, the durations of refueling outages have been declining. In 1990, the average refueling outage took 105 days to complete. By 2001, this number declined to an average of 37 days, and companies continue to apply best practices to reduce this average length of refueling. The record for the shortest refueling outage is 14.67 days for boiling water reactors and 15.63 days for pressurized water reactors.

Figure 5-2. Nuclear Industry Average Capacity Factors
(1990-2002)

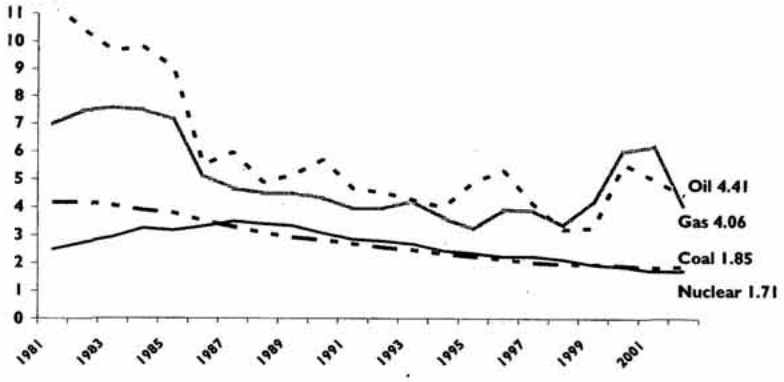


Source: Energy Information Administration

5.2 Cost Competitiveness

Along with increasing output, the U.S. nuclear industry has continued to decrease the cost of producing electricity. In 2002, nuclear power had a production cost of 1.71 cents/kWh, significantly lower than the production costs of electricity generated by oil and natural gas and slightly lower than coal. In the past decade, nuclear power production costs have dropped by about one-third, as a result of the increased efficiency of U.S. plants. Since most of a nuclear plant's costs are fixed, greater electricity production creates lower cost. However, nuclear plants have also taken steps to reduce their total costs through improved work processes.

Figure 5-3. U.S. Electricity Production Costs
(1981-2002 in constant 2002 cents/kWh)



Source: Pre-1995: Utility Data Institute (UDI), Post-1995: Resource Data International (RDI) Modeled Production Cost

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Table 5-1. Regional Wholesale Electricity Prices (cents/kWh)

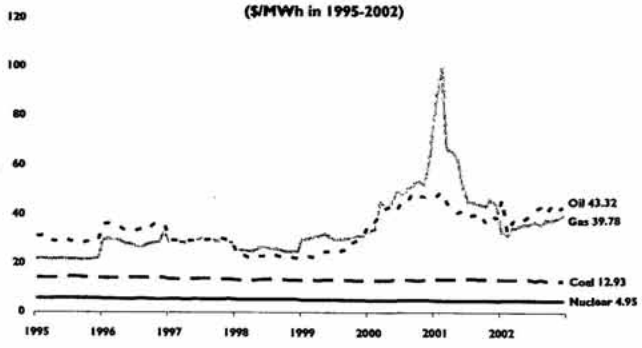
Region	2001 Average On-Peak Prices	2003 On-Peak Futures Prices
New England	4.99	3.58
New York	4.97	4.38
Mid-Atlantic	3.93	3.63
Tennessee Valley	3.58	3.03
Gulf States	3.60	3.05
Midwest	3.39	3.00
Texas	3.46	3.30
Northwest	13.00	3.48
Southwest	11.30	3.73

Source: Megawatt Daily

Because of low production costs and excellent safety performance, today's nuclear plants are very competitive in today's energy markets. Ultimately, the primary test of nuclear energy's competitiveness is how well it performs against market prices. In this respect, nuclear energy is highly competitive. Average production costs at 103 reactors were 1.71 cents/kWh in 2002, lower than the average price of electricity in all regional markets. Nuclear power is also competitive with futures market prices, one of the best ways to judge what prices will be in the year ahead.

Nuclear plants also provide a unique degree of price stability for two reasons. First, production costs for nuclear plants are comprised of costs not associated with fuel. Many fuel markets tend to be volatile, so the production costs of generation sources tied to fuel expenses are highly volatile, as they swing with variations in fuel markets. Fuel represents only 20 percent of the production cost of nuclear power, but it makes up between 60 percent and 80 percent of the cost of natural gas, coal and petroleum-fired electricity. Second, nuclear fuel prices are much more stable than that of natural gas and petroleum. Because of its stable, low production cost, nuclear power can help mitigate large electricity price swings.

Figure 5-4. Monthly Fuel Cost to Electric Generators



Source: Resource Data International (RDI) and Utility Data Institute (UDI).

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5.3 Industry Safety

The nuclear industry's recent performance and cost achievements have been accomplished in an era of outstanding safety at U.S. nuclear plants. In 2002, the nuclear power industry met or exceeded all safety goals set by the Institute of Nuclear Power Operations (INPO) and the World Association of Nuclear Operators (WANO). These entities track safety and performance data in 10 key areas.

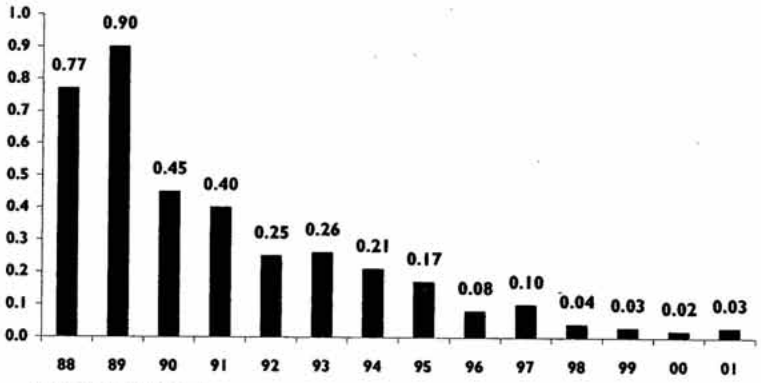
One key indicator tracked by INPO and WANO is the number of unplanned automatic plant shutdowns. The U.S. industry has made dramatic improvements in the number of unplanned automatic shutdowns, dropping from 7.3 shutdowns per reactor in 1980 to a median of zero per reactor since 1997.

Other safety and performance indicators tracked by the Nuclear Regulatory Commission confirm the excellent safety performance of U.S. nuclear plants. The NRC tracks data on the number of "significant events" at each nuclear plant. (A significant event is broadly defined as any occurrence that challenges a plant's safety system.) The average number of significant events per reactor has declined from 0.77 per year in 1988 to 0.03 in 2001.

In addition to safe operations, U.S. nuclear plants continue to improve the already high levels of worker safety. According to NRC data, radiation exposure to workers (measured in rem) decreased from an average of about 1 rem per year in 1973 to 0.16 rem per year in 2001. Both the historical and current doses per employee are far below the regulatory limit of 5 rem per year.

Figure 5-5. Significant Events: Annual Industry Average

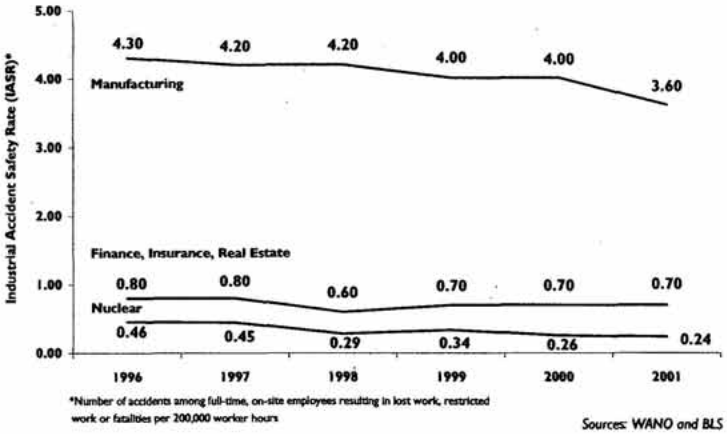
(Number of events per reactor 1988-2001)



Source: Nuclear Utility Service

Figure 5-6. Nuclear's Safety Record

Nuclear Industry's Industrial Accident Safety Rates Compared to Other Industries



*Number of accidents among full-time, on-site employees resulting in lost work, restricted work or fatalities per 200,000 worker hours

Sources: WANO and BLS

General worker safety also is excellent at U.S. nuclear power plants—far safer than the U.S. manufacturing sector. WANO and the Bureau of Labor Statistics provide information on the industrial accident safety rate. This statistic measures the lost workday accidents or fatalities per 200,000 worker hours. The nuclear industry has improved its industrial accident safety rate from 0.46 in 1996 to 0.24 in 2001. By comparison, the U.S. manufacturing industry had an industrial accident safety rate of 3.6 in 2001 and the U.S. finance, insurance and real estate industries had an industrial accident safety rate of 0.7—both trailing the nuclear industry.

5.4 Current Industry Events

The excellent economic and safety performance of U.S. nuclear plants has increased interest in nuclear power by the electric utility industry, the financial community and policymakers. This is evidenced by the increasing number of plants seeking license renewals from the NRC.

Nuclear plants were originally licensed to operate for 40 years, but can safely operate for longer periods of time. The NRC granted the first 20-year license renewal to two reactors at the Calvert Cliffs plant in Maryland in 2000. As of January 2004, 23 reactors have received license extensions, and 17 reactors have submitted an application for a license extension. License renewal is an attractive alternative to building new electric capacity because of nuclear power's low production costs and the return on investment for renewal.

Besides relicensing current plants, interest has recently increased in building new nuclear plants. Several companies are exploring building new plants, including three companies—Entergy, Dominion Energy and Exelon—that have submitted applications with the NRC to test the agency's new permitting process for new reactor sites. In addition, President Bush included construction of new nuclear plants as an essential part of the administration's National Energy Strategy announced in May 2001.

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Section 6: Economic Impact Analysis Methodology

The methodology used to estimate the economic and fiscal impacts of the Indian Point power plant is commonly referred to as input/output methodology. Several operational input/output models are available in the marketplace—the market leaders are Impact Analysis for Planning (IMPLAN), REMI and RIMS-II. The IMPLAN model was selected for use in this study, primarily because the model and many of the data sets were already on hand, the relevance of IMPLAN to the particular application, as well as its transparency and ease of use.

This report section presents typical applications of input/output methodology and explains the methodology and its underpinnings. It also describes how Indian Point data and the IMPLAN model were used to estimate local, state and national economic and fiscal impacts of plant operation.

6.1 Use of Input/Output Models

Input/output models capture input—or demand—and output—or supply—interrelationships for detailed business, government and industry sectors in a geographic region. They also capture the consumption of goods and services for final demand by these sectors and by the household sector. The basic geographic region is a county, and model results can be developed at the county, multi-county, state, multi-state and national levels. They are particularly useful in examining the total effects of an economic activity or of a change in the level of that activity.

These models are typically used when the following key questions need to be addressed:

- How much spending does an economic activity (such as a power plant) bring to a region or local area?
- How much of this spending results in sales growth by local businesses?
- How much income is generated for local businesses and households?
- How many jobs does this activity support?
- How much tax revenue is generated by this activity?

These models are also useful in addressing related questions, such as the geographic and industry distribution of economic and fiscal impacts. Typical applications of these models include facility or military base openings and closings, transport or other public infrastructure investments, industrial recruitment and relocation, and tourism.

6.2 Overview of the Input/Output Methodology

Input/output models link various sectors of the economy—agriculture, construction, government, households, manufacturing, services and trade—through their respective spending flows in a reference year. These linkages include geographic linkages, primarily at national, state and county levels.

As a result of these linkages, the impact of an economic activity in any sector or geographic area on other sectors and areas can be modeled. These impacts can extend well beyond the sector and area in which the original economic activity is located. They include not only the direct, or initial, effects of the economic activity, but also the subsequent, or "ripple," effects that flow from this activity. Direct effects are analogous to the initial "splash" made by the economic activity,

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and ripple effects are analogous to the subsequent "waves" of economic activity (employment, new income, production and spending) that are triggered by this splash. A full accounting of the splash's effect also must include the waves emanating from the splash itself.

The sum of the direct and ripple effects is called the total effect, and the ratio of the total effect to the direct effect is called the "total effect multiplier," or simply the multiplier effect. Multipliers can be developed for any of the model outputs, such as earned income, employment, industry output and total income (which includes the effect of transfers between institutions).

Multipliers can also be developed for any industry or business sector or geographic area in the model. Multipliers for a county are smaller than for a larger area (the state in which the county is located) because some of the spending associated with an economic activity "leaks" from the small area into the larger area. At the local area level, multipliers are larger if the local area economy is more diversified and if the economic activity being modeled is a good "fit" within that economic base.

Ripple effects include two components—indirect and induced effects—that are separately modeled within input/output models. Indirect, or "upstream," effects are the effects on the supply chain that feeds into the business-industry sector in which the economic activity is located. For example, when Indian Point buys a hammer for $5, it contributes directly to the economy by this purchase, but the company that makes the hammer also has to increase its purchases of steel and wood to maintain its inventory, and this will increase output in the steel and wood industries. The steel and wood industries will then have to purchase more inputs for their production processes, and so on. The result will be an economic impact that is greater than the $5 initially spent by Indian Point for the hammer.

Induced effects are the impacts on all sectors that result from changes in final demand of commodities and services that are associated with changes in income from the economic activity. They are primarily associated with changes in household spending on goods and services for final demand. These are the result of changes in labor income.

To illustrate, when Indian Point pays $5 for a hammer, a portion of the $5 goes to pay the wages of employees at the company that makes the hammer. This portion contributes to labor income, which provides an additional contribution to the economy through its effects on household spending for goods and services. There also will be a contribution from the effect of this purchase on labor income in the wood and steel industries, and on the resulting household spending for goods and services. Indian Point's own wage and salary expenditures create induced effects as well, and they occur primarily in the local area economy.

As with any model, input/output models incorporate some simplifying assumptions to make them tractable. There are several key simplifying assumptions in input/output models.

Input/output models assume a fixed commodity input structure. In essence, the "recipe" for producing a product or service is fixed, and there is no substitution of inputs, either new inputs (which weren't in the mix before) for old inputs, or among inputs within the mix. Input substitution does not occur if technical improvements in some inputs make them relatively more productive. Nor does substitution occur if there are relative price changes among inputs. Were any of these types of substitutions allowed, they might dampen the multiplier effects, especially for larger geographic areas.

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Another key simplifying assumption is constant returns to scale. A doubling of commodity or service output requires a doubling of inputs, and a halving of commodity or service output requires a halving of inputs. There is no opportunity for input use relative to commodity or service production levels to change, as those levels expand or contract, so there are no opportunities for either economies or diseconomies of scale. This will not dramatically alter the overall results as long as the economic activity whose effects are being modeled isn't large relative to the rest of the sectors.

In other words, the models assume that for every dollar of output, the same dollar amounts are required for the various input categories. Returning to the hammer example, if a $5 hammer requires $3 of steel, then two hammers would require $6 of steel. Although that works for steel and hammers, some inputs do not vary directly with output. For instance, if an oil refinery's efficiency and output increases, a corresponding increase in personnel operating the plant is unlikely. The return to scale assumption, which takes such differences into account, is necessary for modeling.

Input/output models assume no input supply or commodity/service production capability constraints. This simplifying assumption is related in part to the constant returns to scale assumption, for if there were supply constraints, there likely would be diseconomies of scale. As in the case of the constant returns to scale assumption, this "no supply constraints" assumption is not a major concern as long as the economic activity of interest isn't large relative to the rest of the sectors.

To illustrate, the no-supply-constraints assumption assumes that a hammer manufacturer would purchase all the steel for the same price. If not, doubling the number of hammers sold could mean that the dollar value of the steel might more than double if the manufacturer had to buy more steel at a higher price. This would violate the constant returns to scale assumption, which simplifies modeling.

Homogeneity is also a key simplifying assumption. Basically, firms within sectors and technologies within sectors are characterized as very similar. There is some ability to edit sector files to characterize specialized firms, but there is no ability to reflect full diversity of firms within sectors.

6.3 The IMPLAN Model and Its Application to Indian Point

IMPLAN was originally developed by the U.S. Department of Agriculture's Forest Service in cooperation with the Federal Emergency Management Agency and the U.S. Department of the Interior's Bureau of Land Management to assist in land and resource management planning. IMPLAN, which has been used since 1979, is supported by the Minnesota IMPLAN Group Inc.

There are two components of the IMPLAN system: the software and the database. The software performs the necessary calculations, using study area data, to create the models. It also provides an interface for the user to change the region's economic description, create impact scenarios and introduce changes into the local model. The software is described in a user's guide provided by the Minnesota IMPLAN Group.

The software was designed to serve three functions: data retrieval, data reduction and model development, and impact analyses.

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The IMPLAN database consists of two major parts: national-level technology matrices and estimates of regional data for institutional demand and transfers, value added, industry output and employment for each county in the United States, as well as state and national totals.

The model's data and account structure closely follow the accounting conventions used in the input/output studies of the U.S. economy by the Department of Commerce's Bureau of Economic Analysis. The comprehensive and detailed data coverage of the entire United States by county and the ability to incorporate user-supplied data at each stage of the model-building process provide a high degree of flexibility, both in terms of geographic coverage and model formulation.

In applying the IMPLAN model to Indian Point, three basic types of data were provided by Entergy: purchase order expenditures by Indian Point purchase order code, employee compensation expenditures and tax payment data.

Purchase order expenditures were provided for 2002 by Entergy. Employee compensation (salary data and an estimate of the value of benefits) was provided for the same period. Tax payment data were provided for 2002. For each of these data types, the location of the expenditure was identified.

The purchase order data were mapped to IMPLAN's 528 codes by comparing the descriptions of the purchase orders with the Standard Industrial Classification codes used in IMPLAN sector codes.

The purchase order and compensation data were then augmented by an estimate of revenues from Indian Point sales into the wholesale market over this period. This augmentation was necessary because purchase orders and compensation do not reflect all Indian Point expenditures, and total expenditures (approximated by total revenues) better reflect the full economic impacts of Indian Point. This estimate was obtained from reported data by Entergy.

In tailoring the model to Indian Point, the underlying data sets provided by IMPLAN were reviewed to see if any IMPLAN coefficient could be edited to better reflect local conditions. These coefficients are based on national relationships, and in some cases may not reflect local conditions. In this report, the coefficients within the electric services sector were edited to more accurately reflect a nuclear power plant rather than a "national average power plant of all types." This constituted the majority of the coefficient editing.

IMPLAN was then used to develop the economic and impact estimates contained in this report.

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ML090720673

IPRenewalCEmails

From: Eswc@aol.com
Sent: Thursday, March 12, 2009 12:26 PM
To: IndianPointEIS Resource; mgaristo@scny.org
Subject: opposition to renewing the Indian Point License for 20 years

I share the concerns Riverkeeper has mentioned and listed below. Therefore I oppose the 20 license renewal for Indian Point. — 91-a-OR

Arleen K. Ketchum
10 Pratt Street
New Rochelle, NY 10801

Riverkeeper is particularly concerned about the following environmental impacts:

- The slaughter of billions of fish, eggs and larvae every year that results from Indian Point's outdated cooling water intake system, which uses billions of gallons of Hudson River water every day to keep the plant operating. — 91-b-AE
- The killing of shortnose and Atlantic sturgeon when they are trapped against the cooling water intake screens. Shortnose sturgeon are listed as an endangered species under the Federal Endangered Species Act. — 91-c-AE
- The continuing leak of radioactive water from the Indian Point 2 spent fuel pool into the groundwater and Hudson River. — 91-d-LE
- The long term storage of thousands of tons of highly toxic nuclear waste on the banks of the Hudson River, currently housed in poorly maintained spent fuel pools and " dry casks" that are vulnerable to terrorist attack. — 91-e-OR/RW/ST

Comments should indicate that you support Riverkeeper's environmental impact concerns and opposition to the license renewal of Indian Point.

The Elizabeth Seton Women's Center Inc.
133 West 70th Street
New York, NY 10023
212- 579- 3657

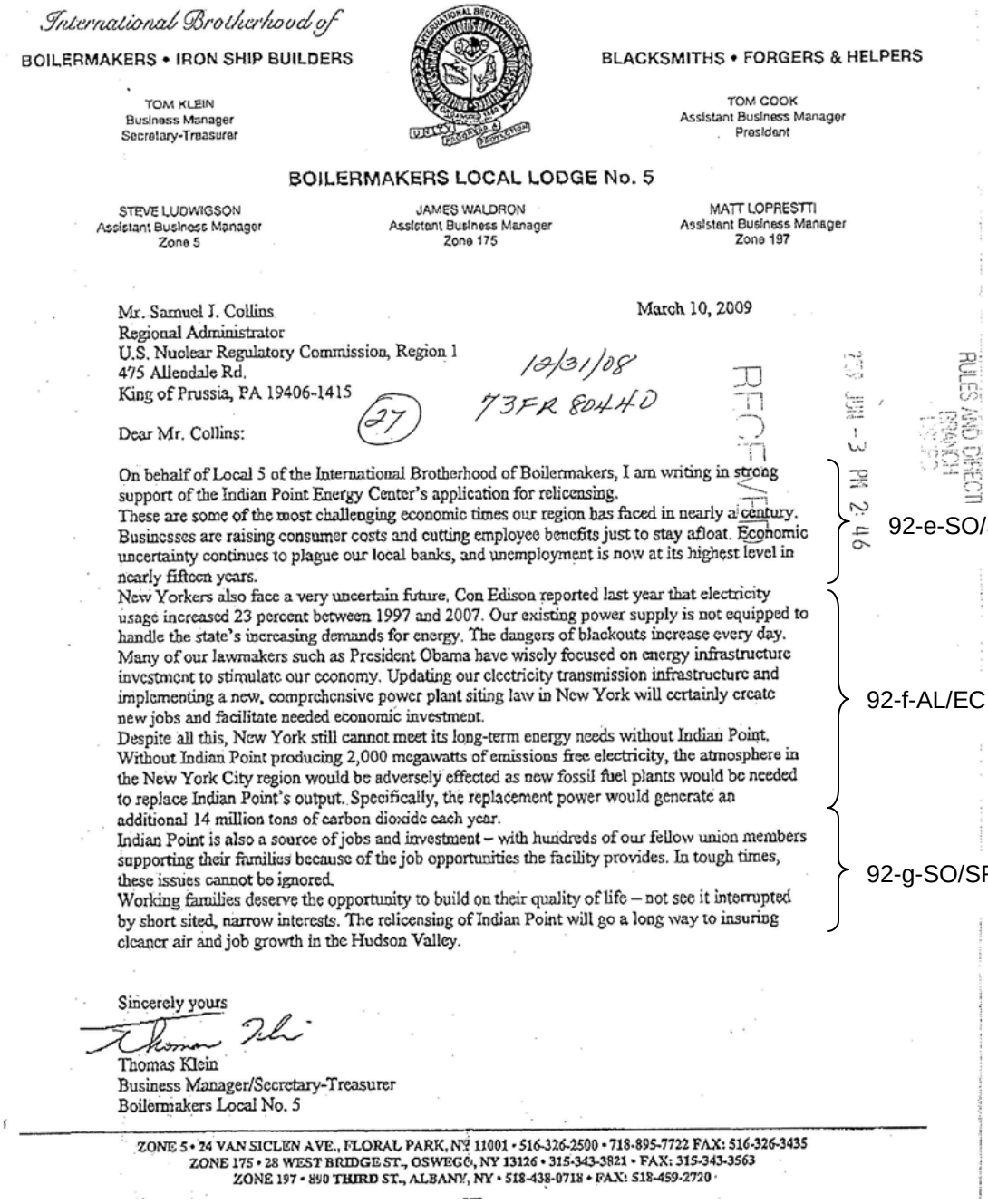
MR. KLINE: Good evening and thank you for this opportunity to address you tonight. My name is Tom Kline. I'm the business manager of Boilermakers Local 5. I live in the Hudson Valley. I have worked at Indian Point many times. Because of the good jobs that it creates, I stand in support of Indian Points re-licensing. There's no question that these are tough times for New York's working families. Businesses are raising consumer costs and cutting employee benefits just to stay afloat. Economic uncertainty continues to plague our local banks and unemployment is now at its highest level in nearly fifteen years. New Yorkers also face an uncertain energy future. ConEdison reported last year that electricity usage increased 23% between 1997 and 2007. Our existing power supply is not equipped to handle the state's increasing demands for electricity. The danger of blackouts increase with each passing day. 92-a-EC/ SO/SR

Many of our lawmakers, such as President Obama, have wisely focused on energy infrastructure investments to stimulate our economy. Updating our electricity transmission infrastructure and implementing a new comprehensive Power Plant Siting Law in New York will certainly create new jobs and facilitate needed economic investment. Despite all this, New York still cannot meet its long term energy needs without Indian 92-b-EC/ SO

Point. Without Indian Point producing 2000 Mw of the emission free electricity, the atmosphere in the New York City region will further degrade as fossil fuel burning power plants are built to replace the enormous levels of power that Indian Point currently produces. Specifically, the replacement power would generate 14 million tons of CO_2 each year. Indian Point is also a source for jobs and investment with hundreds of my fellow union members supporting their families through the work of the energy facility. In these tough economic times, this fact cannot be overstated. Working families deserve opportunity to build on their quality of life, not see it interrupted by short-sighted narrow interests. Using common sense, I am confident that you will agree that Indian Point is the right choice for New York's future. Thank you.

92-c-AL/AQ

92-d-SO/SR



International Brotherhood of
BOILERMAKERS • IRON SHIP BUILDERS
BLACKSMITHS • FORGERS & HELPERS

TOM KLEIN
Business Manager
Secretary-Treasurer

TOM COOK
Assistant Business Manager
President

BOILERMAKERS LOCAL LODGE No. 5

STEVE LUDWIGSON
Assistant Business Manager
Zone 5

JAMES WALDRON
Assistant Business Manager
Zone 175

MATT LOPRESTTI
Assistant Business Manager
Zone 197

Mr. Samuel J. Collins
Regional Administrator
U.S. Nuclear Regulatory Commission, Region 1
475 Allendale Rd.
King of Prussia, PA 19406-1415

March 10, 2009

10/31/08
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2009 JUN -3 PM 2:46
RULES AND DIRECTIVES BRANCH USNRC

Dear Mr. Collins:

On behalf of Local 5 of the International Brotherhood of Boilermakers, I am writing in strong support of the Indian Point Energy Center's application for relicensing.
These are some of the most challenging economic times our region has faced in nearly a century. Businesses are raising consumer costs and cutting employee benefits just to stay afloat. Economic uncertainty continues to plague our local banks, and unemployment is now at its highest level in nearly fifteen years.

92-e-SO/SR

New Yorkers also face a very uncertain future. Con Edison reported last year that electricity usage increased 23 percent between 1997 and 2007. Our existing power supply is not equipped to handle the state's increasing demands for energy. The dangers of blackouts increase every day. Many of our lawmakers such as President Obama have wisely focused on energy infrastructure investment to stimulate our economy. Updating our electricity transmission infrastructure and implementing a new, comprehensive power plant siting law in New York will certainly create new jobs and facilitate needed economic investment.
Despite all this, New York still cannot meet its long-term energy needs without Indian Point. Without Indian Point producing 2,000 megawatts of emissions free electricity, the atmosphere in the New York City region would be adversely effected as new fossil fuel plants would be needed to replace Indian Point's output. Specifically, the replacement power would generate an additional 14 million tons of carbon dioxide each year.

92-f-AL/EC

Indian Point is also a source of jobs and investment – with hundreds of our fellow union members supporting their families because of the job opportunities the facility provides. In tough times, these issues cannot be ignored.
Working families deserve the opportunity to build on their quality of life – not see it interrupted by short sited, narrow interests. The relicensing of Indian Point will go a long way to insuring cleaner air and job growth in the Hudson Valley.

92-g-SO/SR

Sincerely yours

Thomas Klein
Business Manager/Secretary-Treasurer
Boilermakers Local No. 5

ZONE 5 • 24 VAN SICLEN AVE., FLORAL PARK, NY 11001 • 516-326-2500 • 718-895-7722 FAX: 516-326-3435
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ZONE 197 • 890 THIRD ST., ALBANY, NY • 518-438-0718 • FAX: 518-459-2720

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Drew Stuyvenberg

Project Manager

Nuclear Regulatory commission

Mail Stop O-11E19

Washington, DC 20555

As an environmental student attending Ramapo College, I have become increasingly aware of the relicensing process at Indian Point power plant that is currently happening. Our class recently has had the opportunity to review the DSEIS. Below are some environmental assessments that have been brought to my attention that have not been sufficiently raised and analyzed by the NRC. 93-a-OE

There has been a proven link between lichen and nuclear emissions that has not been fully analyzed in the DSEIS. One noted example of this is in Russia, at their North Test Site which is located on the Novaya Zemlya archipelago in the Arctic Ocean. In this North Test Site for the USSR, lichens were found to be incredibly helpful in understanding not only air pollutants, but also aiding as nuclear indicators for the test site and areas surrounding it. Radioactive levels varied from region to region not depending on distance but from the atmospheric precipitation from the site. This alone is a serious concern due to the fact that Indian Point is located on a flowing body of water, which tends to have more precipitation in the area, spreading the radioactive nucleotides over larger areas.

Lichens have been proven to accumulate both 137Cs and Strontium 90. Lichens found at Indian Point power plant will mirror the affects of radioactive nucleotides that were found in and surrounding the North Test Site. According to a study by Richard Harris, "Preliminary List of the Lichens of New York", there are 808 species of lichen in the New York area alone, some most likely surrounding Indian Point. In addition, there have been no deposition measurements outside of the Indian Power Plant area that could accurately estimate nuclear levels. Why has there been no testing for lichen in the area? There needs to be proper testing for a range of at least 50 miles, similar to what the North Test site has concluded. 93-b-RI/TE

In continuation with the testing that has been performed by Entergy and Indian Point, there have been several instances where items of importance, such as flora and fauna, were not properly taken into consideration. One immediate example of this is the level of Strontium 90 found in fish. The DSEIS states that there are no excessively high amounts found in local fish compared to fish from other areas, but also that the Strontium 90 studies are incomplete. Why has there been only certain fish sampled as well as only certain areas studied? Similar to the fish data collected, there has also been many SPDES permit regulations that have either been neglected or limits stretched. 93-c-AE/EC

There needs to be more compliance from Indian Point in regards with the SPDES permit. Excessive amounts of nutrients or increase in temperature throughout waterways can create sudden blooms of phytoplankton or algae. After the large amount of phytoplankton die, 93-d-AE/MP/RG

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decomposition uses up large amounts of oxygen. New York State has a water quality standard for thermal discharges, which provides that "all thermal discharges to the waters of the State shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife and on the body of water." 6 NYCRR § 704.1. This is clearly not happening due to a lack of information.

The SPDES permit issued in 2003 causes the dramatic intake and use of Hudson River water. Why have the impacts not been properly monitored? Indian Point currently has an administratively extended SPDES permit. They extended the permit but a tri-axel, 3 dimensional permit study never occurred. There has been no information saying that Indian Point has done any current testing on water temperature or fish testing.

93-d-AE/MP/RG contd.

In addition, Indian Point needs to be regulated through the context of the State's water quality standard and criteria for Thermal discharges, based on 6 NYCRR Part 704 of the discharge permit, this criteria requires "that a minimum of one-third of the surface as measured from water edge to water edge at any stage of the tide, shall not be raised to more than 4 degrees Fahrenheit over the temperature that existed before the addition of heat of artificial origin." There is insufficient data collected ultimately making the original SPDES permit invalid.

93-e-AE/RG

The once through cooling system also has several negative factors that outweigh the short economic loss of using the BTA. Loss of fish, from entrainment and impingement, directly affects the delicate phytoplankton food chain. With fewer predators, outbreaks of phytoplankton might occur. There is no consideration for the affects of a decreasing aquatic fauna population. Marine webs are extremely complex and delicate, altering any level could be detrimental to another. Why has Indian Point not taken into consideration that these cooling measures only hinder a balanced fish population. In addition, the increase in water temperature may cause phytoplankton to distort and rupture. Harmful algae blooms triggered from excess heat or loss in fish population is also an issue not discussed. Periodically, decomposition of large algal blooms diminishes the dissolved oxygen in the water and blocks out sunlight. This decomposition has been tied to fish die-offs that occur throughout the year. These are just a few consequences of the harmful effects of putting unnaturally high temperatures of liquid into marine water.

93-f-AE

Lastly, from an environmental justice perspective, there needs to be un-biased, up-to-date information collected on the spread of Strontium 90. The study needs to focus on the passage of Strontium 90 from mothers to children in the surrounding 70 mile radius from Indian Point.

93-g-EJ

As a future environmentalist professional, I would like to thank you and the NEPA process for allowing all arguments to be heard. Each assessment should allow the facts to speak for themselves, but when the facts are absent, what speaks? Thank you for your time in this matter.

Liz Knolmayer

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Work Cited

USE. DEC. NYSPDES. (SPDES) DRAFT PERMIT RENEWAL WITH MODIFICATION. 2003. 4 Mar. 2009 <http://www.dec.ny.gov/docs/permits_ej_operations_pdf/IndianPointFS.pdf>.

Holm, Elis. "Distribution of Np and Pu in Swedish lichen samples (Cladonia stellaris) contaminated by atmospheric fallout." 2003. Sceince Direct. 4 Mar. 2009. Keyword: www.sciencedirect.com.

MR. KNUBEL: Yeah, my name is Jim Knubel. I am an adviser on the border of New York AREA. I'm also the former chief nuclear officer for Indian Point 3 and FitzPatrick plant before the sale to Entergy and I transitioned over to Entergy as a vice president there. I only have three major points. First, I'd like to commend the NRC for, I guess, resisting all of the pressure to bend the rules, not follow the rules, change the template, change the regulations, change the requirements. Instead, I think you guys did a very good job of following the rules as they were laid out and as you've used successfully on other planets and come to right conclusion. 94-a-LR

Second, specifically, I am a little confused in Section 4.6 on endangered species, when you have a conclusion in there that the impact on the short-nosed sturgeon may be small to large, but there's been a 400% increase in the population over the three decades. So, to me that's inconsistent and does not make any sense and needs to be rectified in the final EIS. 94-b-AE

The last thing that I'll mention tonight is that on the no action statement in Section 8.2, the draft EIS failed to reference or mention a study that was done by the National Academy of Sciences in 2006 at a cost of $1 billion to the taxpayers to look at alternatives to Indian Point. It's interesting because the conclusion of that report said that even 94-c-AL/EC

with Indian Point, the southeast region here of New York is going to struggle with electrical reliability and supply issues. And without it, it was possible that the region could survive, but only if eight specific things were done to overcome substantial political, interestingly, financial and institutional barriers to building new plants. You might want to guess how many of those have been addressed in the three years since the report has been written? The answer is zero. OK, so for those people who think it's easy to replace Indian Point, I think it's important that the factors from this study and other studies be factored into Section 8.2. Thank your very much.

94-c-AL/EC contd.

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IPRenewalCEmails

From: Kennis Koldewyn [kennis.koldewyn@gmail.com]
Sent: Wednesday, March 11, 2009 11:25 AM
To: IndianPointEIS Resource
Subject: Comment on Draft EIS for Indian Point

I would like to comment on the draft environmental impact statement for a 20-year extension of the operating license for the Indian Point nuclear power plant generators 2 and 3. Among the many serious problems with this document, I would like to concentrate on one in particular: it does not seriously consider conservation as an alternative to license renewal, and even goes so far as to deliberately misstate the results of a 2006 National Research Council report into alternatives.

The Draft EIS claims that the National Research Council report "concludes that energy efficiency and demand-side management have great economic potential and could replace at least 800 MW(e) of the energy produced by IP2 and IP3 and possibly much more" [1], but then goes on to claim that the NRC "predicted that only about 800 MW(e) could be reduced from the IP2 and IP3 service area" [2]. The first claim significantly understates the actual conclusion of the National Research Council's report, and the second claim is simply false. The NRC report actually concludes that "additional cost-effective demand-side investments in energy efficiency, demand response, and combined heat and power facilities can signifcantly offset peak demand...[and] **could reduce peak demand by 1 GW or more by 2010 and 1.5 GW by 2015.** If the cost of distributed photovoltaics can be brought to near-competitive levels over the next decade (see Table 2-7), demand-side measures **could contribute 1.7 GW by 2015, thus approaching the capacity of Indian Point**" [3] (emphasis added).

95-a-AL

It is hard to interpret the discrepancy between what the Draft EIS claims the National Research Council report concluded and what the NRC report actually concluded as merely an accidental oversight or an innocent mistake. Nowhere does the NRC report make any predictions even remotely similar to demand-side measures only reducing 800 MW(e) from the Indian Point service area. The report is online and electronically searchable, making this easy to verify. Instead, the report explicitly states that demand-side measures alone could reasonably be expected to contribute nearly the entire capacity of Indian Point! How can the staff of the Nuclear Regulatory Commission in good conscience write "the NRC staff does not expect that conservation efforts alone will be sufficient to replace either of the IP2 or IP3 units" [4]? This conduct is extremely irresponsible at best, and casts serious doubt as to the veracity and accuracy of the Draft EIS as a whole.

Thanks for your consideration of this comment.

Kennis Koldewyn
13 Ogden Avenue
White Plains, NY 10605
914-421-0018
kennis.koldewyn@gmail.com

Notes:

1. U.S. Nuclear Regulatory Commission (2008). Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3 (NUREG-1437, Supplement 38, Vol. 1). Page 8-59, lines 18 through 20. Retrieved March 11, 2009 from http://adamswebsearch2.nrc.gov/idmws/ViewDocByAccession.asp?AccessionNumber=ML083540594

2. Ibid., page 8-59, lines 23 and 24.

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3. National Research Council (2006). Alternatives to the Indian Point Energy Center for Meeting New York Electric Power Needs. Washington, D.C.: National Academies Press. Page 30. Retrieved March 11, 2009 from http://books.nap.edu/openbook.php?record_id=11666&page=30

4. U.S. Nuclear Regulatory Commission (2008). Page 8-59, lines 24 and 25.

Drew Stuyvenberg

Project Manager

U.S. Nuclear Regulatory Commission

Eileen Kopec's Comments 3/1/09

I am Ramapo college student participating in the Environmental Assessment class.

In reading the draft DSEIS Supplement 38 for the license renewal of Indian Point that is directly written for this facility I got an appreciation for how complex the whole license renewal process and procedure is. Many issues have to be taken into account such as environmental impacts, health, safety, economics and environmental justice affecting minority populations. I have been instructed to not only read the documents to see what is there but to peruse them to see what is not included. Having limited experience with documents such as these I felt it would be a daunting task. I knew in order for me to have a better understanding of these documents I needed to have a different approach other than reading cover to cover. To attack them with some kind of order I decided that after reviewing them I would first read each introduction, summary and conclusion. Then I went back to look at the ecological effects as my indicator of study is fauna. I know that I cannot look at biological effects without also incorporating the functioning and upgrading of the plant and also addressing the water issues too. The GEIS was prepared in 1996 making it more than ten years old. In light of that fact one needs to check other sources of information to make an informed decision.

96-a-GE/LR

To get a better handle on some of the issues our class brought up I looked at the previous meetings that were held during the scoping part of the relicensing procedures. After attending the hearing on the DSEIS on Thursday, February 12, I came to the conclusion that although certain issues were brought to NRC's attention last year they were still being discussed at this hearing. This led me to believe that certain issues will remain off the table even though they are of serious concern. Instead of erring on the side of precaution we are a 'risk assessed' society accepting certain standards in light of advanced technology. Our class discussed that the regulations of NEPA state that a 'hard look' needs to be taken when significant changes or developments are addressed relating to environmental impact statements. Since this term is loosely defined it is anyone's interpretation as to what a 'hard look' signifies.

96-b-LR/NE

My conclusions are that if we are to take this 'hard look' some of the regulations themselves have to be examined. Allowing a relicensing which in a sense is a 'new license' to Indian Point ageing factors must be considered. With an ageing facility there is no assurance that the problem of leaking pipes will not exacerbate to even larger proportions in the near future. Just recently on February 19, 2009, workers had to contain a leak located around the welding joints of some pipes. The NRC, in discussing this recent leak states that the piping is lined with a protective coating so minerals in the water will not corrode and put pin holes in the piping, but the welded

96-c-AM/LE/OM

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joints are not coated. There are miles of piping under the plant that are not easily accessed. Leaks might not be found until it is substantial enough to be detected.

96-c-AM/LE/OM contd.

The leaks of radioactive strontium-90 and tritium have effects and bioaccumulate, and the means of measuring it with an outdated system using a young adult male leaves out much of the population. Strontium is the most hazardous bone-seeking element because it resembles calcium and has a half-life of 28 years. It is easily taken up by the body and concentrates in bones. Because it bioaccumulates and travels to new cell division in early stages of human development it mutates a hundred fold. This may be the reason radioactive leaks are considered to cause an increased risk of leukemia, other cancers, autoimmune diseases, and endocrine disruptions that do not become apparent until many years later. A recently published study in Suffolk County, Long Island, which is located near a nuclear power plant, shows that a single picocurie per gram of calcium in recent baby teeth is associated with nearly a doubled risk of childhood cancer, about three times as serious as the Strontium-90 in baby teeth measured in the early 1960s in St. Louis that originated from high altitude H-bomb tests when fallout came down from the upper stratosphere over a period of years. The reason for the increased risk per picocurie of Sr-90 near nuclear plants as compared with high altitude H-bomb tests is that many short lived radioactive isotopes can be inhaled following repeated routine batch-releases or steady leakages from corroding steam generators, pipes and valves since winds carry the airborne emissions to nearby towns and large cities in a matter of only a few hours.

(J.M. Gould. "Strontium-90 In Deciduous Teeth As A Factor In Early Childhood Cancer". International Journal of Health Services. Volume 30, Number 3/2000)

If Entergy is giving us the assurance that the operation of Indian Point has no correlation to the increased cancer rates in the region the burden of proof should be on their shoulders. Blaming it on previous bomb fallouts only gives credibility to the fact of bioaccumulation.

96-d-HH/LE/RI

Entergy discovered that the groundwater around IP2 was contaminated with tritium and monitoring wells were put in place for leak detection of the spent fuel pools. Entergy's investigation claims that the only dose pathway of the contamination reaching the river is through the consumption of fish from the river. They also claim that it could not affect drinking water as no drinking water exposure pathway exists. Entergy agrees that this could potentially be considered a new issue.

96-e-HH/LE/WA

Entergy states that the leaks do not affect drinking water, but there are drinking water sources close the plant. The Hudson River is tidally influenced leaving the question about the effect that water flow has on dispersal of radioactive material. Leaks from Indian Point 1 that has been shut down haven't been fully addressed. When IP1 was permanently shut down it was stated that all spent fuel was removed. It seems this reactor is just being left in what is termed 'long-term storage.' Entergy's plan to decommission this reactor isn't expected until Indian Point 2 is decommissioned. This could be a long wait period if relicensing is granted.

96-f-DC/LE/WA

Subsistence fishing is also in question as some people eat fish from these waters for economic reasons. There have been leaks from the spent fuel rods emitting Strontium 90 and Tritium in the Hudson River. Knowing that Strontium 90 settles in the bones of fauna, people who eat the

96-g-EJ/HH/LE

fish could be unnecessarily exposed. Records would need to be checked to see if there are any substantiating facts stating how many people still fish the Hudson River on a subsistence level. It would need to be surveyed to see, if indeed, that fish advisory signs are placed along the Hudson and, as many subsistence fishermen do not have English as their first language that the signage is presented in languages other than English. It should be noted that the Hudson River is already on the EPA list of impaired waterways because of the presence of PCBs. From what has been reported fishing restrictions have already been in place.

96-g-EJ/HH/LE contd.

Addressing one of the critical environmental justice issues is one of evacuation of people. Procedures are highly inadequate to pretty much non-existent. The Witt Report of 2003 states that evacuation would be extremely difficult if not impossible. (James Lee Witt Associates, Washington D.C.) Many of the infirm, people below poverty level and prisoners within the 50 mile radius would have difficulty leaving their facilities. Evacuation is not even in the protocol for the prison systems.

96-h-EP

It has been said that nuclear power does not contribute to air pollution. When compared to coal-fired power plants this seems to be true. From an environmental justice standpoint, the whole fuel cycle needs to be taken into account to include the mining of the uranium, as most of the mining seems to be done on Native American land. This brings up air pollution issues, importantly the problem of halogenated compounds being put into the atmosphere during the mining process.

96-i-EJ/UF

At the draft hearing of the SEIS and the past scoping hearings the subject of spent fuel rods and nuclear waste discussions came up each time. It seems that this is also not a condition for relicensing. Storage of wastes is usually onsite as no federal repository has been decided upon. The capacity for storage at any nuclear facility is limited. No one can answer the question of how much energy it is going to take to make nuclear wastes safe nor has anyone figured out a way to do it. Although we are a risk society a mistake at a nuclear power plant is not a localized crisis but one that can cause long-standing, widespread potential damage. One of the points to be brought out is that Indian Point was built on a fault line. Storage of wastes at this particular site could have major repercussions if the tri-state area suffers a significant earthquake.

96-j-LR/PA/RW

Looking at my ecological indicator I have noticed that there have not been any studies confirming that certain endangered species are not present. A few examples of terrestrial species are the Indiana bat, bog turtle and the New England cottontail. The bald eagle, although it has been delisted, still is a species of 'special concern' and is known to nest in the vicinity of Indian Point. Many fish species are impacted by the cooling system. IP's cooling systems before 1991 monitoring data showed impingement mortality to most fish species to be 100 percent. The endangered short-nosed sturgeon has been impinged on the intake screens in the past. Separate studies were conducted to see if the addition of the modified Ristroph screens to the cooling system would decrease impingement mortality for some species. This problem has been mitigated using this screening, but no studies have been done onsite since the installation of these screens back in 1990. Entergy acknowledged that it did not monitor impingement rates nor validate impingement mortality estimates after the new Ristroph screens were in place.

96-k-AE/TS

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4.1.3.4 The NRC acknowledges that the lack of this data yields potential uncertainties for the current impacts and used a Weight of Evidence (WOE) evaluation on the Representative Important Species (RIS) showing potential adverse impacts in the 'moderate to large' category. WOE is an organized process for evaluating information or data from multiple sources to determine whether there is evidence to suggest that an existing or future environmental action has the potential to result in an adverse impact. It has also been stated that some fish, specifically the bluefish are doing well. The DSEIS document fails to mention that the reason some fish are doing well is because their predators are in decline. The question is why did the monitoring stop? Approximately 18 years of data was never collected.

96-k-AE/TS contd.

NYSDEC (2003a) states that while improvements to IP2 and IP3 cooling system including the use of dual-speed and variable-flow pumps and the Ristroph screens improve conditions there is still significant unmitigated mortalities from entrainment, impingement and thermal effects and should be mitigated with Best Technology Available (BTA) if it is economically feasible. To help mitigate these losses the NYSDEC states that the SPDES permit requires the construction of cooling towers if an applicant seeks to renew the operating license. There seems to be some disagreement trying to strengthen the Clean Water Act 316(b), and the addition of cooling towers is still being argued in the courts and is not mandated at present. This is not a condition of relicensing but a permit issue after relicensing.

Upon looking at Volume 2 of the SDEIS reading the environmental issues specifically for the Indian Point facility one might conclude that the studies are current. When checking some of the references I have noted that most studies are before 1990.

96-l-AE/AL/RG

In Appendix E of the Supplement 38 the thermal impacts were evaluated. Even though the NYSDEC SPDES 2003 permit has strict guidelines on the temperature of the discharge waters the computer modeling indicates that the thermal discharge from IP causes water temperatures to rise more than allowed. The NRC staff agrees that they cannot quantify this and so is unable to determine the extent that the short-nosed sturgeon population could be affected.

96-m-AE

I would like to make the argument for addressing aging management as a condition of relicensing by using an analogy to explain concern over the aging facility's pipes. We all know the correlation between groundwater contamination and old rusted home heating oil tanks. New home construction is required to have above ground oil tanks with a built on catch basin attached to prevent a leak of home heating oil. This measure has come about due to the aging underground oil tanks that are starting to rust after being under the ground for 40-50 years. Homeowners are responsible if a leakage occurs before the problem is rectified. I have known of numerous communities that had their drinking water condemned due to this. Homeowners are now required to dig up their existing tanks and replace with above ground ones. What I am stressing here is not which is more serious, but the aging of material used needs to be addressed. Relicensing for another 20 years will add more 'what if' scenarios not knowing how often leaks will occur.

96-n-AM/LE

Alternatives evaluated gave heavy credence to using coal or natural gas if Indian Point were to be denied licensing. Renewable energy was considered to be inadequate. Transitioning to any new energy source that is not already in place will be considered costly or inadequate.

96-o-AL

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It was clearly seen at the hearing that the host communities of Indian Point have been given a false sense of security right from the beginning. Entergy has built themselves up as a good neighbor that supports the community. This definitely affects the way this energy plant is viewed by the local people. The biggest environmental injustice seems to be tweaking the data to give false assurances making the problems seem insignificant. Downplaying the incidents sure makes it hard for the people affected to be willing to relinquish their 'bread and butter'. The state of New York is opposing the relicensing of Indian Point due to its history of problems. This has to tell you something. According to the New York Times this was the first time a state ever called for the closing of a nuclear power plant.

96-p-OR

MS. KAPSHAW: Hi, I'm Kaitlyn Kapshaw. I'm a student at Ramapo College. I'm not here to tell you how wonderful or how horrible Indian Point Nuclear Center is. I'm here to tell you that several of the students and I read through the impact statement that they provided and we had several issues that we felt needed to be addressed or weren't fully explored. It said that humans are not exposed to toxins from the plant because we do not drink the water from the Hudson River. However, we could be affected by drinking the water or eating the fish from it. How can one say that the minimal toxicity that Indian Point lets out is normal? What studies have been done regarding the poorer population of the people in this area who need to fish from the Hudson River to survive? People may not be exposed to toxins by drinking the water, but they are exposed by eating the fish who live in the water. 97-a-EJ/ HH

There are also three endangered species: the Indiana bat, the bog turtle and the New England cottontail, which were identified by the Fish and Wildlife Services as having the possibility of living at or near the Indian Point site. However, it states in the EIS that the wildlife in the forested area within Indian Point has not even been surveyed. So we don't even know if they exist there. The wetlands that are adjacent to the Indian Point site have not been evaluated with 97-b-TS

regard to the bog turtle either. The Indiana bat may reside in the forest as it states in the EIS, that it's a possibility in the summer months that it lives there, but we don't know because no studies have been done. We feel that if there are endangered species that have the possibility of being in this area, we need to discover if they're there and what impacts Indian Point would have on them and on their life.

97-b-TS contd.

It has also been shown that excessive amounts of nutrients or an increase in temperature in the waterways can create sudden blooms of phytoplankton or algae in the Hudson River. We need to find out whether algae or phytoplankton blooms are occurring in this area due to the Indian Point cooling system, which withdraws water from the Hudson River and returns it at a warmer temperature than it was withdrawn. We need to find out if this is having an effect on the environment of the area because periodically, decomposition of large algae blooms diminish the dissolved oxygen in the water and blocks out the sunlight of the river. This decomposition can be correlated to fish die-offs that occur and we need to find out whether Indian Point contributes to an excess of algae blooms, which in turn is linked to fish die-offs. We also feel that the loss of fish is not fully discussed and examined. Loss of fish directly affects the delicate phytoplankton food chain. The fish population helps keep the phytoplankton at an acceptable level

97-c-AQ/ WA

and with fewer predators, outbreaks of phytoplankton might occur. There's no consideration for the effects of the decreasing aquatic fauna population. Marine webs are an extremely complex and delicate system and altering any level of it could be detrimental to another level. 97-c-AQ/WA contd.

In addition, the increase in water temperature from the cooling systems can cause phytoplankton to distort and rupture. We feel that the studies of the impingement of fish seems to occur only up to 1990, which is especially distressing considering that the short-nosed sturgeon, which is an endangered species known to be living in the Hudson River near Indian Point has been impinged at Indian Point in the past. Considering it is an endangered species, it's known to be in the area and it has been impinged in the past, we feel that current research should be done to discover what effects Indian Point is having on its current population. The last research was done over 18 years ago. Another issue that we found was that the MELCOR Accident Consequence Code System version 2.0 is a program with many flaws, but it is cited, referenced and relied upon in the Appendix G. of the Indian Point GEIS. 97-d-AE

The MACCS is a simulation that takes many factors into consideration and produces datapoints about how many people will pass away within immediate impact, latent impact, as well as the financial reparations and cumulative costs of catastrophe, such 97-e-PA

as relocation costs, farm and crop reimbursement, etc. The model is weak with regard to the methodology for determination of direction-independent 95th percentile dose to the off-site individual and may be used to conservatively evaluate the 95th percentile direction-independent dose to receptors equidistant to the source. The atmospheric model included in the code does not model the impact of terrain effects on atmospheric dispersion nor can it except more than one weather spatial location. The MACCS-2 is not well-suited for modeling dispersion close to the source, less than 100 meters or long-distance dispersion, which is beyond 15 to 20 meters. 97-e-PA contd.

MR. RAKOVAN: Miss, if you could please finish up.

MS. KAPSHAW: Okay. Basically, being so close to New York City we feel that the model needs to be a better model to use. So, all right, sorry. Bye.

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To Mr. Andrew Stuyvenberg
Project Manager
U.S. Regulatory Commission
Re: Indian Point

As someone who lives, works, and goes to school within the 50 miles radius of the Indian Point Power Plant, I was very interested in reading the DSEIS. Personally, I am against the idea of nuclear power, especially in the area where Indian Point is located. It seems irresponsible to have a nuclear power plant located so close to a major city that holds such a large portion of the population. In the event of any kind of disaster, natural or otherwise, millions of lives would be destroyed. However, my personal opinions are being put aside to address several concerns that I have about issues that were not dealt with or were insufficiently explored in the DSEIS. 97-f-DE/PA

Again, I have several issues to raise regarding the location of Indian Point. The DSEIS does not mention the fact that Indian Point rests on two different fault lines. As evidenced by the recent earthquakes in northern New Jersey, this could be a very real concern. The plant has no preparation or safety measures in place to deal with such a natural disaster. Also, the location of plant leads to a very poor evacuation plan. The DSEIS does not discuss how there are very few ways out of the immediate area surrounding the plant, and that those ways are narrow, on a mountain, and over bridges. There is no doubt that if there was a need to evacuate the area, people would be trapped. The roads surrounding the plant were not designed for a massive exodus and an evacuation would quickly overwhelm their ability to function. 97-g-EP/PA

Another issue is regarding the cooling system, fish populations, and the effect Indian Point has on the Hudson River. As a nuclear power plant, especially one that was built many decades ago, Indian Point should be using the best available technology. This includes using cooling towers, rather than the current system of using water from the Hudson River. The DSEIS does not adequately discuss the negative effects that taking water from the Hudson has, nor what the implementation of cooling towers would mean to the river. The amount of water taken from the Hudson is significant, and it is returned with a several degree difference. What effect does returning warmer water in the summer and in the winter have on the river? Does this affect the fish populations? This is a major issue that is absent in the DSEIS. Also regarding the current cooling system, Indian Point installed Ristroph screens in 1990, yet no studies were done regarding their effectiveness regarding the impingement and entrainment of fish. This is an oversight that needs to be addressed. It has been acknowledged and proven that the populations of fish species in the Hudson River have been on the decline. Yet the DSEIS does not adequately discuss this issue and the impact that Indian Point is having on the populations. It is also known that an endangered fish species, the Short-Nosed Sturgeon, lives in the river surrounding Indian Point. As an endangered species that is known to be in the area and that also has a history of being entrained and impinged at Indian Point, the effect that the plant has on its population should be intensely studied. However, no recent studies were done as to the effect the plant has on the Sturgeon. How is this acceptable? There should be research done as to how many fish are dying due to the plant. 97-h-AE/AL 97-i-AE/OL

There is also a possibility that there are three endangered terrestrial species in the area surrounding Indian Plant. The DSEIS confirms that the Indiana Bat could use the forested area to the north of the plant as a summer habitat. Yet no studies were done to determine if they are actually in the area. As an endangered species, assuming they are not present is not acceptable. 97-j-TS

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This is the same situation with the Bog Turtle and the New England Cottontail. As long as there is a possibility they are there, they cannot just be dismissed so cavalierly.

Relating to the topic of environmental justice, the DSEIS does not sufficiently discuss fishing from the Hudson River. There are subsistence fishermen in the area, who need the fish to survive. Yet the effects from regularly eating contaminated fish are not explored. The effects are not immediately life endangering, so people are going to continue to fish. However, the toxins do build up over time and these issues regarding subsistence fishermen were not discussed. Also, do people in the area hunt? If so, are they warned about the leakage from the spent fuel rods? Whether or not they are adequately warned, people would still probably hunt and eat contaminated animals. While the leakage may not directly affect people since they do not drink water from the Hudson, they do eat animals that drink contaminated water. Also, Strontium 90 has been found in the area due to leakage from Indian Point. This issue, and the effects that it has on people and wildlife, were not discussed. This is a major issue that really needs to be addressed. It can have major health impacts on the local population, and it was not even mentioned. This needs to be rectified immediately.

Thank you for taking the time to read my thoughts regarding the Indian Point DSEIS and its shortcomings. I hope that further research will be conducted and the findings will sufficiently answer questions that I, and others, have with the nuclear power plant.

Sincerely,
Kaitlin Kopshaw

97-j-TS contd.

97-k-EJ/HH/LE

IPRenewalCEmails ML090640375

From: Kathleen Kourie [kkourie@optonline.net]
Sent: Friday, February 27, 2009 2:07 PM
To: IndianPointEIS Resource
Subject: Close Indian Point

I've been a resident of Garrison for more than 28 years. During this time I've participated in demonstrations to close the plant. I am deeply concerned about the lack of a workable evacution plan should an incident occur at Indian Point due to malfunction, human error, terrorism or natural disaster such as an earthquake from the fault line under the plant. — 98-a-EP/OR/PA

People's safety should be of utmost concern, not just the cost of electricity. We can harness the power of the wind and sun cleanly and there will be no radioactive waste to store, no emergency evacuation plans to put into place. People won't have to worry about losing the value of their homes, businesses and land thru the enaction of the Price Anderson Act which limits the company's liability in the case of a disaster at the plant. — 98-b-AL/SA

This aging plant, which is constantly leaking radioactive water laced with tritium and other cancer causing agents into the ground and the hudson river, killing millions of fish, fish eggs and contaminating the ecosystem. Babies drinking milk from their mothers are being nursed with Strontium-90 contaminated breastmilk. My grand daughter had been nursing for more than a year before we discovered this possibility. Her mother has lived in this area all of her 31 years so she has been subjected to the radiation leaks from the plant. — 98-c-HH/LE/RI

Please do not relicense Indian Point. Let it be closed and cleaned up so that there will be no danger to the millions of people living within the radius of this plant. — 98-d-OR/RE

Sincerely,
Kathleen Kourie
131 Upland Drive
Garrison, NY 10524

MR. KREMER: Thank you very much. Again, we'd like to thank the commission for holding these hearings. On behalf of the New York Affordable Reliable Energy Alliance, I'm here as chair to voice the views of our hundred members plus for the continued operation of Indian Point Energy Center. We represent business groups, labor unions, an array of community organizations throughout the Hudson Valley and New York City. I served in the New York State legislature for 23 years. I was the author of the original Power Plant Siting law, which there is none today, because it lapsed some years ago. According to the NRC, this hearing is designed to give members of the public the issue to raise environmental issues that you should consider. There is a lot of factors that you're going to take into account, but I think one of them clearly is air quality. To understand the gravity of the air quality situation in this region, one need only look at the United States Environmental Protection Agency scorecard on air quality.

99-a-SR

The following areas in New York State are in violation of federal ozone standards, as well as federal standards for particulate matter: the five boroughs of New York City, Long Island, three counties of the lower Hudson Valley, including Westchester, Putnam and Rockland. Dutchess and Orange County are also in violation of federal ozone standards. The American

99-b-AQ/HH

Lung Association's 2007 report shows New York's air quality continuing to worsen with the New York area continuing to be a dangerous place to breathe the air for thousands and thousands of asthma sufferers along with others who are respiratory illnesses.

The fact of the matter is that without Indian Point, our air quality would continue to erode and more people would suffer. The continued licensing of the Indian Point Energy Center may be the difference between dark skies or cleaner air for the entire downstate regions. New York's air quality in this area is now considered one of the worst in the nation. If you eliminate a non-polluting plant like Indian Point and replace it with many new fossil fuel burning facilities, it could be the tipping point to an environmental disaster. 99-b-AQ/HH contd.

We understand that one of the alternatives that you talked about in your preliminary study is, can we replace Indian Point with power generated from wind or solar panels. These renewable forms of energy are certainly an important aspect of our energy portfolio. But let's think of it. They are not base-load power sources. In other words, they don't generate electricity 24-hours a day, seven days a week. Solar gives us electricity when the sun is out. Not in this region. Wind power plants are the standard base-load sources of electricity, but this is not a region where the wind constantly blows. For 99-c-AL/EC

example, the mass transit system of New York City or hospitals and emergency rooms and sporting arenas cannot wait for the wind to blow or the sun to shine. They need power on demand and they need it now and Indian Point provides that for them. 99-c-AL/ EC contd.

The thing that makes nuclear the best form of base-load power is the fact that it doesn't emit harmful pollutants like nitric oxide and sulfur dioxide. So we would urge you in your consideration of factors as to whether the environmental impact of Indian Point Energy Center is: We need the 2000 megawatts. There's no rational environmental alternative. We need this plant for another 20 years. 99-d-AL/ AQ

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IPRenewalCEmails ML090640399

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From: hlapido [hlapido@optonline.net]
Sent: Sunday, March 01, 2009 2:31 PM
To: IndianPointEIS Resource
Subject: RETIRE INDIAN POINT - CLOSE IT - GET RID OF IT - HOW MUCH CLEARER CAN WE BE?

100-a-OR

Helen S. Lapido
Cortlandt Manor

Affiliations
INTERNATIONAL ASSOCIATION OF BRIDGE, STRUCTURAL, ORNAMENTAL AND REINFORCING IRON WORKERS
AFL-CIO
BUILDING TRADES DEPARTMENT OF AFL-CIO
THE NEW YORK STATE IRONWORKERS DISTRICT COUNCIL
THE BUILDING AND CONSTRUCTION TRADES COUNCIL OF GREATER NEW YORK
THE NEW YORK CITY CENTRAL LABOR COUNCIL
THE NASSAU AND SUFFOLK COUNTY BUILDING TRADES COUNCIL
THE WESTCHESTER COUNTY BUILDING TRADES COUNCIL
THE ROCKLAND COUNTY BUILDING TRADES COUNCIL
THE MANHATTAN BOARD OF BUSINESS AGENTS
THE BRONX BOARD OF BUSINESS AGENTS
THE BROOKLYN BOARD OF BUSINESS AGENTS
THE QUEENS BOARD OF BUSINESS AGENTS
THE STATEN ISLAND BOARD OF BUSINESS AGENTS
THE CONCRETE TRADES ALLIANCE

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METALLIC LATHERS UNION
AND
REINFORCING IRONWORKERS
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Fax: (212) 535-8542

Metal Lathers Trust, Pension & Vacation Funds
Telephone: (212) 535-2323 • Fax: (212) 535-3203
Web Site: www.ml46.org

"The Injury of One is the Concern of All"

JOHN COFFEY, *President*
ROBERT A. LEDWITH, *Business Manager & Financial Sec'y-Treas.*

Business Agents
TERRENCE MOORE, FRED LEMOINE
KEVIN KELLY, RONNIE RICHARDSON

Union Meetings
Second and Fourth Tuesday
of Each Month at 5:00 PM

Executive Board Meetings
First and Third Tuesday
of Each Month at 5:00 PM

March 10, 2009

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2009 MAR 13 PM 12: 20

Mr. Samuel J. Collins
Regional Administrator
U.S. Nuclear Regulatory Commission, Region 1
475 Allendale Road
King of Prussia, PA 19406-1415

Dear Mr. Collins,

On behalf of Local 46 Metallic Lathers Union and Reinforcing Ironworkers, I would like to offer our strong support for the relicensing of Indian Point. 101-a-SR

The facts clearly demonstrate that New York cannot meet its current and future energy needs without the continued operations of the Indian Point Energy Center. The New York Independent System Operator (NYISO) has also noted that closure of the Indian Point's reactors would result in an 'immediate violation of reliability standards'. Given that on a typical day Indian Point provides up to 30 percent of the power used in New York City and the surrounding region, it is even more critical to keep Indian Point online. 101-b-EC

Indian Point produces 2,000 megawatts of clean, emissions-free electricity and is a critical economic engine for the Lower Hudson Valley; responsible for more than $700 million in annual regional economic activity. Additionally, Indian Point is also a friend to working families throughout the region. Not only does Indian Point provide reliable, low-cost electricity, but organized labor has been central to the continued operations and support of the facility.

Working families deserve a comprehensive, common-sense energy plan that will support our state's economic recovery. Indian Point's 2,000 megawatts of clean reliable, low-cost electricity are crucial to this effort. 101-c-SO/SR

RULES AND DIRECTIVES BRANCH
2009 JUN 23 PM 3:
RECEIVED

Sincerely,

Robert A. Ledwith
Business Manager, Financial
Secretary/Treasurer

MS. LEE: I seem to be in a minority today because my group does not receive funding from Entergy. However, I did represent Wall Street and the tobacco industry for 20 years, so I'm very well aware of how easy it is to buy support. I would like to devote my points simply to what the purpose of this meeting is, which is the EIS report, the draft report. I'll make four main points. I'll make them quickly.

First of all, the no action alternative analysis is inadequate, incomplete and cursory. The principle data relied upon by Entergy is from Entergy, which is a self-serving environmental report and from some hand cherry picked reports from the Department of Energy. It's completely ignores, not just hundreds, but thousands of reports that have come out in recent years from major universities as well as from the United States National Renewables Laboratories about the numerous alternatives to Indian Point which would be available, which would put us truly on the path of a clean sustainable energy future. Which I'm sorry, but giving money to coal and to nuclear does not do. 102-a-AL

Number two, the draft EIS completely ignores the impact of global warning upon the Hudson River ecosystem particularly the affects of warming and the interaction of that warming with the fish and other aquatic populations. 102-b-AE/GI

Number three, the report ignores potential, and I would argue almost inevitable, long-term impact of spent-fuel kept on premises. The evidence supports the conclusion that the Indian Point Nuclear Power Plant site will become a permanent high-level nuclear waste dump on the banks of the Hudson River and it is absolutely egregious omission of duty on the part of the NRC staff not to even examine this issue or to give it any kind of consideration whatsoever. That it in fact suggests very strongly that this draft report is nothing else but a rubberstamp for this re-licensing. 102-c-RW/SF

And number four, my final point, is that the fact that the environmental impact ignores, again completely ignores, the possibility and the impact of an accident and what the real effects of an accident, including the NRC's own studies, as well as ignoring that possible effects on the environment and public health of another terrorist attack, particularly in light of the events of 9/11, absolutely unethical. Thank you. 102-d-OW/PA/ST

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IPRenewalCEmails ML090641135

From: michel [ciecplee@verizon.net]
Sent: Thursday, March 05, 2009 2:05 PM
To: IndianPointEIS Resource
Subject: Indian Point: Submission of Comments to on Comments on Draft Generic Environmental Impact Statement for License Renewal of Indian Point Nuclear Generating Units No. 2 and 3

Subject: Comments on Draft Generic Environmental Impact Statement for License Renewal of Indian Point Nuclear Generating Units No. 2 and 3

Chief, Rules Review and Directives Branch
U.S. Nuclear Regulatory Commission
Mail Stop TWB-05-B01
Washington, DC 20555-0001

To Whom it May Concern,

The Draft Generic Environmental Impact Statement for License Renewal of Indian Point Nuclear Generating Units No. 2 and 3 ("Draft EIS") is fatally defective in that it is inadequate, incomplete, and cursory. — 102-e-OE

Ten crucial problems are:

The Draft EIS utterly fails to evaluate the options for obtaining electricity by clean, sustainable forms of energy (e.g., through solar, wind, geothermal, small hydro) or for dramatically reducing consumption (e.g., through efficiency technologies, reducing energy waste, and green buildings). The final EIS must properly evaluate the No Action Alternative. — 102-f-AL

The Draft EIS fails to properly and fully evaluate the impact of Indian Point on the aquatic ecology of the Hudson River and related waterways, especially with respect to endangered species and the coastal zone. — 102-g-AE

The Draft EIS fails to properly and fully evaluate the long-term and cumulative effects upon human health of the planned and unplanned releases of radiation into the air, soil, groundwater and Hudson River. The Draft EIS further completely fails to look at the impact upon human health of the synergistic interactions of such radiation with other known toxins which are known to have been released into the regional environment, most notably the PCBs and mercury in the Hudson River. — 102-h-HH/RI

The Draft EIS fails to evaluate the impact of global warming – including the projected warming of the Hudson River and the projected increase and severity of storms and flooding – upon Indian Point. Two examples: (1) The warming of the Hudson River will exacerbate the impact of the hot plume of water expelled by Indian Point into the river. (2) Increased storms and flooding will exacerbate the corrosion, rusting, etc. of underground piping and other systems at the plant, thereby increasing the likelihood of more accidental radiation releases such as the one discovered in February 2009. — 102-i-AM/GL

The Draft EIS fails to analyze seismic hazards. This is a manifest dereliction of the NRC's duty, especially in light of recent seismic activity in the region and recent studies conducted by Columbia University's Lamont-Doherty Earth Observatory which specifically note the potential threat to Indian Point. — 102-j-PA

The Draft EIS utterly and appallingly ignores the impact upon the environment and human health of keeping spent fuel and other nuclear waste on site indefinitely. The evidence available strongly supports the conclusion that the Indian Point site will, *de facto*, become a high level nuclear waste dump for the foreseeable future. — 102-k-RW

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The cost/benefit analysis of the Draft EIS is incomplete and inadequate and constitutes a violation of NEPA. Notably, it relies upon the preposterous conclusion that a major nuclear accident need not be of concern, and even if one occurred, it would not have a significant effect on the environment or public health. This flies in the face of the United States government's (including the NRC's) own former analyses. The NRC must include the postulation of a major radioactive release — including the possibility of a meltdown and spent fuel fire – in its cost/benefit analysis. 102-l-NE/PA

The Draft EIS is defective in neglecting to evaluate the environmental risks inherent in the realities that the operator and the NRC have acknowledged that it is not feasible to fully inspect the fuel pools, the buried and embedded piping, critical electrical wiring, or the dome, where rust has already been detected. 102-m-GE/OM

The Draft EIS is defective in neglecting to evaluate the environmental risks inherent in an aging nuclear facility which has already demonstrably shown signs of deterioration. The NRC's disregard of aging as a *separate* crucial factor, and its reliance upon "aging management" as a failsafe for finding all potentially critical problems, not only flies in the face of standard engineering risk analysis, but is belied by the actual experience at the plant. 102-n-AM

The Draft EIS is defective in neglecting to evaluate the environmental risks created by the fireproofing exemptions given by the NRC to Indian Point. 102-o-OM

CONCLUSION: The failure of the NRC to acknowledge the above represents a deplorable disregard of the NRC mandate to protect human health and the environment and strongly suggests that the Draft EIS is merely a façade for rubberstamping Indian Point's relicensing. 102-p-OE

Sincerely,

Michel Lee, Esq.
Chairman
Council on Intelligent Energy
& Conservation Policy
(914) 420-5624
ciecplee@verizon.net

MS. LEIFER: I guess what I want to say is when we talk about any of these topics, there's jobs, there's pollution, there's a need for energy. I think we have to see it as a very big picture. The United States has 1/5 of the world's population. And it uses 25% of the world's energy. What I want to suggest to you tonight is that conservation, in many ways, could be the way that we save enough energy to have the cleanest possible energy, so that we don't have asthma and we don't have cancer because the energy from the Indian Point power is not pollution free. Yes, it does not at the plant make carbon dioxide. But when you mine the yellowcake in Navajo country and change it to nuclear rods, you use a tremendous amount of coal CO_2 energy. 103-a-AL/ UF

When you get the nuclear rods to Indian Point and dispose of them, we have no really good way of disposing them. We are sitting on a mountain of polluted nuclear waste that can last for 100,000 years, a million years, we do not know how to deal with it. For us sit here and think that, OK another 20 years of piling it up will be a good idea, is something I think we should think very hard about. I think conservation would be the major thing that New York State can do for its energy crisis. I think that the jobs that are at Indian Point can be changed to other kinds of jobs that produce energy. We're 103-b-RW/ SF 103-c-AL/ UF

certainly going to need those kind of people. So, I'm not looking to lose jobs for any of these good people, but I am saying that you do not produce on-site carbon dioxide, but you do produce on-site a tremendous amount of nuclear waste. You do not have a solution for it. Thank you.

103-c-AL/UF contd.

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Philip H. Likes IV
845-528-0957

I arrived late and had to leave early so was unable to read my say.

1:30 pm

I have attended enough of these gatherings to have recognized the utter futility of the process for anybut those entrenched in the current system. There are two groups, those who have something to gain or to lose and those who have nothing to gain except peace of mind. The gainers are armed with half truths, lies by means of omission, and often questionable experts with equally questionable statistics coldly devoid of human considerations and consequences; in essence spin and propaganda. They represent power, money, and influence; the status quo. The other groups, the nothing to gainers, lacking these resources and advantages, nonetheless represent the people's interests and have demonstrated time and again many different ways and reasons, supported by facts and truth, why Indian Point should be closed. This group is not supported by the power elite, so needless to say they have made very little progress having been ignored, sidelined, stalled, undermined by technicalities, and changing (changing the ground rules) of the playing field by the opposition. These legally necessary gatherings provide an opportunity for staged events for the gainers and little more than a forum for venting for everyone else. It does not take much to recognize who has the upper hand here and what will happen after this, yet again another charade, takes place. It is almost a foregone conclusion, perhaps even predetermined.

104-a-LR

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MR. LUDWIGSON: Good evening. I'm Steve Ludwigson. I am the vice-president for Boilermakers Local-5. I thank you for the opportunity tonight to address you. I stand in support of Indian Point Energy Center's re-licensing. Indian Point produces 2000 Mw of low-cost electricity in the lower Hudson Valley. In the process, it employs hundreds of local people and good paying jobs. A study by the Nuclear Energy Institute found that Indian Point is responsible for more than $700 million in annual regional economic activity. The electricity produced is clean, carbon free electricity. This helps in New York's efforts to curtail greenhouse gas emissions. Replacing Indian Point's clean base-load power in densely populated downstate New York would require using fossil fuels and negatively affect those goals. Previous reports by New York Independent System Operator noted that southeastern New York will need up to 2000 Mw of new electricity by as soon as 2012, just to satisfy growing demand for electricity. According to economic and environmental studies by the Bloomberg administration, projections indicate the population of New York City will grow by one million people by the year 2030. With this growth and the growth of surrounding municipalities will come an ever increasing demand for electricity. The Article-10 Power Plant Siting Law expired on December 31, 2002. So the source of where the power will

105-a-SO/SR

105-b-AL/EC

come from is still in question.

Indian Point has been a good neighbor and a financial boom for its employees and the Hudson Valley. It safely and cleanly produces a product America depends more for each day. Until a means are in place to meet the electric capacity of the projected growth, including the reinstatement of Article-10 Power Plant Siting Law, it would be both detrimental and foolish not to re-license Indian Point Energy Center. Indian Point Energy Center is safe, secure and vital to New York. Thank you. 105-c-EC/SR

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Sister Florence Mallon, SC

March 12, 2007

Chief
Rulemaking, Directives & Editing Branch

I write to support Riverkeeper's environmental impact concerns and opposition to the license renewal of Indian Point:

the slaughter of billions of fish eggs and larvae;
the killing of shortnose + Atlantic sturgeon;
the continuing leak of radioactive water into the groundwater + Hudson;
the long term storage of tons of toxic waste.

Thank you for your attention to this request and hopefully, the decision to deny the license renewal.

Sister Florence Mallon SC.

106-a-AE/LE/RW/SF

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TESTIMONY OF JOSEPH J. MANGANO
TO THE U.S. NUCLEAR REGULATORY COMMISSION
ON THE DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
REGARDING LICENSE RENEWAL
FOR THE INDIAN POINT 2 AND 3 NUCLEAR REACTORS

Cortlandt Manor NY
February 12, 2009

I'm Joseph Mangano, Executive Director of the Radiation and Public Health Project. Scientists and health professionals in our group have published 23 medical journal articles and 7 books on health risks from nuclear reactors.

The DSEIS assumes that since routine emissions from Indian Point are below federally permitted limits, there were no health risks in the past, and won't be in the next 20 years. There is no hard evidence, no statistical data, in the DSEIS to support this assumption.

Our group elects to conduct research, rather than blindly accept this assumption, near Indian Point and other nuclear plants. To date, we have made several findings:

1. Routine radioactive releases from Indian Point are among the highest of U.S. plants
2. Westchester and Rockland child cancer incidence is significantly above the U.S. rate.
3. The average level of radioactive Strontium-90 in baby teeth local children is among the highest in the U.S., and rose sharply after the late 1980s.

Each finding suggests Indian Point has harmed local residents. Today I present new data on local thyroid cancer rates. For the first time, national county-specific incidence rates are now published (42 states) by the U.S. Centers for Disease Control and Prevention.

107-a-HH/RI

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Thyroid cancer can be a red flag for harmful effects of radiation exposure. Specifically, radioactive iodine, only produced in nuclear weapons and reactors, enters the body through breathing and the food chain, and attacks cells in the thyroid gland. A 1997 study by the National Cancer Institute concluded that Iodine-131 from atomic bomb fallout caused as many as 212,000 Americans to develop thyroid cancer.

The great majority of residents in four New York counties live within 20 miles of Indian Point. According to official CDC data from 2001-2004, three of these counties (Rockland, Orange, and Putnam) have the 1st, 2nd, and 3rd highest thyroid cancer rates in the state. The other county, Westchester, ranks 8th of 62 New York counties.

Local thyroid cancer rates are actually among the highest in the U.S. The four counties rank 5th, 15th, 26th, and 122nd out of 806 counties published by the CDC.

The local thyroid cancer rate was slightly below the state average in the late 1970s, when Indian Point 2 and 3 had just started. Something caused the low local rate, now 67% above the U.S., to rise. Indian Point emissions must be considered as one possible factor. The high thyroid cancer rate represents a public health problem that officials should address promptly. Moreover, the DSEIS is incomplete without addressing thyroid cancer and other components of a local health "report card".

107-a-HH/RI contd.

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No decision on license extension should be made until all historical health risks of Indian Point are studied using statistical evidence, and the public is fully informed. The fact that the NRC does not require evidence-based proof of safety as a condition for license extension is poor policy, which may put many lives at risk.

107-a-HH/RI contd.

Thank your for your time. I hope the NRC will take my comments seriously.

Joseph J. Mangano MPH MBA
Executive Director, Radiation and Public Health Project

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ATTACHMENTS

1. Cancer Incidence Rate, 2001-2004
Counties Closest to Indian Point vs. NYS and U.S.

ALL CANCERS

County	Cases/Yr	Cases/100,000	NY Rank	vs Oth NY	vs U.S.
Rockland	1555	520.6	22	+ 7.2%	+ 9.9%
Orange	1676	523.4	21	+ 7.7%	+10.5%
Putnam	520	561.6	2	+15.6%	+18.6%
Westchester	5124	495.9	49	+ 2.1%	+ 4.7%
TOTAL	8875	510.0	---	+ 5.0%	+ 7.7%

Total NY State = 487.8
Other NY State = 485.8
United States = 473.6

In the four county area, the "Excess" cancer cases is obtained by multiplying 8875 x 4 years = 35,500 total cases, then multiplying by 5.0% (1775 excess cases vs. other NY) and by 7.7% (2734 excess cases vs. U.S.).

THYROID CANCER

County	Cases/Yr	Cases/100,000	NY Rank	vs Oth NY	vs U.S.
Rockland	55	18.7	1	+101%	+117%
Orange	59	16.5	2	+ 77%	+ 92%
Putnam	16	15.5	3	+ 67%	+ 80%
Westchester	118	12.0	8	+ 29%	+ 40%
TOTAL	248	14.3	---	+ 54%	+ 67%

Total NY State = 9.7
Other NY State = 9.3
United States = 8.6

Source: U.S. Centers for Disease Control and Prevention, http://statecancerprofiles.cancer.gov, Rates adjusted to 2000 U.S. standard population. U.S. includes Atlanta, CA, rural GA, HI, IA, KY, Detroit, NM, UT, Seattle, or 20% of U.S. population.

107-a-HH/RI contd.

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2. Thyroid Cancer Incidence Rate, By U.S. County
42 States, 806 Counties with >15 Cases Total, 2001-2004

County	Cases/Year	Cases/100,000 Pop.
HIGHEST RATES		
1. Los Alamos NM	6	32.5
2. Lehigh PA	72	21.4
3. Jefferson OH	15	19.4
4. Cache UT	13	19.0
5. Rockland NY	**55**	**18.7**
6. Northampton PA	53	18.5
7. Socorro NM	3	18.1
8. Juneau City/Boro AK	5	17.8
9. Laramie WY	15	17.5
10. Benton IA	5	17.1
11. Sanpete UT	3	16.9
12. Hall NE	9	16.7
12. Luzerne PA	58	16.7
14. Bristol RI	9	16.6
15. Orange NY	**59**	**16.5**
16. Warren IA	7	16.3
16. Jones IA	4	16.3
16. Bucks PA	106	16.3
19. York PA	67	16.2
20. Bourbon KY	3	16.1
20. Mercer PA	20	16.1
22. Santa Cruz AZ	6	15.7
22. Camden NJ	82	15.7
22. Lancaster PA	75	15.7
25. Lawrence PA	15	15.6
26. Putnam NY	**16**	**15.5**
26. Burlington NJ	72	15.5
26. Valencia NM	10	15.5
26. Somerset PA	13	15.5
122. Westchester NY	**118**	**12.0**
U.S. Rate		8.6
LOWEST RATES		
803. Vanderburgh IN	7	3.6
803. Charlotte FL	9	3.6
805. Robeson NC	4	3.5
806. Ellis TX	4	3.4

Excluded are IL, MD, MN, MS, NH, ND, TN, VA. States/cities using 2001-2005 data include Atlanta, CA, rural GA, HI, IA, KY, Detroit, NM, UT, Seattle. The 806 Counties represent 68% of U.S. population.
Source: U.S. Centers for Disease Control and Prevention, http://statecancerprofiles.cancer.gov,

107-a-HH/RI contd.

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3. Thyroid Cancer Incidence Rate, By New York County
Counties with >15 Cases Total, 2001-2004

County	Cases/Year	Cases/100,000 Pop.
1. Rockland	**55**	**18.7**
2. Orange	**59**	**16.5**
3. Putnam	**16**	**15.5**
4. Sullivan	10	12.9
5. Oneida	30	12.2
6. Chenango	7	12.2
7. Suffolk	184	12.1
8. Westchester	**118**	**12.0**
9. Nassau	169	11.9
10. Richmond	56	11.8
11. Dutchess	34	11.4
12. Schenectady	17	11.3
13. Saratoga	25	11.3
14. Montgomery	6	11.0
15. Niagara	25	10.8
16. Madison	8	10.6
17. Cayuga	9	10.3
18. Onandaga	47	10.3
19. Tioga	6	10.2
20. Broome	21	10.1
21. Oswego	12	9.9
22. New York	168	9.8
23. Otsego	6	9.6
24. Erie	94	9.5
25. Washington	6	9.3
26. Delaware	5	9.3
27. Albany	28	9.2
28. Chemung	9	9.1
29. Greene	5	8.9
30. Orleans	4	8.8
31. Queens	203	8.7
32. Chautauqua	13	8.6
33. Columbia	6	8.6
34. Allegany	4	8.5
35. Monroe	62	8.3
36. Herkimer	5	8.1
37. Jefferson	9	8.0
38. Warren	6	8.0
39. Kings	193	7.9
40. Ulster	14	7.5
41. Livingston	5	7.4
42. Fulton	4	7.2

107-a-HH/RI contd.

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43. Bronx	89	7.2
44. Rensselaer	11	6.9
45. Genesee	4	6.4
46. Ontario	6	6.1
47. Cattaraugus	5	5.9
48. Wayne	6	5.7
49. Clinton	5	5.4
50. St. Lawrence	6	5.0
51. Steuben	5	4.4

Excluded counties (fewer than 4 cases/year) are Cortland, Essex, Franklin, Hamilton, Lewis, Schoharie, Schuyler, Seneca, Tompkins, Wyoming, and Yates Counties. Rates adjusted to 2000 U.S. standard population. Source: U.S. Centers for Disease Control and Prevention, http://statecancerprofiles.cancer.gov,

107-a-HH/RI contd.

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4. Thyroid Cancer Incidence Rate
Four Counties Closest to Indian Point vs. Other NY State
By Five Year Period, 1976-2005

	Thyroid Cancer Cases per 100,000 Population (number of cases)			
Period	Orange	Putnam	Rockland	Westchester
1976-80	1.85 (20)	4.65 (15)	4.10 (46)	3.55 (156)
1981-85	4.05 (50)	2.50 (10)	5.70 (70)	3.95 (176)
1986-90	3.10 (42)	2.05 (10)	6.70 (90)	4.35 (203)
1991-95	4.80 (72)	4.35 (19)	8.25 (112)	4.95 (234)
1996-00	11.25 (181)	8.60 (43)	10.65 (153)	8.60 (414)
2001-05	16.55 (295)	18.20 (93)	18.05 (267)	12.35 (621)

Period	4 County Total	Other NY State	% Local Rate is is +/- Oth NYS
1976-80	3.40 (237)	3.45	**- 1.5%**
1981-85	4.20 (306)	3.71	**+13.2%**
1986-90	4.38 (345)	3.91	**+11.9%**
1991-95	5.46 (437)	5.07	**+ 9.2%**
1996-00	9.51 (791)	7.11	**+33.7%**
2001-05	14.55 (1276)	9.82	**+48.1%**

Source: NY State Cancer Registry, www.nyhealath.gov/statistics/cancer/registry. Rates per 100,000, adjusted to 2000 U.S. standard population.

5. Thyroid Cancer Mortality Rate
Four Counties Closest to Indian Point vs. U.S
By Age Group, 1979-2005

	4 Counties Cloest to Indian Point			U.S.	
Age Group	Deaths	Ann. Pop.	Rate	Rate	% +/- U.S.
All Races					
45-64	69	350,379	0.729	0.517	**+41.2%**
65 and over	173	194,440	3.295	2.536	**+29.9%**
Whites					
45-64	59	303,597	0.720	0.515	**+39.8%**
65 and over	166	177,374	3.466	2.535	**+36.7%**

Source: U.S. Centers for Disease Control and Prevention, http://wonder.cdc.gov, underlying cause of death. Uses ICD-9 cancer codes 193 (1979-1998) and ICD-10 cancer codes C73 (1999-2005). Rates are deaths per 100,000 persons adjusted for 2000 U.S. standard population. About 98% of thyroid cancer deaths occur in persons 45 years of age and over.

107-a-HH/RI contd.

MR. MARZULLO: Good evening. My name is Dominic Marzullo and I am proud to have worked with the men and women of Indian Point as a designer for over 30 years. At the present time, I am a business agent representing the diligent, hard workers and union members. Knowing the benefits of Indian Point on our community, I fully support license renewal. Indian Point produces 2000 Mw of clean, emission free electricity and is a critical economic engine for the lower Hudson Valley responsible for more than $700 million in annual regional economic activity. The New York State Independent System Operator noted that the closure of Indian Point's reactors would result in an immediate violation of the reliability standards. Given that on a typical day Indian Point provides up to 30% of the power used in New York City and the surrounding region. It is critical to keep Indian Point online. In these tough economic times, I also know the consequences for closing Indian Point would have to our community. This would include job losses of over 100,000 workers and lost wages amounting in the billions. Finally, any potential alternatives laid out to replace Indian Point do not match the commonsense test. Windmills and solar panels simply cannot replace the base-load power produced by the plant. Even if it could, Westchester residents would not allow them in their backyards. As tonight's hearing also focuses on the

108-a-EC/SO/SR

108-b-AL/GI/SR

environment, please note that it would also take up to five fossil fuel burning plants to equal the power generated by Indian Point. This is bad for our air, our water and our quality of life that we all enjoy as New Yorkers. Indian Point is a good neighbor, a good steward of our environment and I urge you to support Indian Point in it's re-licensing. Thank you very much.

108-b-AL/GI/SR contd.

MR. MATTIS: Good afternoon. My name is John Mattis and I've been a proud resident of the town of Cortland for 36 years. I'm also the chairman of the town's Zoning Board of Appeals. But more importantly, I'm a member of the town's Economic Challenge Committee. The committee is responsible for assisting small business owners, promoting economic development issues and ensuring economics are part of the town's future planning process. As an advocate for those small-business owners, I can tell you that closing Indian Point would be a devastating action for them. As well as the residents of Cortland, like me, who depend on these local businesses for many goods and services as well as feeding the tax base, which includes the school district. Businesses and residents alike depend upon Indian Point for its low-cost reliable energy, the jobs provided by the site, the taxes paid by Entergy, the support of our community programs, as well as the emergency planning technical expertise we have received being a close neighbor of the site.

109-a-SO

109-b-EC/EP

We hear many negatives about Indian Point in the media. But we never hear the positives associated with the site, which is a shame. Entergy and the workers at Indian Point have been good neighbors to all of us. And in difficult times, as we are facing now, neighbors stick together. This community

109-c-SE/SO

will not survive without Indian Point. Look across the river at Rockland County, if you want to see what happens to a neighborhood, to a school district, when a power plant leaves you. It's devastating. Your taxes increase dramatically and the higher your taxes move, the more hard-working residents will take flight and leave the area, leaving those behind with an even greater financial burden to carry. There a lot of people here today who do not live here and yet they're telling us how to live our lives. For years, they have spoken of the devastation Indian Point would cause. Yet, it is some of their very greedy Wall Street donors who have destroyed this region.

109-c-SE/SO contd.

In closing, I'll say to those of you who oppose the re-licensing of this plant, if you are successful, God forbid, and this plant is not re-licensed, I invite you to move here. Move in this area so that you can share in our economic devastation. So you can share in our runaway taxes. So you can share in our regional brownouts and our regional blackouts. Thank you.

109-d-SO/SR

ML090771333

IPRenewalCEmails

From: Michael Maturo, Councilman [mmaturo@orangetown.com]
Sent: Wednesday, March 18, 2009 11:56 AM
To: IndianPointEIS Resource
Cc: Ben Rubin; Anne Phyllis Pinzow
Subject: Re: Indian Point Relicensing

To the NRC:

Entergy's Indian Point nuclear power plant is currently being reviewed by your office for relicensing that would permit operation well into the future.

On behalf of 50,000 constituents in the Town of Orangetown, I ask that you deny relicensing until a comprehensive and well-publicized assessment of the plant's operation and safety be conducted.

110-a-OP/OR

Indian Point continues to leak radioactive water into the Hudson River, endangering the unique and already-imperiled watershed wildlife. Any infiltration into our groundwater -- which is already in short supply -- threatens the safety of our residents and the very viability of our community.

110-b-LE/WA

Equally concerning is the poor management and protection of Indian Point. Over the past several years, there have been many incidents of perceived mismanagement, from employees coming to work under the influence of drugs or alcohol to a distinct lack of security in our post-9/11 world.

To allow Indian Point to continue operating under the status quo would be an irresponsible decision that threatens the Hudson Valley and New York City, which is less than 15 miles away. Please consider alternatives to relicensing that ensure the long-term health and safety of our region.

110-c-AL/OP/ST

Sincerely,
Michael Maturo

Michael Maturo, Orangetown Councilman
www.MichaelMaturo.com
845.641.3580

DR. MCCANN: Good afternoon. My name is Dr. Daniel and I'm the superintendent of schools for the Hendrick Hudson School District. The district encompasses many of the communities surrounding Indian Point. Including Buchanan, Verplanck, Krugers, Montrose, Cortland Manor, Croton and part of the city of Peekskill. Many of these residents were students themselves of the Hendrick Hudson school's and they send their children, if not their grandchildren, to our school's. We strive for excellence by ensuring every student receives a quality education and that includes providing a balanced view of the world. Encompassing all opinions and ideas, in such a way, or I should say, that has not always been a case in a debate over the future of Indian Point. In fact, Indian Point’s story is a rich part of the region's history and certainly a large part of its growth and success as a thriving community. The site remains a considerable component in the economic expansion of the area because Indian Point provides a firm financial foundation upon which we maintain and continuously evolve a well respected school district, a homeowner's main yardstick for measuring the current viability and future value of a home. Those men and women who tolled on the construction of the two Indian Point plants remain in the area and laid down roots.

111-a-SO

Today, area residents are operating the site, guarding

111-b-SO/SR

the parameter, maintaining the site's critical systems. Even serving lunch in the cafeteria. They are taxpaying residents, members of the PTA, coaches on our fields, and are even those who buy the baked goods during our local fund-raising efforts. We teach our students about the importance of service to the community and Entergy employees clearly represent a fine example of getting involved and staying involved. As much as we look at the past and present, we also teach our students about looking towards the future. Now the consequences of actions today will impact the future. The consequences of today's recession are forcing many school districts throughout Westchester County to consider the impact on tomorrow's educational programs. So too are we, as we consider the impact of potential higher electricity costs, reductions in state aid and a quickly diminishing tax base on the quality of education we provide to our children. 111-b-SO/SR contd.

When taking all the facts into consideration, there is no more direct way of saying it than the loss of Indian Point will simply devastate the quality and depth of education we provide to the students we proudly served in this community. Indian Point is a major source of low-cost power for us and provides a stabilizing revenue stream to the district. It provides 28% of the revenue of our schools. 111-c-EC/SO

We welcome the site's employees as neighbors and enjoy 111-d-SO

their participation in the educational process of our children. Over the years, Indian Point has been very generous to our schools. Their donations to our schools have provided lights on our athletic fields, outdoor education programs and textbooks in our classrooms. All of the gifts to our schools are too numerous to mention. Our community greatly appreciates their generosity. The students of this community demand thoughtful discussion of the future of Indian Point and so at a minimum, we owe them a civil debate and well reasoned facts. That is why I'm asking the Commission to remain faithful to this process, demonstrating to the Hendrick Hudson school students that when all is said and done, this will be a fair, honest and open debate. Thank you for the opportunity to speak to you this afternoon.

111-d-SO contd.

MR. MCCORMICK: I'm John McCormick and I'm speaking for the Center for Environment Commerce and Energy where I'm a volunteer consultant. When people ask, well what does the Center represent, we like to say we're speaking for asthmatic children. I want to thank the NRC for this opportunity make the presentation and I want to compliment Lance, you certainly do run a tight ship, sir. I want to focus specifically on the Environmental Impact Statement at page 8-16 in lines 9-17. I'll read just a small portion of it. Replacement power required during a 42-week outage could increase air quality effects depending upon the location and characteristics of generation units to replace Indian Point's 2 and 3.

Now of course, that 42-week outage is related to the outage required if Indian Point was required to put in cooling towers or -- to change its cooling system. But, I use that 42-week outage as a subtext for the much larger question, which is permanent outage if in fact NRC does not grant the re-licensing of Units 2 and 3. One of the advantages I have in speaking later in the program is that I get to agree with everyone who supports re-licensing. Now, it's really a question of what is available in the city of New York to provide New York's power on any given time. If you took all the capacity that New York City has available to keep its lights on, you're talking about 12,600 Mw. That includes Indian Points 2 and 3. So, if you take that

112-a-AL/AQ/EC

out, you're looking at 10,500 Mw. The impact statement doesn't really look at the very specifics of what would be the energy demand on a peak hour. So, I looked at 2007. August 8th, in fact. At two o'clock in the afternoon, the peak load for New York City or Zone J, as the New York ISO calls it, was about 11,000 Mw. 112-a-AL/AQ/EC contd.

So again, if you took Indian Point off-line, New York City couldn't meet its own supply of electricity. But, if you put everything online, equipment that was running at two o'clock on August 8th, you're looking at power plants that are 30 and 40 years old, they're small peaking units. But, they all burn natural gas. So, we're seeing an increase of oxides of nitrogen at a peak time during which is probably an air inversion and we see deteriorating air quality.

So, it's a combination then of the ozone coming from the plants that would run if Indian Point was also supplying energy and that's about five tons of oxides of nitrogen at two o'clock in the afternoon. Now, you add the additional oxides of nitrogen from units that would have to come online to replace Indian Point's 2 and 3 and you're looking at almost 10 tons the oxides of nitrogen at two o'clock in the afternoon at a peak period. This is what is the problem, there is not the capacity to replace Indian Point's 2 and 3 and if you ran everything that you had, you still wouldn't meet load, but you're increasing the 112-b-AL/AQ/EC

nox emissions. Therefore, you're exacerbating the ozone problem and you're hurting the children who are asthmatic and certainly the elderly as well. Thank you for your time. I'll just conclude by saying that this impact statement is incomplete if it doesn't really take apart what is the demand at a peak hour? What kind of increased air pollution at that peak hour on a typical day in say July or August. Thank you.

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Center for Environment, Commerce & Energy

Written Statement of

John McCormick
Volunteer Consultant
Center for Environment, Commerce & Energy

For the

Generic Environmental Impact Statement

For

License Renewal

For the

Indian Point Nuclear Power Plant

Presented to the

U.S. Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

February 12, 2009

9903 Caltor Lane, Ft. Washington, MD 20744
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Introduction

My name is John McCormick and I am a volunteer consultant for the Center for Environment, Commerce & Energy (Center). The Center, founded in 1985, is an organization dedicated to protecting the environment, enhancing human, animal and plant ecologies and promoting the efficient use of natural resources. The Center supports the 20-year License Renewal for the Indian Point nuclear power plant located in Buchanan, New York. My comments today address the General Environmental Impact Statement (GEIS) of the License Renewal Application (LRA) and other environmental issues of concern to the Center regarding this proposed action.

Because nuclear power is emission-free and has a demonstrated safety record, whereas fossil-fuel power contributes to numerous health issues, The Center seeks to promote the safe use of nuclear power. The Center specifically supports the Indian Point 2 and 3 nuclear power facilities because these facilities provide significant electrical capacity to the State of New York with minimal human, animal, air, water, and land impacts.

112-c-AL

Fossil-Fuel Power Causes Serious Adverse Health Effects

The Center is deeply concerned with any policy or measure that impacts the air quality of the communities where it is based, or that affects the health of American citizens. The license renewal of Indian Point is vitally needed because if units two and three are not producing emission free electricity then the air pollution will increase throughout the region. Closure of Indian Point would result in compliance issues for the State with respect to the federal Clean Air Act State

112-d-AL/AQ

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Implementation Plan ("SIP"). Additionally, Indian Point provides reliable energy without contributing pollutants that exacerbate asthma.

In 1999, coal-fired power plants in the United States emitted into the environment 1.3 million tons of sulfur dioxide ("SO_2"), a criteria air pollutant that is correlated to asthma and impaired lung functions, 6.5 million tons of nitrogen oxides ("NO_x") which, when combined with other pollutants and sunlight, forms ozone, another lung irritant linked to asthma, and 1.9 billion tons of carbon dioxide ("CO_2"), yet another contributor to increased ozone levels and global climate change.[1] This equates to approximately 60% of all SO_2 emissions, 25% of all NO_x emissions, and 32% of all CO_2 emissions nationwide.[2]

These and other airborne pollutants emitted by fossil-fuel power stations may have a direct and significant effect on human health. In a study by Abt Associates, one of the largest for-profit government and business research consulting firms in the world, it was found that over 30,000 deaths each year are attributable to air pollution from U.S. power plants.[3] Another study found that air pollution from power plants was a contributing factor to higher infant mortality rates and higher incidences of Sudden Infant Death Syndrome ("SIDS").[4] Research has further shown that pollutants from fossil-fuel power plants form tiny

112-d-AL/AQ contd.

[1] *See* Rachel H. Cease, ADVERSE HEALTH IMPACTS OF GRANDFATHERED POWER PLANTS AND THE CLEAN AIR ACT: TIME TO TEACH OLD POWER PLANTS NEW TECHNOLOGY, 17 J. Nat. Resources & Envtl. L. 157, 158 (2002-2003); Martha H. Keating, AIR INJUSTICE, at 4 (October 2002) (attached hereto as Exhibit B).
[2] 17 J. Nat. Resources & Envtl. L. at 158.
[3] *Id.* at 159.
[4] *See* Martha H. Keating, AIR INJUSTICE, at 3 (October 2002).

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particles (called fine particulate matter) that are linked to diseases of both the respiratory and cardiovascular systems.[5]

Not surprisingly, air pollution has been characterized as one of the largest threats to public health.[6] In New York City, it is estimated that there are 2,290 deaths, 1,580 hospitalizations, 546 asthma-related emergency room visits, 1,490 cases of chronic bronchitis, and 46,200 asthma attacks yearly attributable to power plant pollution.[7] The New York City area has also been ranked as one of the top five U.S. metropolitan areas for particulate air pollution.[8] And again, these adverse effects disproportionately affect minority communities. In one study, nonwhites in New York City were found to be hospitalized twice as many times as whites on days when ozone levels were high.[9] Another study found that, of the 23 counties in New York State that fail to meet Federal air pollution standards, 87.7% of them are populated by people of color.[10]

112-d-AL/AQ contd.

[5] *See id.* at 4. *See also* Air Quality in Queens County: Opportunities for Cleaning Up the Air in Queens County and Neighboring Regions, at S-6, Synapse Energy Economics, Inc. (May 2003) ("Air Quality in Queens County") ("Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die.") (available at http://www.synapse-energy.com/Downloads/Synapse-report-queens-air-quality-exec-summary-05-29-2003.pdf); Children at Risk: How Pollution from Power Plants Threatens the Health of America's Children, at 2, Clean Air Task Force (May 2002) ("Power plant emissions and their byproducts form particulate matter, ozone smog and air toxics. These pollutants are associated with respiratory hospitalizations, lost school days due to asthma attacks, low birth weight, stunted lung growth and tragically, even infant death.") (available at http://cta.policy.net/fact/children/).

[6] Allison L. Russell, URBAN POLLUTANTS: A REVIEW AND ANNOTATED BIBLIOGRAPHY, at 3, New York City Environmental Justice Alliance 2000 (available at http://www.nyceja.org/pdf/Urban.pdf).

[7] *See* Death, Disease & Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants, at 24, Clean Air Task Force (October 2000) ("Death, Disease & Dirty Power") (Exhibit C) (available at http://cta.policy.net/fact/mortality/mortalitylowres.pdf).

[8] *See* New York's Dirty Power Plants, Clear the Air – the National Campaign Against Dirty Power (available at http://cta.policy.net/relatives/17841.pdf). The Air Quality in Queens County Report states that "New York City … [is] burdened with significant air quality problems" and "[t]he US EPA has determined that the NY metropolitan area … is in 'severe nonattainment' for ozone." *Id.* at S-5.

[9] *See* Martha H. Keating, AIR INJUSTICE, at 4 (October 2002).

[10] *See* Clear the Air: People of Color in Non-Attainment Counties (available at http://cta.policy.net/fact/injustice/injustice_non_attainment.pdf).

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would increase by 105% (or 16,107 tons). Even if replacement electricity were spread out more broadly, to include all of the Hudson Valley and New York City plants, CO_2 plant emissions would still increase by 57% (to 13,686,648 tons), SO_2 plant emissions would increase by 62% (to 35,961 tons), and NO_x emissions would increase by 57% (to 20,258 tons).

And as the level of air pollution increases, so do the incidences of death and respiratory and cardiovascular ailments. For instance, in the National Morbidity and Mortality Air Pollution Study ("NMMAPS"), a team of investigators from Johns Hopkins University and the Harvard School of Public Health found, among other things, strong evidence linking daily increases in particle pollution to increases in death in the largest U.S. cities.[11] Links have also been found between fine particle levels and increased hospital admissions for asthma, cardiovascular disease, pneumonia, and chronic obstructive pulmonary disease.[12] Stated bluntly in the Air Quality in Queens County Report, "Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die

112-e-AL/AQ

The Benefits of Indian Point 2 and 3

The Indian Point facilities, located in the affluent and predominantly white Westchester County, have a combined generating capacity of approximately 2000 megawatts (MW). The facilities provide approximately 20-30% of the electricity for New York City and its northern suburbs. And, unlike New York's fossil-fuel burning facilities, Indian Point 2 and 3 do not pollute the air.

112-f-AL/AQ

[11] Cited in Death Disease & Dirty Power, at 14.
[12] *Id.*

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Attempts To Replace Indian Point Will Increase Air Pollution

If generation at Indian Point 2 and 3 were to be significantly limited or were to cease altogether, the lost electricity would most likely be replaced by nearby facilities, including the above-referenced in-city facilities and the Lovett coal-burning facility. For instance, in a study by Synapse Energy Economics, Inc., dated November 3, 2003 and entitled, *The Impact of converting the Cooling systems at Indian Point Units 2 and 3 on Electrical System Reliability* (attached hereto as Exhibit D), Synapse finds that New York electricity generators, particularly in-city generators, have excess capacity which would supplant capacity losses at Indian Point if Indian Point were brought offline. Similarly, in an August 2002 study by the TRC Environmental Group entitled, *Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC Emissions Avoidance Study* (the "TRC Report"), TRC concluded that "it is reasonable to assume that the majority of lost output [(if Indian Point were brought offline)] would be made up by increased generation of units nearest to the New York City/Westchester load pocket."

112-f-AL/AQ contd.

Increasing Air Pollution Without Indian Point

The TRC Report further found that, if Indian Point is brought offline, the air quality in New York would decrease dramatically. For instance, if the gap created by Indian Point's closure were to be filled by the power plants located in New York City, almost all of which are in predominantly minority communities, CO_2 plant emissions would increase by 101% (or 12,494,172 tons), SO_2 plant emissions would increase by 106% (or 8,020 tons), and NO_x plant emissions

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Draft SPDES Permit Hinders IP Non-Air-Polluting Electricity

Several conditions of the DEC's Draft SPDES Permit for Indian Point 2 and 3 significantly limit Indian Point's ability to generate electricity for the State of New York. For example, Special Condition 28 of the Draft Permit requires the construction of cooling towers. NYSDEC issued a draft SPDES permit for IP1, IP2, and IP3 in 2003 that, among other conditions, requires the design and, if appropriate, the installation of closed-cycle cooling systems for IP2 and IP3 if the site seeks and receives from NRC license renewals for IP2 and IP3.

The Center understands that, under conservative estimates, it would take approximately 10 months of Indian Point being offline for a closed-cycle cooling system to be installed. The Center further understands that the costs of installing cooling towers are sufficiently prohibitive so that Indian Point's owners may elect to shut down the plants rather than invest in the retrofit. Either way, the results will be devastating in terms of the pollution-related health effects when New York's non-clean burning plants scramble to replace the power lost by Indian Point 2 and 3. For this reason, the Center objects to any provision of the Draft SPDES Permit for Indian Point 2 and 3 that imposes any significant limit on the facilities' ability to generate clean-burning electricity.

112-h-AL/RG

Conclusion

The Center supports the 20-year License Renewal for the Indian Point nuclear power plant located in Buchanan, New York. We support this renewal because the facility is a positive structure for mitigating ground level air pollution, global warming and environmental injustice.

112-i-SR

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MR. MCDONALD: My name is Norris McDonald. I'm the founder and president of the Center for Environment, Commerce and Energy. Also our outreach arm, the African-American Environmentalists Association. We obviously support the renewal of the license. We're an environmental organization and we support it. But let me also admit one thing here. We also love Indian Point. I love Indian Point. I love more than that, and as a matter of fact for the record, I would like for the NRC to consider putting love into the record for this power plant. Love indeed. Not only do we love the nuclear power plant that is Indian Point, we also love green jobs. You're probably hearing a lot about green jobs now. Well, we already have green jobs at Indian Point. We already have numerous green jobs at Indian Point. So, we love Indian Point. We love the green jobs. We love and we want license renewal. Very specifically, though, the report is excellent too. Love this report. Great reading. I suggest you thumb through it and read it often. As far as the fish analysis, we think that was on the point. The environmental benefits of fishing in the Hudson River are great. There's no harm to the fish from the nuclear power plant.

As a matter of fact, poison run off and other issues are definitely more detrimental to the Hudson River than Indian Point. When the issue of the cooling tower comes up, we have

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113-b-AE/AL/EJ

national issues that we're addressing, 316(b) and some other issues that will come up. Well, we really have pay attention to that because basically, if cooling towers have to be built, that's basically a no-action alternative, in our opinion. When it comes to the alternatives, the report did an excellent job of putting together the analysis of the alternatives: the renewables, the wind, even conservation, supercritical boilers. You might even want to take a look at ultra-supercritical boilers. But, no matter what you look at, and the four boilers that they recommended for that, still could not replace the capacity of Indian Point. So, that's something you want to look at. We have a concern about the lack of environmental justice in the generic GEIS, the generic portion. It's not included, so there's not a framework, in our opinion, an excellent guidance for addressing environmental justice. We would hope the NRC would reconsider that. We know some of the history of the atomic licensing safety board. But because there's not a guidance at the generic level, then we think that maybe that leads to an inadequacy at the specific EIS components and for the record we have a lot of that information included in here. The percentages of smog components that impact communities in the inner cities. You know the asthma incidences of that. Another interesting component in the report was the global warming section. We really liked that section and the

113-b-AE/AL/EJ contd.

113-c-EJ/GE

113-d-AQ/GL/SR

effects it would have on the river. Really dangerous impacts. Increasing rising river level. Increasing temperature. We have the same concerns there that we have in the inner cities when cooking up a hotter smog from global warming. So, global warming is a huge issue and in our opinion, the global warming threats to the Hudson River are much greater than any possible threat that Indian Point can have. In these times, we should never talk about closing anything. So, we love Indian Point. We love your green jobs. Thank you very much.

113-d-AQ/GL/SR contd.

Center for Environment, Commerce & Energy

Written Statement of

Norris McDonald
President
Center for Environment, Commerce & Energy

For the

Generic Environmental Impact Statement

For

License Renewal

For the

Indian Point Nuclear Power Plant

Presented to the

U.S. Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

February 12, 2009

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Introduction

My name is Norris McDonald and I am the President of the Center for Environment, Commerce & Energy (Center). The Center, founded in 1985, is an organization dedicated to protecting the environment, enhancing human, animal and plant ecologies and promoting the efficient use of natural resources. The Center supports the 20-year License Renewal for the Indian Point nuclear power plant located in Buchanan, New York. My comments today address the General Environmental Impact Statement (GEIS) of the License Renewal Application (LRA) and other environmental issues of concern to the Center regarding this proposed action.

The Center agrees with the preliminary recommendation of the NRC staff:

> "...that the Commission determine that the adverse environmental impacts of license renewals for IP2 and IP3 are not so great that not preserving the option of license renewals for energy planning decision makers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS, (2) the ER submitted by Entergy, (3) consultation with other Federal, State, and local agencies, (4) the staff's own independent review, and (5) the staff's consideration of public comments received during the scoping process."[1]

113-e-SR

Federal and State Water Permit Issues

Constituents of the Center live and work – and breathe the air in a Clean Air Act Nonattainment Area. Of particular import is the promotion of clean air in New York metropolitan area communities. Because nuclear power is emission-

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[1] U.S. NRC GEIS for License Renewal of Nuclear Plants, Supplement 38, Regarding IP2 & 3, Draft Report For Comment, Main Report, Executive Summary, p. xvii.

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free and has a demonstrated safety record, whereas fossil-fuel power contributes to numerous health issues, the Center seeks to promote the safe use of nuclear power. The Center specifically supports the Indian Point 2 and 3 nuclear power facilities because these facilities provide significant electrical capacity to the State of New York with minimal human, animal, air, water, and land impacts.

The license renewal of Indian Point is needed because if units two and three are not producing emission free electricity then the air pollution will increase throughout the region. Closure of Indian Point would result in compliance issues for the State with respect to the federal Clean Air Act State Implementation Plan ("SIP"). Additionally, Indian Point provides reliable energy without contributing pollutants that exacerbate asthma.

113-f-AL/AQ contd.

In order to reduce the levels of impingement and entrainment of Hudson River fish, the Department of Environmental Conservation's ("DEC") Draft SPDES Permit could substantially limit the ability of Indian Point 2 and 3 to generate electricity, and may even lead to the closure of the facilities. Any substantial reduction in the amount of electricity generated by Indian Point 2 and 3 will spark demand for replacement electricity from nearby power plants. As production at these fossil-fuel plants increases, the air quality in and around these plants will further deteriorate, causing a spike in the incidences of respiratory and cardiovascular diseases in the communities where these plants are based.

EPA suspended the Cooling Water Intake Structure Regulations for existing large power plants on July 2, 2007. This suspension is in response to the

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2nd Circuit Court of Appeals decision in Riverkeeper, Inc., v. EPA. In the meantime, all permits for Phase II facilities should include conditions under section 316(b) of the Clean Water Act developed on a Best Professional Judgment basis. See 40 C.F.R. § 401 .14.[2] . This issue is of vital importance because an unacceptable permit could cause Entergy to close the facility, which would exacerbate air quality issues in the region. We are submitting this information in the hope that NRC will utilize it for the Final EIS (FEIS) and will also see the important environmental implications of this facility.

113-g-AE/AL/AQ contd.

Climate Change – Aquatic Resources

The Center is deeply concerned about the potential effects of climate change described in the GEIS, which warns about sea level rise, salinity changes and wind and water circulation changes. The GEIS says that these changes result in the reduction or redistribution of submerged aquatic vegetation, affect spawning patterns or success, change the nature of sediment and nutrient inputs and generally influence the estuarine food web on many levels. The GEIS concludes that: The extent and magnitude of climate change impacts to the aquatic resources of the lower Hudson River are an important component of the cumulative assessment analyses and could be substantial.[3] IP2 and IP3 do not contribute to global warming and actually serve to mitigate global warming, and thus, the problems described above.

113-h-AE/GL

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[2] http://www.epa.gov/waterscience/316b , Federal Register Notice (July 09, 2007) Implementation Memo (PDF) (1 page, 72K, About PDF; March 20, 2007)

[3] GEIS, Draft NUREG-1437, Supplement 38, 4.8.1: Cumulative Impacts on Aquatic Resources, Climate Change, p. 4.58.

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Fossil-Fuel Power Causes Serious Adverse Health Effects

In 1999, coal-fired power plants in the United States emitted into the environment 11.3 million tons of sulfur dioxide ("SO_2"), a criteria air pollutant that is correlated to asthma and impaired lung functions, 6.5 million tons of nitrogen oxides ("NO_x") which, when combined with other pollutants and sunlight, forms ozone, another lung irritant linked to asthma, and 1.9 billion tons of carbon dioxide ("CO_2"), yet another contributor to increased ozone levels and global climate change.[4] This equates to approximately 60% of all SO_2 emissions, 25% of all NO_x emissions, and 32% of all CO_2 emissions nationwide.[5]

These and other airborne pollutants emitted by fossil-fuel power stations may have a direct and significant effect on human health. In a study by Abt Associates, one of the largest for-profit government and business research consulting firms in the world, it was found that over 30,000 deaths each year are attributable to air pollution from U.S. power plants.[6] Another study found that air pollution from power plants was a contributing factor to higher infant mortality rates and higher incidences of Sudden Infant Death Syndrome ("SIDS").[7] Research has further shown that pollutants from fossil-fuel power plants form tiny particles (called fine particulate matter) that are linked to diseases of both the respiratory and cardiovascular systems.[8]

113-i-AL/AQ

[4] *See* Rachel H. Cease, ADVERSE HEALTH IMPACTS OF GRANDFATHERED POWER PLANTS AND THE CLEAN AIR ACT: TIME TO TEACH OLD POWER PLANTS NEW TECHNOLOGY, 17 J. Nat. Resources & Envtl. L. 157, 158 (2002-2003); Martha H. Keating, AIR INJUSTICE, at 4 (October 2002) (attached hereto as Exhibit B).
[5] 17 J. Nat. Resources & Envtl. L. at 158.
[6] *Id.* at 159.
[7] *See* Martha H. Keating, AIR INJUSTICE, at 3 (October 2002).
[8] *See id.* at 4. *See also* Air Quality in Queens County: Opportunities for Cleaning Up the Air in Queens County and Neighboring Regions, at S-6, Synapse Energy Economics, Inc. (May 2003) ("Air Quality in Queens County") ("Epidemiological studies tell us that on days when air pollution levels are high, more

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Not surprisingly, air pollution has been characterized as one of the largest threats to public health.[9]

New Yorkers Pay the Price for Fossil-Fuel Air Pollution

In New York City, it is estimated that there are 2,290 deaths, 1,580 hospitalizations, 546 asthma-related emergency room visits, 1,490 cases of chronic bronchitis, and 46,200 asthma attacks yearly attributable to power plant pollution.[10] The New York City area has also been ranked as one of the top five U.S. metropolitan areas for particulate air pollution.[11] Another study found that, of the 23 counties in New York State that fail to meet Federal air pollution standards.[12]

Lost Production From Indian Point Will Be Replaced By In-City and Other Nearby Facilities

If generation at Indian Point 2 and 3 were to be significantly limited or were to cease altogether, the lost electricity could not be completely replaced with existing resources. However, any attempts to do so would most likely be replaced by nearby facilities.

113-i-AL/AQ contd.

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people get sick or die.") (available at http://www.synapse-energy.com/Downloads/Synapse-report-queens-air-quality-exec-summary-05-29-2003.pdf); Children at Risk: How Pollution from Power Plants Threatens the Health of America's Children, at 2, Clean Air Task Force (May 2002) ("Power plant emissions and their byproducts form particulate matter, ozone smog and air toxics. These pollutants are associated with respiratory hospitalizations, lost school days due to asthma attacks, low birth weight, stunted lung growth and tragically, even infant death.") (available at http://cta.policy.net/fact/children/).

[9] Allison L. Russell, URBAN POLLUTANTS: A REVIEW AND ANNOTATED BIBLIOGRAPHY, at 3, New York City Environmental Justice Alliance 2000 (available at http://www.nyceja.org/pdf/Urban.pdf).

[10] *See* Death, Disease & Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants, at 24, Clean Air Task Force (October 2000) ("Death, Disease & Dirty Power") (Exhibit C) (available at http://cta.policy.net/fact/mortality/mortalitylowres.pdf).

[11] *See* New York's Dirty Power Plants, Clear the Air – the National Campaign Against Dirty Power (available at http://cta.policy.net/relatives/17841.pdf). The Air Quality in Queens County Report states that "New York City … [is] burdened with significant air quality problems" and "[t]he US EPA has determined that the NY metropolitan area … is in 'severe nonattainment' for ozone." *Id.* at S-5.

[12] *See* Clear the Air: People of Color in Non-Attainment Counties (available at http://cta.policy.net/fact/injustice/injustice_non_attainment.pdf).

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Increasing Generation at Facilities Near Indian Point Will Increase Air Pollution in the Communities Where These Facilities Are Based

The TRC Report further found that, if Indian Point were brought offline, the air quality in New York would decrease dramatically. For instance, if the gap created by Indian Point's closure were to be filled by the power plants located in New York City, CO_2 plant emissions would increase by 101% (or 12,494,172 tons), SO_2 plant emissions would increase by 106% (or 8,020 tons), and NO_x plant emissions would increase by 105% (or 16,107 tons). Even if replacement electricity were spread out more broadly, to include all of the Hudson Valley and New York City plants, CO_2 plant emissions would still increase by 57% (to 13,686,648 tons), SO_2 plant emissions would increase by 62% (to 35,961 tons), and NO_x emissions would increase by 57% (to 20,258 tons).

And as the level of air pollution increases, so do the incidences of death and respiratory and cardiovascular ailments. For instance, in the National Morbidity and Mortality Air Pollution Study ("NMMAPS"), a team of investigators from Johns Hopkins University and the Harvard School of Public Health found, among other things, strong evidence linking daily increases in particle pollution to increases in death in the largest U.S. cities.[13] Links have also been found between fine particle levels and increased hospital admissions for asthma, cardiovascular disease, pneumonia, and chronic obstructive pulmonary disease.[14] The Air Quality in Queens County Report states that, "Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die.

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[13] Cited in Death Disease & Dirty Power, at 14.
[14] *Id.*

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Based on the above data and studies, it is clear that if Indian Point 2 and 3 were to be brought offline, forced to close, or if their production were limited, the void in electricity production would be filled by power plants located in minority communities, with a corresponding increase in the rates of asthma and other respiratory diseases, cardiovascular diseases, and even infant mortality in these communities.

113-i-AL/AQ contd.

The Benefits of Indian Point 2 and 3

The Indian Point facilities, located in the affluent and predominantly white Westchester County, have a combined generating capacity of approximately 2000 megawatts (MW). The facilities provide approximately 20-30% of the electricity for New York City and its northern suburbs. And, unlike New York's fossil-fuel burning facilities, Indian Point 2 and 3 do not pollute the air.

113-j-EC

Draft SPDES Permit Hinders Indian Point's Ability to Produce Non-Air-Polluting Electricity

Several conditions of the DEC's Draft SPDES Permit for Indian Point 2 and 3 significantly limit Indian Point's ability to generate electricity for the State of New York. For example, Special Condition 28 of the Draft Permit requires the construction of cooling towers. NYSDEC issued a draft SPDES permit for IP1, IP2, and IP3 in 2003 that, among other conditions, requires the design and, if appropriate, the installation of closed-cycle cooling systems for IP2 and IP3 if the site seeks and receives from NRC license renewals for IP2 and IP3.

The Center understands that, under conservative estimates, it would take approximately 10 months of Indian Point being offline for a closed-cycle cooling system to be installed. The Center further understands that the costs of installing

113-k-AL/AQ/RG

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cooling towers are sufficiently prohibitive so that Indian Point's owners may elect to shut down the plants rather than invest in the retrofit. Either way, the results will be devastating in terms of the pollution-related health effects when New York's non-clean burning plants scramble to replace the power lost by Indian Point 2 and 3. And since most of these plants are in African American and minority communities, the bulk of the adverse health effects – including asthma and other respiratory diseases, cardiovascular disorders, and even infant mortality – will be borne by these communities. For this reason, the Center objects to any actions or provisions that impose any significant limit on the facilities' ability to generate clean-burning electricity, including Special Condition 28.

The Center has a strong environmental interest in this proceeding because the Center is an environmental action group, with a chapter in Long Island, New York, with a stated goal of promoting clean air in low-income and minority communities by, among other things, supporting the safe use of nuclear energy. Further, the Center has publicly supported Indian Point 2 and 3, due to its positive impact on New York's air quality, for several years. For instance, in May 2002, Center President Norris McDonald presented testimony before the Committee on Environmental Protection in opposition to Chairman James F. Gennaro's Resolution 64, which called for the immediate shutdown of Indian Point. The Center also presented testimony on February 28, 2003, before the New York City Council's Committee on Environmental Protection, again opposing

113-k-AL/AQ/RG contd.

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efforts to shut down Indian Point. And most recently, the Center participated in the DEC's legislative hearing relating to Indian Point's Draft SPDES Permit.

113-k-AL/AQ/RG contd.

Conclusion

The Center supports the 20-year License Renewal (ESP) for the Indian Point nuclear power plant located in Buchanan, New York. We support this renewal because the facility is a positive structure for mitigating ground level air pollution, global warming and environmental injustice.

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MR. MCGRATH: How you all doing? I'm John McGrath from Easter Seals New York. I'm senior vice president of organizational development. I want to thank all of you for a chance to come out and speak. I look around this room and I'm a part of this neighborhood. I run four schools for children with severe disabilities throughout this area. We have a no ejection/no rejection policy. We take care of the kids that no one else will take care of. I look around this room and I see some faces I know and the reason I know those faces is because they work at Entergy. They come out to support us day in and day out. This is a group of people that made Christmas happen for 2000 poor families across the state of New York.

Now everyone can stand up here and talk about the environmental issues, that's not my place to comment. But I can tell you there will be thousands of children in New York that will not be served if Entergy it is not a part of our community. Remember that. Thousands of disadvantaged children with severe disabilities will not be served. They don't get a lot of press for it. They don't get a lot of accolades. We're not one of those United Way groups. We're not a sexy organization that's out there with a rock stars. We're not putting them in concerts, but there're showing up and digging ditches for us. They are spreading the mulch for playgrounds for disabled

114-a-SE

children. The union workers who come in on their free time and deliver presents to children that don't get presents on the holidays. So, think long and hard before you ask this group to leave our community. They are the backbone of everything we do. So, I want to thank you all for the opportunity to be here and I want to thank everyone of you who is connected with Entergy for all the charitable work that you've done for all the children that no one else cared about. Thank you very much.

114-a-SE contd.

MR. MIRANDA: Good afternoon. My name is George Miranda. I'm the president of New York Teamsters Joint Council-16. The Teamsters Joint Council-16, along with its 120,000 working men and women in the greater New York area, strongly supports the of the Indian Point Energy Center. Our members work at Indian Point and live in the surrounding neighborhoods with their families of Indian Point. Teamsters Joint Council-16 believe that this plant is 100% safe. Re-licensing Indian Point Energy Center is the right move for New York's union workers. Outside of it being the backbone of the downstate regions clean and affordable electricity supply, Indian Point employs thousands of highly skilled workers, including hundreds of unionized workers. In addition to scientists, physicists, security and maintenance personnel employed at the plant, there are hundreds of thousands of workers throughout the region who rely on the Indian Point’s continued operation for their survival and financial survival. At a time when New Yorkers are struggling and experts predict that the loss of 220,000 jobs in the state over the next two years, now is not the time to drive working men and women to the unemployment lines.

115-a-SA/SE/SO

Indian Point remaining open and operational is also a necessary component to creating a prosperous green energy economy. Through our years of work, the Teamsters Joint

115-b-SO

Council-16 and other unions have shown unwavering dedication to building a socially, economically and environmentally just New York City. We have worked to accomplish this by building new power plants. The construction of which creates new jobs, drives the cost of energy down and pumps millions of dollars into local economies.

As the government now looks for ways to stimulate our sagging economy, we should encourage considerable investments in new power plants and other clean energy technology. New Yorkers are now faced with a harsh reality. Governor Patterson and state leaders have reached a deal that would cut $1.6 billion in spending from critical priorities, including healthcare, education, human services and economic development. In New York City, where the collapse of the financial sector has caused a $4 billion shortfall, workers are faced with budget cuts totaling hundreds of millions and reduced services and fare hikes on mass transit. In light of these depression like numbers, the Teamsters believe we should be protecting the jobs provided and created by Indian Point, not eliminating them. Thank you for allowing me the opportunity to address this public forum on the concerns of union workers across New York City. The labor community believes that closing down a vital source of clean and affordable energy like Indian Point will jeopardize jobs and drain millions from local governments. It is the hope of

115-b-SO contd.

unionized men and women across the region that we work together to produce a solution that not only protects jobs and encourages investment, but also ensures a continuous supply of clean, safe and affordable energy for all of New Yorkers. Thank you. 115-b-SO contd.

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Washington, DC 2055-0001

RE: February 12, 2009 Public Hearing on the Relicensing of the Indian Point Energy Center

The Teamsters Joint Council 16, along with it's 120,000 working men and women in the Greater New York area, strongly supports the relicensing of the Indian Point Energy Center. Our members work at Indian Point and live in the surrounding neighborhoods with their families of Indian Point Teamsters Joint Council 16 believe that this plant is 100% safe.

Relicensing Indian Point Energy Center is the right move for New York's union workers. Outside of being the backbone of the downstate regions' clean and affordable electricity supply, Indian Point employs thousands of highly skilled workers including hundreds of unionized workers. In addition to the scientists, physicists, security and maintenance personnel employed at the plant, there are hundreds of thousands of workers throughout the region who rely on the Indian Point's continued operation for their financial survival. At a time when New Yorkers are struggling and experts predict the loss of 225,000 jobs in the state over the next two years, now is not the time to drive working men and women to the unemployment lines.

115-a-SA/SE/SO

Indian Point remaining open and operational is also a necessary component to creating a prosperous green energy economy. Through our years of work, the Teamsters Joint Council 16 and other labor unions have shown unwavering dedication to building a socially, economically and environmentally just New York City. We have worked to accomplish this by building new power plants, the construction of which creates new jobs, drives the cost of energy down and pumps millions of tax dollars into local economies. As the government now looks for ways to stimulate our sagging economy, we should encourage considerable investments in new power plants and other clean energy technology.

New Yorkers are now faced with a harsh reality. Governor Patterson and state leaders have reached a deal that will cut $1.6 billion in spending from critical priorities including health care, education, human services and economic development. In the New York City, where the collapse of the financial sector has caused a $4 billion dollar shortfall, workers are faced with budget cuts totaling hundreds of millions, and reduced services and fare hikes on mass transit. In light of these Depression-like numbers, the Teamsters believe we should be protecting the jobs provided and created by Indian Point, not eliminating them.

115-b-SO

Page 1 of 2

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Thank you for allowing me the opportunity to address this public forum on the concerns of union workers across New York City. The labor community believes that closing down a vital source of clean and affordable energy like Indian Point will jeopardize jobs and, drain millions from local governments. It is the hope of unionized men and women across the region that we work together to produce a solution that not only protects jobs and encourages investment, but also ensures a continued supply of clean, safe and affordable energy for all New Yorkers.

George Miranda
President
The Teamsters Joint Council 16

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MR. MIRANDA: Good afternoon, my name is Rick Miranda and as president and CEO of the Brooklyn Hispanic Chamber of Commerce, I rise today in support of the Indian Point Energy Center. Simply put, re-licensing Indian Point Energy Center is the right move for Brooklyn businesses. Our current economic downturn, poses a difficult challenge for business owners. Brooklyn's unemployment rate of 7.4% outpaces Manhattan, Queens and Staten Island and is at its highest level in five years. Revenues for half of Brooklyn's businesses were flat or down last year when compared to 2007. 116-a-SO/SR

Today, research shows more small business owners sense a bleak outlook for 2009 with roughly half saying they've been adversely affected by the sour credit markets. In light of these depression type numbers, the last hurdle we should place in front the business owners is the real possibility of higher energy prices. A recent survey ranked energy prices second behind providing affordable health insurance as the most severe problem Brooklyn businesses are facing. And make no mistake about it, closing Indian Point Energy Center would lead to drastic spikes in energy prices for Brooklyn business owners. 116-b-EC/SO

New York currently has the highest energy prices in the nation and independent reports have concluded that those prices could increase by over $10,000 a year for businesses if

Indian Point is closed. Business owner's should be spending to expand their markets, not to satisfy a volatile energy market. In these uncertain times, we cannot foster a welcoming business climate, where mom and pop stores, young entrepreneurs and family-run businesses are forced to spend precious dollars just to turn the lights on. Unstable energy prices also jeopardize our organization's mission of advancing the civic, commercial and industrial interest of Brooklyn's Hispanic business owners. Creating an environment where Hispanic business owners can succeed is a key goal of our organization and therefore we must prevent the further energy cost increase.

116-b-EC/SO contd.

Recognizing these goals, it is essential that the Indian Point Energy Center be re-licensed. We are grateful for the opportunity to address this public forum. We are hopeful that the concerns of the Hispanic business owners in Brooklyn are granted their rightful voice at the decision-making place. We urge cooperation by all parties who are served by Indian Point. It is our hope that we could all work together toward a solution that provides reliable stream of clean energy power for all New Yorkers. Thank you very much.

116-c-LR/SR

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(7)

February 27, 2009

Chief, Rulemaking, Directives and Editing Branch
Division of Administrative Services
Office of Administration, Mailstop T-6D59
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

To Whom It May Concern:

I have been a resident of the Lower Hudson Valley for more than 30 years and I am completely opposed to the relicensing of the Indian Point nuclear plant. This week I learned about yet another leak of radioactive material from the plant. This is a deteriorating facility which has passed its expiration date, was poorly located to begin with, and is not necessary to our energy future. It's time to shut it down, mop up and move on to cleaner energy and more comprehensive conservation programs.

117-a-AM/LE/OR

The Hudson River has been named an American Heritage River and is one of our most magnificent natural resources. For millennia it has been a source of food, but the functioning of Indian Point has killed billions of fish, their eggs and larvae, impacting even the endangered sturgeon population. The continuing leak of radioactive water has contributed strontium-90 and cesium-137 to the river, adding further to concerns about the health of all life in and near it. In this time when we are increasingly concerned about sustainable living, the Hudson should be cleaned up as quickly as possible so it might once again become a viable resource for the Hudson Valley rather than a soup of industrial chemicals and radioactive pollutants.

117-b-AM/LE

Closing Indian Point and removing the tons of radioactive waste products stored onsite would be an inspired step in that direction. It would also remove what has been acknowledged as a prime target for terrorist attack. This plant is located in one of the most densely populated areas in the nation and an attack here would be disastrous for the whole country.

Let's not waste any more time and money struggling to keep Indian Point alive. Those precious resources could be much better used to help heal our river and build an energy program for a sustainable future.

117-c-DE/ST

Thank you.

Sincerely,

Grace Mitchell
Box 55
Sparkill, NY 10976

MS. MONTAGUE: Good afternoon. Again, my name is Virginia Montague and I'm president of the New York Coalition of 100 Black Women. I'm here not necessarily as a representative speaking on behalf of the organization, but in our name its black women. We are advocates for black women, their children and their families. I am also here to give rise, to give voice to those who have woefully, we believe, under-represented in this ongoing debate and that is the children and families of Harlem. On behalf of these two Harlem constituencies, and children and families throughout New York City, communities of color, I stand here today in support of re-licensing Indian Point Energy Center. I would like to first put a face on these consumers of this energy.

We've already experienced a lifetime of bad environmental decisions and cannot withstand additional threats to our health and safety. Harlem is already home to one-third of Manhattan's eight bus depots, one of the two sewage treatment plants and both a garbage truck depot and parking lot. There are seven local truck routes from 96th St. to 125th St. alone. An estimated 25% of the thousands of trucks running through Harlem each day violate state emission standards. In addition, in nearby Bronx and Queens, there's an extremely high concentration of fossil fuel burning power plants, which pollute

118-a-AQ/ EJ/SR

our neighborhoods with carbon dioxide and other pollutants.

As this debate has taken shape, these neighborhoods have received no reassurance that any power plant built to replace Indian Point, will not once again end up in or near our neighborhood. These environmental policies of the past have already taken a severe toll and Harlem has had one of the highest asthma rates in the country with one in four children suffering from the disease.

In addition, asthma causes more hospitalization among Harlem children than any other disease and is among the leading cause of missed school days. The picture becomes even more bleaker when we realize that asthma is also one of the leading causes of death among our children. It is clear that continuing down a path where public policy places further air polluting power plants in our neighborhoods cannot and will not be allowed. Although the youth of Harlem faces a myriad of challenges, we must also remember that single women with children in Harlem also deserve a voice in this debate. The impact of higher priced fuel and energy has pushed poor families led by single women with children to the brink. Harlem families are spending and increased amount of their income to keep pace with rising energy costs.

Whether it's through high home heating oil bills, which this year estimated to reach $2000 a year, to electricity

118-a-AQ/EJ/SR contd.

118-b-EC/EJ/SR

bills, which this year jumped 58% over last year. We find more poor families are having to choose between which bills to pay and have little left over for educating their children, health care or even savings accounts. It is not just in the form of increased heating oil and electric bills that poor families pay for high energy costs, these families are hit once again at the supermarket, the laundromat and even transit. But when subway and bus fares increase, in communities where 38% of the families live below, the energy cost remains stable. So we believe shutting down Indian Point Energy Center without viable and reliable energy production already in place will cause energy prices to soar and place these already at risk families into further jeopardy. Again, we do indeed support the re-licensing of this energy plant.

118-b-EC/ EJ/SR contd.

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Westchester
County Association

William M. Mooney, Jr.
President

12/31/08
73FR 80440
(29)

March 6, 2009

Mr. Samuel J. Collins
Regional Administrator
U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415

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2009 JUN -3 PM 2:46
RULES AND DIRECTIVES BRANCH

Dear Mr. Collins:

As President of the Westchester County Association, I would like to offer our organization's strong support for the relicensing of Indian Point. — 119-a-SR

In focusing on the long-term needs of our region, the issue of energy is one of the three most identified issues most often identified by my members. The availability of affordable, reliable baseload power is critical to creating jobs, stimulating investment and growing our economy. Indian Point does just that. — 119-b-EC/SO

Not only does Indian Point produce more than 2,000 megawatts of reliable baseload power – but it produces it in an emission's free manner. It is also responsible for an economic impact approaching three-quarters of a billion dollars, and also responsible for more than one thousand jobs. In these tight economic times, those facts clearly speak for themselves. — 119-c-AQ/EC/SO

Indian Point's operator Entergy is also an important presence in our community – donating millions of dollars to schools, health care facilities and other worthy causes. And Indian Point is an important steward of the environment – helping New York achieve the distinction of having one of the lowest per-capita carbon emissions counts in the nation. — 119-d-AQ/SE

As you continue your deliberations, I ask you to look at the facts carefully. When evaluated using a sober and reasonable approach, I am sure you will agree that Indian Point remains a critical component of our region's energy supply, which provides the economic and environmental benefits that our region rightfully deserves. — 119-e-EC/GI/SO

Thank you for the opportunity to share our views, and I strongly urge you to support the relicensing of Indian Point. — 119-f-SR

Sincerely yours,

William M. Mooney, Jr.

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REGION 1
2009 MAR 11 PM 1:51

THE WESTCHESTER COUNTY ASSOCIATION, INC.
1133 WESTCHESTER AVENUE, SUITE S-217 WHITE PLAINS, NEW YORK 10604
Tel: 914 .948 .3671 www.westchester.org Fax: 914 .948 .6913

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Add = A. Stuyvenberg (ALS3)

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Template = ADM-013

MR. MOONEY: My name is Bill Mooney, President of the Westchester County Association and I come to you today in support of the Indian Point re-licensing by the NRC. Focusing on the long-term region needs of our region, the issue of energy is one of the most identified issues most often identified by our members. The availability of affordable, reliable base-load power is critical to creating jobs, stimulating investment and growing our economy. Indian Point does that obviously. Not only does Indian Point produce over 2000 Mw of reliable base-load power, but it produces it in an emissions-free manner. It's also responsible for an economic impact approaching three quarters of $1 billion, a huge economic engine. And also responsible for more the 1000 jobs. In these tight economic times, those facts speak clearly for themselves. Indian Point operator Entergy is also an important presence in our community. Donating millions of dollars to schools, health care facilities and other worthy causes. Indian Point is also important steward of the environment helping New York with the distinction of having one of a lowest per capita carbon emissions count in the region. In the nation, as a matter of fact. As you continue your deliberations, I ask you to look at the facts carefully when evaluating. Using a sober and reasonable approach, I'm sure you'll agree that Indian Point remains a critical component of the region's energy supply, which provides the economic and

119-g-EC/SO/SR

119-h-AQ

119-i-SO

119-j-SE/SR

environmental benefits that our region deserves. Thank you for the opportunity in sharing my thoughts.

119-j-SE/SR contd.

DR. MOORE: Thanks very much for the opportunity to present on behalf of New York area this evening. My name is Patrick Moore. I'm a cofounder of Greenpeace. Former leader of Greenpeace and Chair of the Greenpeace Greenspirit Strategies, Ltd. and adviser to New York Affordable Reliable Electricity Alliance. I'd just like to make three key points to start. First, nuclear energy is reliable and affordable. This is proven through 50 years of history that it has been a reliable source of power that has given 24/7 electricity to people in the United States and has done so at a reasonable cost. Nuclear power is safe. Again, in 50 years of history, no member of the public has ever been harmed by a nuclear power plant in the United States. Even Three-Mile Island, which is always mentioned as a terrible accident, was a bad mechanical failure. But nobody was damaged because the radiation was contained within the containment dome that was built by engineers to do that in the event of an accident. In addition, it's safe to work in a nuclear plant not to just live near one.

120-a-EC/SA

A study of 54,000 nuclear workers by Columbia University published in 2004 showed that they have fewer cancers and live longer than their counterparts in the general population. This is just a plain fact. That's a lot of workers who are working in nuclear plants every day of their lives.

120-b-HH

Nuclear energy has strong environmental benefits and that's really the main reason why I'm associated with this project. To make sure that we continue to build nuclear power because it is good for the environment compared to the alternatives, especially compared to fossil fuels, which are making our air dirty and giving us health problems. That is why the American Lung Association supports nuclear energy. The American Lung Association is concerned about air you're breathing. They're totally focused our health. They support nuclear power because they know it's superior to burning fossil fuels. It would take at least five large natural gas plants, and I mean large plants, to replace Indian Point. Nobody would fool themselves into thinking that if Indian Point was shut down, you don't need to replace the power. That power is running the subways in New York. It's running the trains that go into the City every day with people in mass transit. It's running the hospitals. It's running the apartment buildings. It's running people's lives and keeping them with heat and keeping them with cooling. You cannot just shut that down unless you replace it with something. Whenever I'm asked, well if Indian Point was shut down, what do you replace it? I always say that's simple, another nuclear plant. Because that would be the best thing to build.

120-c-AL/ AQ/EC

Not long ago, Robert Kennedy Jr. of Riverkeeper was talking about the work he's done over the years on bringing back

120-d-OS

the health of the Hudson River. He was talking about how back in 1966 this river was dead for 20 mile stretches because of chemicals from the chemical industries. That the environmental movement, I give him some credit for being in that, helped clean it up. Then he said, very recently, quote today it's the richest body of water in the North Atlantic region producing more pounds of fish per acre than any other waterway in the Atlantic Ocean north of the equator unquote. Now, just for convenience sake, he's decided to forget that he said that even though it's the truth, the Hudson River has been brought back to health, and now he's accusing Indian Point of killing the fish in the river. A billion fish per year. Well, they say a billion fish when they really are talking about fish eggs. There's a big difference between a fish egg and a fish. That plant has a screen on it to prevent fish of any size from coming into it and being harmed. It's true that fish eggs can go in through the intake. If there's a billion fish eggs going through Indian Point every year, imagine how many fish eggs there are in that river. It's only taking a very small portion of the river inside to keep it cool. So this is a totally misleading and phony allegation about the plant killing fish. The fish in the river are healthy.

As a matter of fact, there’s more striped-bass in there than there has been since they started measuring them.

120-d-OS contd

120-e-AE

120-f-AE

That's one of the reasons why some of the other fish are going down the numbers because the striped-bass are eating them. In addition, there's an over-fishing problem out in the ocean for some of these fish that come in from the sea to spawn. The fisheries people have said that very clearly, that there's an over-fishing problem. If Riverkeeper is really concerned about the health of the Hudson River, they should focus on trying to stop the over-fishing that's going on if they think there are some fish stocks which are damaged rather than using Indian Point as a scapegoat. Because it's not causing any problem for the fish out in the river. 120-f-AE contd.

MR. RAKOVAN: Sir, if you could complete, please.

DR. MOORE: I should probably stop now. I have a lot to say here.

MR. RAKOVAN: We can take it all in written form if you'd like.

DR. MOORE: It is. It's in written form if anybody would like a copy of this. I'm sure it's available. And right on everybody for turning out tonight. Thank you.

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Dr. Patrick Moore
Co-Founder of Greenpeace and
Advisor – New York Affordable Reliable Electricity Alliance
Prepared Remarks to the U.S. Nuclear Regulatory Commission
Indian Point Environmental Impact Hearing
February 12, 2009

Introduction

Good evening.

My name is Dr. Patrick Moore. I am a co-founder of Greenpeace, former Greenpeace leader, Chair of Greenspirit Strategies Ltd and advisor to the New York Affordable Reliable Electricity Alliance.

Thank you for the opportunity to speak to you this evening about why, from an environmental perspective, nuclear energy and Indian Point are so important to the energy future of downstate New York.

I have often said – and I continue to believe – that there are few places where nuclear power makes as much sense or is as important as in New York. Indeed, the state is a microcosm of the challenges America and the world face to have ample, clean and reasonably priced electricity.

Let me make three key points.

Nuclear energy is reliable and affordable

Nuclear energy makes economic sense. The cost of producing nuclear energy in the United States is on par with coal and hydroelectric. That's a very important consideration in New York, which has the country's second-highest electricity costs. This impacts the poor and elderly, in particular, and makes it difficult for the business sector to operate efficiently as well.

120-g-EC

Nuclear power is safe.

Worldwide, nuclear energy is one of the safest industrial sectors. Here in North America, no one has been harmed by a radiation-related incident in the entire history of civilian nuclear power generation. Indeed, it's proven safer to work at a nuclear power plant than in the finance or real estate sectors.

A 2004 Columbia University Study of 53,000 workers concluded that "…nuclear power plant workers in the United States…live longer and have significantly lower cancer rates compared to the general population."

120-h-OP/HH

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Very much related to the topic of safety, people often talk about the dangers of nuclear waste. The notion is misleading, as used fuel is not all 'waste'. After its first cycle, spent fuel still contains 90 percent of its energy. Future generations will be able to put this valuable resource to work, powering the country. Used nuclear fuel is one of America's most important future domestic energy resources.

120-h-OP/HH contd.

Nuclear energy has strong environmental benefits

Nuclear energy has the lowest impact on the environment – air, land, water and wildlife – of any major energy source. Not only does it produce no harmful greenhouse gases or controlled air pollutants, but its waste byproducts are isolated from the environment.

In addition, nuclear energy requires less land to produce the same amount of electricity as any other electricity sources.

Nuclear power plants improve air quality by reducing smog. It is well established that this pollution has harmful health effects, especially for children and the elderly. This needs to be addressed now. Downstate New York arguably has the worst air quality of any region in the country, thanks to high levels of ozone and particulate pollution.

U.S. EPA recent statistics about New York show that pollution from coal power plants shortens the lives of 1,212 citizens annually, causes 164,612 lost workdays, 1,191 hospitalizations, and 28,665 asthma attacks.

120-i-AL/AQ/GI

More on Indian Point

I would like you to consider the following points about Indian Point nuclear facility:

1) Indian Point nuclear plant makes New York a cleaner, healthier place

- Indian Point mitigates 14 million tons of CO2 annually. In fact, New York has one of the lowest per capita CO2 emissions of any state, because nearly 50 percent of its electricity comes from nuclear and hydroelectric plants.
- The American Lung Association's State of the Air 2007 gives several counties in New York State failing air quality grades and the U.S. EPA says New York has some of the worst air in the country. The situation would be even worse without Indian Point.
- It would require four to five natural gas fired power plants to replace Indian Point's 2,000 megawatts of electricity. This would increase toxins and airborne particulates significantly, which we know are linked to asthma and other respiratory illnesses.

120-j-AL/AQ

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2) Indian Point is compatible with a clean, thriving Hudson River

- Back in the early 1970s when my colleagues at Greenpeace were advocating for fundamental environmental changes, the Hudson River was extremely polluted, "dead" in some areas, and was an international disgrace. Since then, Indian Point's two nuclear plants were built.

- Robert Kennedy Jr., the leader of Riverkeepeer, has said, and I quote, "This waterway was a national joke in 1966 … It was dead water for 20-mile stretches north of New York City, south of Albany. It turned color. It caught fire … Today it's the richest body of water in the North Atlantic region, producing more pounds of fish per acre than any other waterway in the Atlantic Ocean north of the equator."

- Indian Point not only is compatible with a clean Hudson River, but by mitigating pollution from other plants that causes the release of other harmful substances, including acid rain, it makes the Hudson cleaner.

- Riverkeeper has recently claimed there is:

  "the slaughter of billions of fish, eggs and larvae every year that results from Indian Point…"

  As a lifelong student of marine ecosystems, I can say categorically that this statement is misleading at best. Billions of fish cannot possibly be at risk because the plant goes to great lengths to screen out fish at the water intake. It is not possible for a fish of any size to enter the cooling system.

  It is also basic fish biology that each productive female fish produces thousands of eggs, and only a very small percentage of those eggs will normally result in fry. If Indian Point is killing a billion fish eggs imagine how many trillions of fish eggs there are in the Hudson River.

- Water flow at Indian Point is reduced during spring months to optimize fish spawning conditions. Studies conducted during the last 25 years demonstrate that the relatively small number of larvae and eggs that enter the plant have no impact on the Hudson River's overall fish population. **In fact, fish populations in the Hudson are on the rise**.

- **Moreover,** Indian Point uses high-tech underwater screens to prevent fish as small as a finger from entering the plant in the water that is used for cooling. The screens slowly rotate to ensure that young fish caught near them are transported to a device that safely returns the fish to the river away from the water intake structures.

120-k-AE

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3) Nuclear energy from Indian Point is much safer than the alternatives

- If the power generated by Indian Point nuclear plant was replaced with coal power almost 6,300 tons of SOx emissions and over 1,400 tons of NOx emissions would be released into the New York air every year. Also released would be 48 tons of particulate matter and almost 1,500 tons of CO would enter the atmosphere.

- Replacing Indian Point energy with natural gas energy isn't much better: 212 tons of SOX and 679 tons or NOX emissions per year would be released. 143 tons of CO and 118 tons of particulate matter would also be generated from creation of natural gas energy.

120-l-LE

- As to safety issues raised: Dry casks storage and spent fuel pools at Indian Point are not particularly vulnerable to terrorist attack. Consider that water serves as a natural—and one of the most effective—barriers to radiation. This is why spent fuel is stored in pools. The fuel is contained neatly in fuel rods in a 40 foot deep pool. The racks stand 13 feet high leaving the fuel completely contained and safely submerged under 27 feet of water.

- The spent fuel pool for Indian Point 1 is in a fully-enclosed concrete building. Both Indian Point pools are 99% to 100% underground making them virtually impossible to compromise from the sides. The roof of the spent-fuel pool building has no nuclear safety function. Damage to it would not have safety consequences. The fuel pools can easily be re-filled with water and have several backup mechanisms for doing so. In fact, it is highly unlikely there would be significant off-site radiological consequences even if the pools were drained of their water.

- Casks are placed upright on a concrete pad and are hardened structures capable of withstanding natural disasters and terrorist attacks. The canister/cask system is very robust, about 20 feet in height and 11 feet in diameter, with a cask wall that is over two feet thick and a total loaded weight of about 360,000 pounds.

120-m-RW/SF

- And finally, the plants and property at Indian Point Energy Center are monitored around the clock, 24 hours a day, seven days a week by well-trained, armed security guards, both at guard stations and in constant patrols. The **security force rivals the size of most local law enforcement troops, and is comprised of highly trained officers.** They attend fire range practice on a regular basis. These are extremely hardened targets.

120-n-ST

Some have mentioned leaks. Let me say a couple of words about that:

- Once discovered, Entergy immediately took steps to identify and mitigate leakage of strontium-90 and tritium from the spent fuel pool of the non-operating Unit 1 plant and tritium from Unit 2 pool. Entergy installed a water purification system to remove more than 95% of SR-90 from the Unit-1 pool water.

120-o-LE

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- To stop leakage permanently, Entergy moved up its timetable to 2008 for removing the spent fuel and draining the water from pool. Entergy also installed more than 35 monitoring and sampling wells after its initial detection in September of 2005.
- In addition, Entergy has continued to inspect the inner liner of the IP2 pool with **no reports of any active leaks to date.**

120-o-LE contd.

Conclusion

In order to meet New York's energy needs going forward, and to continue to do so in an environmentally responsible manner, we must mobilize all the clean energy sources available. The time for common sense, for scientifically sound decisions on energy and support for nuclear power generation is here and now. Thank you.

120-p-SR

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ML090771332

IPRenewalCEmails

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From: Chad Murdock [kcmurdock@gmail.com]
Sent: Wednesday, March 18, 2009 12:15 PM
To: IndianPointEIS Resource
Subject: Indian Point Relicensing

To: IndianPoint.EIS@nrc.gov
Indian Point Nuclear Plant Relicensing?
Please don't let it happen!

>It should never have been sited there in the first place in such a heavily populated area with constrained egress. — 121-a-DE/OR

>It is near the end of its designed life. As a research chemist I understand corrosion, radiation damage and concrete. The operators have so far been unable to stop the daily leakages into groundwater and the Hudson of radioactive strontium, cesium and tritium, etc. As intensely radioactive core components continue to deteriorate, sometimes unexpectedly, how do we avoid disaster and replace them without volunteers for suicide or astronomical costs to ratepayers? — 121-b-AM/LE

>Concern for citizens and their descendants must take priority over short-term corporate and stockholder profits. If worst comes to worst we know who will suffer the damages and pay the price to clean up the radioactive fallout. — 121-c-OR/PA

Respectfully submitted,

K.C. Murdock, Ph.D.
15 Birch St.
Pearl River, NY 10965

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IPRenewalCEmails ML090640396

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From: Murphy, Regina A. [RAMurphy@scny.org]
Sent: Tuesday, March 03, 2009 2:19 PM
To: IndianPointEIS Resource
Subject: Indian Point Reactor

Dear Friends,

I am vehemently opposed to the license renewal of Indian Point Nuclear Generating Units for two reasons:

1) The danger to human life. Indian Point is located in one of the most densely populated areas in the U.S. Approximately 20 million people live within a 50 mile radius of the plants. I live about 20 miles south of the reactors. If there were a terrorist attack or an accident in the spent fuel pools, the catastrophe would make September 11 attack on the World Trade Center look miniscule.
The most recent leak(Feb.20,2009) of radioactive water at IP2 is an example of what has been happening routinely for years. It is said that this most recent leak had tritium concentrations of only 1/10 the allowable concentrations allowed by federal clean water regulations for drinking water. Previous tritium leaks at IP@ came from its spent fuel pool in concentrations that were 25 times the acceptable EPA level. Personally, I think only NO level of tritium is acceptable for drinking water.
2) The negative environmental consequences: Billions of fish, eggs and larvae are slaughtered every year because of the outdated cooling system at IP. Shortnose sturgeon (an endangered species) and Atlantic sturgeon are killed when they are trapped against the cooling water intake screens at the plants.

Yes, we need sources of energy but we should be able to and be encouraging alternate forms of human and ecologically friendly sources which would also create jobs.

Thank you for your invitation to comment on this matter.

Sr Regina Murphy

Sr. Regina Murphy
Property Director
Sisters of Charity
718-549-9023 ph
718-884-3013 fax
rmurphy@scny.org

122-a-DE/PA/ST

122-b-LE

122-c-AE

122-d-AL

MR. MUSEGAAS: Well, I think I need to start out by saying that this is probably the first time in my memory that Fred Dacimo and I have agreed on something regarding Indian Point and that is we agree with Fred that the impacts on fish that was concluded by the NRC, that the impacts on bluefish are large. We think that's wrong as well. So, interesting day indeed for the Indian Point case. On the other hand, we think that the rest of the impacts on numerous other Hudson River fish species are actually large and so basically we believe the reverse is true. We think they got wrong in the bluefish because the impacts are not proven and they got it wrong on the rest of the fish species that are of concern because we think the impacts are out there and are proven. I'll just give a couple of brief comments on the fish and on nuclear waste concerns and then we will be filing detailed written comments in the middle of March that will go into much more detail on these issues. 123-a-AE

As far as the impacts of the once-through cooling system at Indian Point on Hudson River fish species, Indian Point's once antiquated once-through cooling system kills billions of fish eggs and larvae every year through entrainment and impingement. This contributes to the overall decline of Hudson River fish species. Riverkeeper commissioned a report of 123-b-AE

fish biologists last year in the summer that found that 10 out of 13 Hudson River signature species were in decline. We found, and I think the state of New York, the Natural Resources Defense Council, other environment organizations, all have found that Indian Point's once-through cooling system contributes to these declines. Entergy's biologists and apparently NRC's biologists seemed to be to be the only ones that disagree with this. In terms of that, I'd like to backtrack a little and just also say we disagree with the NRC's preliminary findings that the range of environmental impacts would not preclude license renewal. Wee find it hard to understand since when you're looking at the fish impacts for example, the NRC admits that they're not sure what the impact are that they could range from small to large. This is like saying the weather forecast for tomorrow is, it's going to rain or maybe not. Or the range of impacts, on a scale of 1 to 10, and it could be 1 and it could be 10. To us that is not a conclusion that's an inconclusive statement that doesn't really help us determine what the environmental impacts of this plan are on the Hudson River. So, we disagree with that. I'll move on, I know my time is short.

123-b-AE contd.

123-c-AE

As far as spent fuel nuclear waste storage at Indian Point, the NRC continues to rely on an outdated generic environmental study that is 13 years old. Has not been updated in 13 years, this is from 1996. It does not deal with

123-d-GE/SF

groundwater leaks. Does not deal with spent-fuel pools leaking and refuses to assess any impacts or potential impacts of either accidents or sabotage or terrorist attack on spent-fuel pools or dry cask storage. That is unacceptable to us. We disagree with that. We think there should be a site-specific assessment of environmental impacts caused by this nuclear waste storage. 123-d-GE/SF contd.

There are 1500 tons of nuclear waste on this site right now. There will be another 1000 tons produced at the site if the plant is re-licensed. There is nowhere to put this waste. There's nowhere to store it. It's going to pile up on the Hudson River. It's going to sit there in leaking spent-fuel pools and sit there in dry casks that are lined up by the side of the hill like bowling pins. You can see it from the Hudson if you're on a boat. We don't think that's safe. We don't think it's wise. It looks like they may be almost out of time. Our concerns about spent-fuel are well recorded. We've been talking about this issue for years. We would encourage the NRC to, if they are planning on updating the GEIS, we think that should happen sooner rather than later. The fact that they continue to rely on an outdated GEIS is just simply, basically ridiculous. 123-e-RW/SF 123-f-GE

Just one note -- I want to note on the restoration alternatives that Drew talked about as one of the alternatives to once-through cooling. Indian Point is located in the 123-g-AL

jurisdiction of the Second Circuit Court of Appeals, the federal court system. The Riverkeeper 2 case, which was decided in the Second Circuit basically found that to comply with the Clean Water Act and to comply with Section 316(b), which has to do with cooling water systems at power plants, you are no longer allowed to use restoration measures or mitigation measures to offset the impacts of the cooling system. So, I'd be interested to hear more information about that as to how they think that is a viable alternative since it is potentially illegal in New York to propose that type of solution. Thank you.

123-g-AL contd.

To Whom It May Concern,

My name is Melissa Myslinski, I am an Environmental Studies major at Ramapo College of New Jersey. I had the opportunity to review the DGEIS and have some written comments to add on the relicensing of Indian Point Units 2 and 3. The following points are the issues that I feel were left out of the DGEIS.

On page 8-1 it says that, following the shutdown of each unit, decommissioning requirements in the 10 CFR 50.82, "Termination of License." Full dismantling of structures and decontamination of the site may not occur for up to 60 years after the plant shut down. This means that the spent fuel rods can sit on the site for the next 60 years and no one would be attending to them, if there was a leak in the containment units. Also, The National Academy of Science concluded that early planning, sufficient resources were dedicated to replacing lost capacity and meeting expected increase demand, the reactors could be retired without major disruption in the grid, and Indian Point can be replaced. Also, under the section of alternatives there were certain alternatives that I feel were left out, and could potentially help in replacing Indian Point. For example, there was no mention of the the New York Regional Interconnect (NYRI) in the DGEIS as an additional alternative. The project would bring significant economic, environmental and electric system reliability benefits to the State of New York. The NYRI has the potential of bringing 1200 MW of energy to the area surrounding Indian Point. This transmission line would bring plenty of clean power to the area if Indian Point were shutdown. Another alternative to mention in the DGEIS is the conversion of Landfill gas into energy. Landfill gas could provide 6MW of energy to New York State. Throughout the impact statement there is no mention about the poor population in the area who rely on the fish in the Hudson as a source of food. They are being indirectly exposed to radiation through the fish in the Hudson. Also, the testing of radiation levels are based on 20-30 years old males. The elderly people and young children are improperly represented when there is testing for radiation. A large problem for the Indian Point power plant is the evacuation plan, which needs to be looked at in greater detail. There is no way to evacuate this high populated area living in the area surrounding Indian Point. Finally, the plant does not have enough protection against earthquakes. Being that there has been a large increase in activity along the Ramapo fault line this could cause serious damage to the radioactive units.

Thank you for considering my points in the the relicensing of the Indian Point nuclear rectors unit 2 and 3.

Sincerely,

Melissa Myslinski

124-a-AL/RW/SF

124-b-EJ/EP/HH/PA

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To: Mr. Drew Stuyvenberg
Project Manager
U.S. Nuclear Regulatory Commission
In reference to: Supplement 38

My name is Jessica Nemeczek and I am a member of the Environmental Seminar class at Ramapo College of New Jersey. I have had an opportunity to review Supplement 38 and wish to submit the following comments on the relicensing of Indian Point Units 2 and 3. The following are points I feel should be added to the DSEIS.

The Emergency Planning Guide distributed to the four counties in the 10-mile radius is provided in only English in Orange, Rockland, and Putnam Counties and English and Spanish for Westchester County. There is no available Emergency Planning Guide in any other languages. The ten mile radius in the Emergency Planning zone is highly diverse with many languages spoken. The Emergency Planning guide is distributed but there is no guarantee that the communities will be familiar with evacuation procedures. Also, there is no evacuation procedure or evacuation education for people traveling through the area on highways, roads, in malls, restaurants and in workplaces.

During an evacuation, some roads will become one way. School busses will need to make multiple trips back and forth to schools to evacuate all students. Clear routes need to be accessible to school busses. The Emergency Planning Guide relies on the event occurring during school hours. There is also no plan for unsupervised children to be accounted for and evacuated if an emergency happens when children are out of school. What if children are at clubs, summer camp, lessons, the mall, movies or other places? There needs to be an accountability plan among families and communities.

125-a-DE/EP

There are no planned practice evacuations mentioned in the DSEIS. Current evacuation routes may not be effective in a time of emergency. There should be drills that simulate an emergency evacuation. Drills should practice moving all people, a large number, and incorporate real actions. This will help prepare for the unexpected.

FDR Veterans Hospital, Helen Hayes Rehabilitation Hospital, Hudson Valley Hospital and Sing Sing are all within the evacuation areas yet have no mention in the DSEIS. Places such as these need to have separate and thorough evacuation procedures. Hospitals and correctional facilities need to have reception centers with routes planned out.

In the event of an emergency, the Evacuation Plan says that men and women of child bearing age can opt out in assisting in the evacuation. This includes the majority of teachers, EMT's, police, firefighters, nurses and doctors. If these people are evacuating themselves, who is to help with the actual evacuation? For example, who is to assist with guiding traffic, helping the injured, assisting children out of schools? Some issues are car accidents or fire, no one working gas stations, weather and other secondary issues.

These are some issues that I had after reading the DSEIS. I feel these pertinent issues should be addressed before relicensing of the Indian Point Nuclear Power Plant

125-b-EP

Sincerely,
Jessica Nemeczek

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ML090650457

NRCREP Resource

From: Janet Newman [janetnewman@optonline.net]
Sent: Monday, March 02, 2009 4:16 PM
To: NRCREP Resource
Subject: Response from "Comment on NRC Documents"

12/31/08
73 FR 80440

Below is the result of your feedback form. It was submitted by

Janet Newman (janetnewman@optonline.net) on Monday, March 02, 2009 at 16:16:29

(3)

Document_Title: GEIS FOR LICENSE RENEWAL OF NUCLEAR PLANTS - INDIAN POINT UNIT NOS. 2 & 3 (NUREG - 1437,Supple/ment 38)

Comments: I live within 10 miles of the Indian Point Nuclear Plants and I oppose their license renewal because:

126-a-DE/RW/SF/ST

1) They are unsafe for a highly populated area:
the long-term spent fuel storage tanks and dry casks are poorly maintained and vulnerable to terrorist attack.

126-b-AE

2) They are killing billions of fish and fish eggs every year including Atlantic Sturgeon and Shortnose Sturgeon, endangered species.

126-c-LE

3) They continue to leak radioactive water from Indian Point 2 spent fuel pool into the ground and into the Hudson River.

126-d-LE/RI

4) Residual contamination caused slow leaching of toxic strontium-90 and cesium-137 into the Hudson River via plumes of contaminated groundwater.

organization: West Branch Conservation Association

address1: 46 South Mountain Road

address2:

city: New City

state: NY

zip: 10956-2315

country: United States

phone: 845 634-5123

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2009 MAR -3 PM 4:40
RULES AND DIRECTIVES BRANCH

MR. NICKLAS: Good evening. Thank you for having me. My name is Donald Nicklas. I'm a Local 7 Carpenter. I have no doubt that obviously everybody who's come here tonight before you has spoken from their heart and firmly believe everything that they've told you. Although I am definitely an advocate for the re-licensing of IP-2 and 3 reactor sites, you know, I do believe some of the things they're saying. Sure, we can do better with our spent fuel. But having worked at the reactor before, I can assure you that I personally feel completely safe. I would actually take a trip there for my family to see it if that were actually allowed. 127-a-SA/ SR

One of the things that has not been mentioned tonight is no Nuclear Regulatory Commission, no Army Corps of Engineers nor any other committee that can be brought together to determine any kind of environmental impact when it's, as it relates to the production of energy for our needs, is going to come back and submit any kind of publishing that has a zero impact. Let us not be naïve. Anything that we do to produce any kind of energy that we need from now into the future is going to have some sort of impact. So we have to look at the big picture and say which is the lesser of the evils. 127-b-EC/ SO

Personally I feel nuclear energy is the lesser of the evils. If we want to talk about leaching of waste into our drinking water, nobody has come up here and talked about the effects of methyl 127-c-AL/ SR

butyl ethylene in our drinking water. If anyone doesn't know what I'm talking about, that's in all of our gasoline. Leaching from every gas station into all of our drinking water supplies. Nobody has come up here and mentioned that once. Everybody wants to sit up here and bash Indian Point and no one wants to talk about where we stop and get our gasoline. I don’t understand that. I know that everybody's very passionate about this issue. I'm pretty passionate about it to. I'm currently laid off and I'm going back to work next week at Indian Point. So I'm thankful, and sure, maybe I am a little biased because I'm going to be employed once again there at the reactor for the refueling outage. But, you've got to understand this is definitely the future of our energy. I know a lot of you don't agree with that. I do. I appreciate you listening to what I have to say. Thank you.

127-c-AL/SR contd.

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

COMMENTS ON

THE NRC STAFF'S DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

FOR THE

LICENSE RENEWAL OF
INDIAN POINT UNITS 2 AND 3, BUCHANAN, NEW YORK

submitted to the United States Nuclear Regulatory Commission

March 18, 2009

4

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
COMMENTS ON
THE NRC STAFF'S DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE LICENSE RENEWAL OF
INDIAN POINT UNITS 2 AND 3, BUCHANAN, NEW YORK

March 18, 2009

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C. The NRC Staff Has Failed to Adequately Assess the Impacts to Endangered and Candidate Threatened Species from the Continued Operation of Indian Point's Once-through Cooling System.

1. The Draft Supplemental EIS Does Not Include the Required Endangered Species Biological Assessment for Continued Operation of Indian Point that Is Complete, or Complies with the National Marine Fisheries Services Requirements.

2. The Draft Supplemental EIS Is Incomplete Because NRC Staff Failed to Submit an Essential Fish Habitat Assessment, as It Is Required to Do under the Magnuson-Stevens Fishery Conservation and Management Act, and Thus, It Is Not Acceptable for Public Review and Comment under NEPA.

3. Summary of the Department's Position

IV. SPENT FUEL POOLS AND THE THREAT OF TERRORIST ATTACK

A. The NRC's Generic EIS and the Draft Supplemental EIS Fail to Review the Safety of the On-Site Storage of Spent Fuel and the Consequences of a Terrorist Attack on the Spent Fuel Pools at Indian Point.

1. Substantial Evidence Exists that the Threat of a Terrorist Attack Is Real, Yet It Has Never Been Included in Any Environmental Review for Indian Point.

2. The Numerous Efforts by the Government and Others to Report and Analyze the Threat of a Terrorist Attack at Indian Point Demonstrates That It Is Credible and Real.

3. The Analyses of Radiological Release from the Containment Structures of Indian Point, and the Resulting Conclusions, Do Not Apply to the Spent Fuel Pools.

4. The NRC Staff Should Consider Mitigation Measures in the NEPA Review that Address the Threat Posed by the Vulnerability of the Spent Fuel Pools at Indian Point.

5. Summary of the Department's Position

V. EMERGENCY EVACUATION PLANNING

A. The NRC's GEIS and the Draft Supplemental EIS Fail to Review the Adequacy of the Emergency Evacuation Plan for Indian Point.

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1. The Indian Point Evacuation Planning Issues Have Not Been Addressed in Either the Generic EIS for Nuclear Power Plant License Renewals, or in the Draft Supplemental EIS.

2. The Unique Situation and Challenges Posed by Indian Point Require a Full Review of the Emergency Evacuation Plan in the Supplemental EIS.

3. The Legal Conclusion that First Responders Will Perform as Trained Is Undercut by Actual Experience during Hurricane Katrina and by Information Received from First Responders Located in the Communities Surrounding Indian Point.

4. Mitigation Measures that Address Emergency Evacuation Planning Concerns for Indian Point Exist and Must Be Considered in the NEPA Review.

5. Summary of the Department's Position

VI. CONCLUSION

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
COMMENTS ON
THE NRC STAFF'S DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE LICENSE RENEWAL OF
INDIAN POINT UNITS 2 AND 3, BUCHANAN, NEW YORK

March 18, 2009

I. INTRODUCTION

Despite the ongoing license renewal application process for Indian Point, the federal government has never conducted a complete and thorough environmental review of this nuclear generating facility. The Nuclear Regulatory Commission's Draft Supplemental Environmental Impact Statement ("EIS") does not change this fact. In its comments at the February 12, 2009, Public Meeting in Cordlandt Manor, the State of New York characterized the Draft Supplemental EIS as "inadequate, incomplete," and reaching the "wrong conclusion" because it *concluded that the environmental impacts would not preclude a 20-year extension of the operating license for the Indian Point nuclear power plant.* The Draft Supplemental EIS just accepts significant environmental impacts as "unavoidable" even though the document contains numerous examples of incomplete analysis, contradictory analysis, and glaring omissions of analysis of important issues.

128-a-LR

The State does not accept this premise, nor does it accept the NRC's premise that the Draft Supplemental EIS meets the NRC's legal obligations regarding a National Environmental Policy Act ("NEPA") environmental review for the pending license renewal applications for Indian Point. These comments identify and document the concerns of the Executive Agencies of the State of New York.

Indian Point is a nuclear generating facility consisting of Units 1, 2, and 3 located on the Hudson River in the Town of Buchanan, New York. While Unit 1 is no longer active, the license renewal application for an additional 20 years of operation for Units 2 and 3 was submitted to the NRC in April 2007. The Hudson River is one of the great public assets of the State of New York. The operation of this nuclear generating facility has many significant environmental impacts, and the costs of those impacts are borne by the environment and the communities surrounding the facility.

128-b-AE/EP/TS

For example, in the process of generating electricity, Indian Point consumes 2.5 billion gallons of Hudson River water *each day*. This consumption of Hudson River water is one of the best known of the significant environmental impacts. The massive amount of water is taken into the facility, runs through it, and is then discharged back into the river. This process has significant impacts, including killing billions of fish and other aquatic organisms each year. These operations' effects on the River also threaten endangered species.

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Other well known potentially significant impacts involve the vulnerability of the facility to attack and the ability of surrounding communities to be evacuated if there is an emergency. NEPA requires the NRC to undertake a thorough analysis of these impacts, before it makes the license renewal decision, and to determine what can be done to avoid or minimize them.

128-b-AE/EP/TS contd.

The Executive Agencies of the State of New York, including the Departments of Environmental Conservation and State, commented on the Scope of the environmental review for the license renewal in Fall 2007. Specifically, the State of New York undertook a detailed review and analysis of the applicant's Environmental Report. The State submitted the results of that review, in the form of written scoping comments, to the NRC on October 31, 2007. In its Scoping Comments, the State asked the NRC to reject the 1996 Generic EIS for License Renewal of Nuclear Plants and in its place, to conduct a comprehensive environmental review specific to the Indian Point nuclear generating facility. The State proposed that this review incorporate critical issues in a "supplemental" review, and by also including in the review all of the issues that NRC addressed in its 1996 Generic review.

The State's submission argued that the 1996 Generic EIS was stale and outdated, given that many developments occurred since 1996 -- notably the terrorist attacks on America in 2001 and Hurricane Katrina in 2005 -- and that the unique characteristics of Indian Point, such as location and population density, warranted a thorough and detailed analysis that addressed all of these issues as they relate to the facility. A recent 9th Circuit Court decision supports the State's Position that these terrorism issues must be addressed because of the expansive nature of NEPA on these issues.

New York's 2007 Scoping Comments identified specific impacts that the NRC needed to address in the EIS, including aquatic ecology, groundwater, socio-economics, endangered species, historic, and aesthetic impacts. The Generic impacts from the NRC's 1996 review (known as "Category 1 impacts" in NRC parlance) that the State argued were required to be reviewed under NEPA include the possibility of a terrorist attack, accidental release and emergency response and evacuation, radionuclide air dispersion, alternatives to license renewal, and long-term storage of spent fuel at Indian Point. The Draft Supplemental EIS does not comply with the State's request for this thorough NEPA review.

128-c-GE/LR

II. NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act of 1969 ("NEPA") "places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action," and "ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Baltimore Gas & Elec. Co. v. Natural Res. Def. Counsel, Inc.*, 462 U.S. 87, 97 (1983). NEPA requires that federal agencies take a "hard look" at the environmental impacts of proposed actions, specifically

(i) the environmental impact of the proposed action,

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

128-d-GE/LR

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(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved if the proposed action should be implemented.

42 U.S.C. § 4332(2)(C). Federal agencies must prepare an Environmental Impact Statement ("EIS") for "all major Federal actions significantly affecting the . . . environment." *Id.* The requirements of NEPA are mandatory and apply to the NRC. *Calvert Cliffs Coordinating Comm., Inc. v. U.S. Atomic Energy Comm'n*, 449 F.2d 1109 (D.C. Cir. 1971) (holding that NEPA applies to NRC's predecessor). In addition, "significant new circumstances or information relevant to the environmental concerns that bear on the proposed action or its impacts" must be reviewed by the agency in a Supplemental EIS. 40 C.F.R. § 1502.9 (c)(1)(ii).

In this case, the NEPA review of the Indian Point license renewal application involves a number of documents that the NRC generated over the past thirteen years. In May 1996, the NRC produced a Generic Environmental Impact Statement ("Generic EIS") for License Renewal of Nuclear Plants. *See NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants"* (May 1996); *see also* 61 Fed. Reg. 28,469 (June 5, 1996); 61 Fed. Reg. 66,546 (Dec. 18, 1996). ("Generic EIS"). The so-called Category 1 issues are included in the Generic EIS. It was codified at 10 CFR Part 51, and in 1999, the NRC added a table of Category 2 issues. *Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants,"* 10 C.F.R. Part 51, App. B to Subpart A. The NRC deemed these Category 2 issues as warranting site-specific review in a Supplemental Generic EIS for each plant that applies for license renewal. The State of New York participated in the NEPA review for the license renewal of Indian Point by submitting written Scoping Comments on October 31, 2007 ("NY Scoping Comments"). The Indian Point specific supplement to the Generic EIS is the NRC document entitled Draft NUREG-1437, Supplement 38, December 2009 ("Draft Supplemental EIS"), to which the State is submitting these comments.

As demonstrated below, the State of New York believes that the Draft Supplemental EIS is incomplete, full of factual and legal errors, and arrives at the wrong conclusion. Without question, Indian Point produces significant adverse impacts that cannot be mitigated, but that must be fully analyzed and addressed in the context of the NEPA review for the license renewal application.

128-d-GE/LR contd.

III. ANALYSIS OF AQUATIC IMPACTS

The operation of Indian Point consumes and returns approximately 2.5 billion gallons of Hudson River water each day. The River is an important estuarine ecosystem, and this operation has significant adverse impacts to the fish that call the Hudson home. Large fish are "impinged" on screens at the water intake where they are severely stressed and then suffocated. Smaller fish are "entrained" in the water intake, pulled through the operating plant, and killed. At the other end of this once-through cooling

128-e-AE

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system, the water is discharged at a higher temperature, changing the natural fish habitat. Among the many fish that are adversely affected from this once-through cooling system are an endangered species and a candidate threatened species. The State disagrees with the NRC that the facts support continuation of this relentless process -- which continued relatively unabated for almost 40 years – for an additional 20 more years. While the NRC chose to reject the State's Contentions on the aquatic impacts because it deferred to the State Administrative Proceeding on the federal Clean Water Act permit renewal and the expertise of the New York State Department of Environmental Conservation, the NRC Draft Supplemental EIS, without explanation or rationale, ignores the State's findings on these aquatic impacts.

128-e-AE contd.

A. Entrainment and Impingement of Fish and Shellfish

In its Scoping comments, New York State informed the NRC that it must fully analyze in the Draft Supplemental EIS the impacts from the outdated once-through cooling system that Entergy uses at Indian Point – and which Entergy boldly refuses to change. *NY Scoping Comments* at 7. Specifically, New York demonstrated that the impacts of entrainment and impingement of aquatic organisms are significant, and that as part of the Supplemental EIS, the NRC Staff needed to identify and analyze meaningful alternatives to determine if the license renewal should be granted.

In the Draft Supplemental EIS, the NRC purported to evaluate the impacts on aquatic organisms from the continued operation of Indian Point's once-through cooling water system. The NRC Staff analysis targeted the impingement and entrainment impacts on eighteen representative important species. *Draft NUREG-1437, Supplement 38, Chapter 4; Appendices H & I.* The NRC analysis assessed the level of impact of once through cooling on the overall fish population, and concluded that for only one representative important species – bluefish -- continued operation would have a LARGE impact, but that it would only have MODERATE or LARGE impacts on hogchoker and white perch, and SMALL, MODERATE, or unknown impacts on all other species. The NRC Staff further concluded that none of these impacts would prevent the issuance of a license renewal for Indian Point.

The NRC Staff further identified wetlands restoration and the construction of a striped bass fish hatchery as alternatives and mitigation measures to the continued use of the antiquated once-through cooling system at Indian Point.

On a number of critical points, discussed below, the NRC analysis of the aquatic impacts of continued operation of Indian Point is inaccurate and misleading. At other times, while the NRC Staff may have examined relevant data, the focus and direction of the NRC Staff's analysis of that data are wrong and they lead to conclusions that are not supported by the facts. These significant problems with the NRC Staff's analysis in the Draft Supplemental EIS undermine its credibility and undercut its validity.

The Draft Supplemental EIS states that the operation of the existing once-through cooling system has an adverse environmental impact. New York agrees with NRC staff that adverse impacts exist, but rejects the conclusions of the NRC regarding the severity and the measurement of those adverse impacts. New York reaches its conclusion that this impact is due

128-f-AE

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to the simple and uncontroverted fact that the operation of Indian Point facilities impinge and entrain *billions* of aquatic organisms every year. The NRC staff does not share the State's view on the severity of these impacts because the NRC staff's analysis improperly focuses on population trends caused by the operation of the facility.

128-f-AE contd.

1. The New York State Department of Environmental Conservation, the U.S. Environmental Protection Agency, and the U.S. Court of Appeals for the Second Circuit All Rejected Population Analysis Regarding Aquatic Impacts of Indian Point.

The NRC Staff assessed the severity of impact based upon the *overall population*, and not on the *massive numbers of actual organisms* that have been, are currently, and will continue to be impinged and entrained as long as this applicant uses once-through cooling at Indian Point. In effect, the NRC Staff has used a surrogate impact analysis – once removed from the obvious, actual, direct, and obvious impacts – and in doing so, has bypassed those actual, direct, and obvious impacts. The NRC Staff adopted the approach urged by the applicant, and for which the applicant has not succeeded in the New York SPDES permit proceeding. The reason for the NRC Staff's behavior is obvious – it allows the Staff to conclude that no significant adverse impacts would result from the outdated once-through cooling system at Indian Point, thus avoiding the harder decisions on mitigation and alternatives.

In the parallel and ongoing Clean Water Act SPDES administrative proceeding in New York State, the New York State Department of Environmental Conservation has rejected – as a matter of law and science – the overall population approach used by the NRC to assess impacts from once-through cooling at Indian Point. *See Mtr. of Entergy Nuclear Indian Point 2 and Entergy Nuclear Indian Point 3*, Interim Decision of the Assistant Commissioner (August 13, 2008) (http://www.dec.ny.gov/hearings/45956.html) (hereafter "Indian Point SPDES Interim Decision").

In the Indian Point SPDES Interim Decision, the Department rejected Entergy's argument that fish populations must be analyzed, and that once they are, Entergy can then demonstrate that the overall fish population is not adversely affected by outmoded once-through cooling. The Assistant Commissioner ruled the following:

> In this case, it is not necessary to resolve the factual issue concerning the actual fish mortality rate to determine that an adverse impact exists as a matter of law. Even accepting the "lower boundary" estimate of fish mortality in the DEIS [industry's number], a mortality rate in the range of 900,000[,000][1] fish per year far exceeds any de minimis level, represents excessive fish kills and is sufficient to establish that the operation of the Indian Point cooling water intakes results in an adverse environmental impact . . . .

Indian Point SPDES Interim Decision at 17.

128-g-AE

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1 In this decision, the Department incorrectly stated this figure to be 900,000. The correct figure in the record is 900,000,000, representing a mortality rate that is orders of magnitude higher.

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This determination, by the administrative agency with the expertise and authority to make such a determination – the New York State Department of Environmental Conservation – is entitled to substantial deference. Since the NRC Staff successfully urged the ASLB to rule that the effects of impingement and entrainment are not adjudicable in the license renewal proceeding because the New York State Department of Environmental Conservation has a parallel administrative proceeding on Entergy's renewal of its SPDES permit, the NRC Staff should necessarily defer to the findings of fact and law that have been issued in that proceeding. The NRC Staff has not deferred, but instead directly contradicts the DEC decision. On this important environmental issue, the NRC Staff cannot have it both ways, i.e., urge the Atomic Safety and Licensing Board to not accept the State's contentions on these impacts, and then produce a Draft Supplemental EIS that rejects the legal and factual conclusions that result in that parallel proceeding. This kind of gamesmanship should not be tolerated.

New York State has been collecting and analyzing data relating to aquatic organisms in the Hudson River for decades. The NRC Staff's recent efforts to review this data or to hire consultants to review it – and to draw different conclusions that support the NRC Staff's and Entergy's position that these plants should be re-licensed – can in no way supplant the determinations rendered by the State of New York.

Not only is the New York State determination entitled to deference, both the United States Environmental Protection Agency and the United States Court of Appeals for the Second Circuit have rejected a population analysis as the measurement of the impacts of impingement and entrainment from once-through cooling systems. The Second Circuit expressly endorsed EPA's interpretation of what constitutes "adverse environmental impact" under the Clean Water Act:

> In Riverkeeper I [Riverkeeper v. EPA, 358 F.3d 174 (2004)], we rejected the arguments that some species are nuisance and require eradication, that other species respond to population losses by increasing their reproduction, and that removing large numbers of aquatic organisms from waterbodies is not in and of itself an adverse impact. We specifically rejected the view that "the EPA should only have sought to regulate impingement and entrainment where they have deleterious effects on the overall fish and shellfish populations in the ecosystem, which can only be determined through a case-by-case, site-specific regulatory regime."
>
> * * *
>
> It is also significant that Congress "did not include that [water quality or population level] approach or make any reference to it in [CWA § 316(b)] . . . The statutory structure thus indicates that Congress did not intend to limit 'adverse environmental impact'"in section 316(b) to population-level effects.

Riverkeeper, Inc. v. U.S.E.P.A., 475 F.3d 83, 109 (2d Cir. 2007) (*Riverkeeper II*), 475 F.3d at 124, 125 fn. 36 (*internal citations omitted*).

Additionally, in adopting its population analysis, the NRC Staff got it wrong. NRC Staff did not even include the entrainment of eggs and larvae in the final determinations – a monumental

128-g-AE contd.

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scientific oversight. Thus, not only has the NRC Staff improperly and inappropriately latched onto a population analysis, it has so narrowed the universe of that population, skewing the results and further underlining the meaninglessness of the Draft Supplemental EIS on this issue.

128-g-AE contd.

2. NEPA Requires an Accurate and Valid Analysis of Significant Impacts.

Implicit in NEPA's mandate that an agency evaluate the environmental impacts of its actions, is that the agency's evaluation be accurate. As demonstrated below, the NRC Staff's Draft Supplemental EIS contains numerous and repeated inaccuracies. Thus, even if it could be argued that NRC Staff took the proper approach, the environmental review here is too fatally flawed in too many areas to satisfy the required NEPA analysis.

Disputed levels of impact by species

In the Draft Supplemental EIS, the NRC Staff has assigned levels of adverse impact of SMALL, MODERATE, or LARGE, by specific species. The NRC Staff has misinterpreted some of the available data, and as a result has assigned levels of impact that are not accurate because they do not match up with the data. In fact, even though NRC Staff admits it cannot assess five of the representative important species it identifies, it arbitrarily concludes that the impacts to these species, which are unknown, should not preclude license renewal.

The State agrees with the NRC Staff that the potential adverse impacts caused by the continued operation of the existing once-through cooling water systems at Indian Point range from SMALL to LARGE depending on the species affected. Draft NUREG-1437, Supplement 38 at 4.1.3.5. However, since the number of individuals of each species impinged and entrained ranges from a few individuals to millions, the "Weight of Evidence" analysis undertaken by the NRC Staff to reach this conclusion raises questions about the NRC Staff's results for various species. *See Draft NUREG-1437, Supplement 38, Table H-17.*

128-h-AE/AL

For example, the only species that the NRC Staff specifically claims that the continued operation of the existing once-through cooling water intake structure will potentially have a LARGE adverse impact is the bluefish. This assessment is contrary to the understanding of the New York State Department of Environmental Conservation. Very few adult bluefish are impinged, and few if any bluefish eggs and larvae have ever been entrained by Indian Point. Moreover, survival of adult bluefish off the intake screens is likely very high, on the order of 85%.

The NRC Staff also did not feel that the strength of connection between the species and the intake of the once-through cooling system at Indian Point is as strong for white perch (medium to high connection) and Atlantic tomcod (low to medium connection) as it is for bluefish and striped bass (both rated a high connection). *Draft NUREG-1437, Supplement 38, Strength of Connection Line of Evidence, Table H-17.* However, several hundred thousand white perch individuals are impinged annually, which is orders of magnitude greater than the numbers of either striped bass or bluefish (600,000 white perch impinged in 1987 and 803,000 impinged in 1988). EA Science and Technology. 1988. *Hudson River ecological study in the area of Indian Point: 1987 Report* ("EA 1987"); EA Science and Technology. 1989. *Hudson River ecological study in the area of Indian Point: 1988 Report* ("EA 1988").

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Although Atlantic tomcod impingement is highly variable among years, in 1987, several hundred thousand Young-of-the-Year Atlantic tomcod were impinged, clearly indicating that Indian Point can and does impact large numbers of these Atlantic tomcod. EA 1988.

The table below demonstrates that the NRC Staff's assessed levels of impact for certain species do not comport with the existing data for the Hudson River.

2003 Hudson River FEIS & 1987/88 EA Hudson River Ecology Study Reports		**NRC Staff Draft Supplemental EIS**
Top Impinged Species	**Top Entrained Species**	**NRC Level of Impact Assessed**
White perch	White perch	Moderate to Large
Atlantic tomcod		Small to Moderate
Blueback herring		Small to Moderate
Striped bass	Striped bass	Small
	River Herring	Small to Moderate
	Bay anchovy	Small to Moderate
	American shad	Small to Moderate

Based on New York's review of the NRC's rationale for scoring the impacts to striped bass, white perch, and Atlantic tomcod -- population trends, likelihood of impinging young-of-the-year, and likelihood of reducing a species food resource -- and considering historical impingement and entrainment data collected at the facility, the potential adverse impacts of the continued operation of Indian Point's once-through cooling system would be LARGE for striped bass, white perch, and Atlantic tomcod – especially because the NRC considers the potential adverse impact to be LARGE on bluefish.

Moreover, because of this disconnect between the NRC Staff's assessed potential adverse impacts and the actual impingement and entrainment that occurs with four species, i.e., striped bass, white perch, Atlantic tomcod, and bluefish, the assessed potential impact for the other 14 species considered by the NRC Staff is also questionable.

As further demonstrated in the above table, the NRC Staff concludes that the levels of impact on white perch are MODERATE to LARGE. And yet, even with an assessment of LARGE impacts, the NRC Staff is not proposing that Entergy be required to install closed cycle cooling at Indian Point.

A closer look at the NRC Staff's overall conclusion – that the continued operation of the once-through cooling water intake system would have a SMALL to LARGE impact depending on the species – shows that it is based on incomplete data and analysis. *Draft NUREG-1437, Supplement 38* at 4–21. The NRC Staff acknowledges that it was unable to assess the potential impacts on 5 of the 18 representative important species of aquatic organisms, including Atlantic menhaden, shortnose sturgeon, Atlantic sturgeon, gizzard shad, and blue crab. *Draft NUREG-1437, Supplement 38, Table 4-4*. Instead, the NRC Staff threw their hands up in the air with a pronouncement of "SMALL to LARGE" impacts for each of these 5 species. The NRC Staff thus

128-h-AE/AL contd.

12 of 40

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concedes that it does *not* know the impact that the relicensing of Indian Point will have on these species. Accordingly, because the NRC Staff failed to address the impacts on nearly one-third of the RIS organisms, it has no accurate basis upon which to draw the final conclusion that the relicensing of Indian Point can go forward.

The NRC Staff has confused "mortality" rates for "survival" rates off the Ristroph screens.

The NRC Staff also appears to be confused about some of the data relating to the Ristroph screens at Indian Point. For instance, the NRC Staff incorrectly reports impingement survival rates off the Ristroph screens – bluefish (9%), white perch (14%). Those rates, however, are not survival rates, but instead are just the opposite -- they are mortality rates. In addition, Fletcher (1990) does not report mortality rates for bluefish, so it is unclear where the NRC acquired its estimate. ConEd & NYPA. 1992. *Indian Point Units 2 and 3 Ristroph Screen Return System Prototype Evaluation and Siting Study: Supplement I. Appendix G Table 2*. November 1992. ("ConEd and NYPA (1992")) (the former operators of Indian Point Units 1 and 2, and Indian Point Unit 3, respectively) reported a mortality rate of 15%, which is similar to white perch and not striped bass as stated by the NRC Staff. *Draft NUREG-1437, Supplement 38* at H-47 through H-49.

Additionally, while the NRC Staff correctly states that Fletcher (1990) does not report mortality rates for rainbow smelt, this information does exist. ConEd evaluated this species during the Ristroph screen studies and found mortality rates to be about 15%. ConEd & NYPA 1992. *Draft NUREG-1437, Supplement 38* at H-49, H-50. This calls into question how carefully the NRC Staff reviewed site-specific mortality data.

128-h-AE/AL contd.

3. The NRC Staff's Restoration Alternative Is Precluded by the Clean Water Act and Would Not in Fact Mitigate the Significant Adverse Impacts from Once-through Cooling at Indian Point.

In Chapter 8.0, the NRC Staff discusses an alternative that it believes has the potential to mitigate the impingement and entrainment mortality caused by the continued operation of IP2 and IP3 once-through cooling systems to levels commensurate with closed cycle cooling. This alternative is very similar to the 1981 Hudson River Settlement Agreement (HRSA), except that the NRC Staff is also proposing wetlands restoration, including wetlands mitigation and stocking the Hudson River with striped bass from a new hatchery. The NRC Staff believes that this alternative would have fewer LARGE environmental impacts than the closed cycle cooling alternative included in the draft SPDES permit issued by the New York State Department of Environmental Conservation. *Draft NUREG-1437, Supplement 38* at Table 9-1.

As demonstrated below, the NRC Staff's position is not supported in law or fact: (1) the Second Circuit has ruled that restoration is prohibited as an alternative under the Clean Water Act and, (2) wetlands restoration and a striped bass fish hatchery would not even mitigate the significant adverse environmental impacts in the Hudson River estuary from the continuation of once-through cooling. In the end, even with these measures, Indian Point would still draw 2.5 billion gallons of Hudson River water each day, and it would still impinge and entrain aquatic organisms in similarly vast numbers to the operation of the facility today.

128-i-AL

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The NRC Staff's Proposed Restoration Alternative Is Precluded by the Clean Water Act.

The NEPA process is necessarily constrained by the operation of other substantive laws. Here, the Second Circuit has held that Clean Water Act expressly precludes restoration as an alternative to the technology-based requirement for cooling water intake systems under section 316(b) of the Act: "best technology available to minimize adverse environmental impact." *Riverkeeper, Inc. v. U.S.E.P.A., 358 F.2d 174 (2d Cir. 2004) ("Riverkeeper I").* As the Second Circuit stated:

> We think the EPA's own findings reveal that restoration measures are inconsistent with Congress's intent that the "design" of intake structures be regulated directly, based on the best technology available, and without resort in the first instance to water quality measures.

Id. at 190. The Court struck down the part of EPA's section 316(b) regulations for the "best technology available to minimize adverse environmental impact" – the technology-based standard for cooling water intake systems -- that allowed for restoration measures to satisfy the standard.

Riverkeeper I concerned regulations for new power plants. The Second Circuit reiterated its *Riverkeeper I* holding in a subsequent case in which it struck down restoration measures, which EPA offered as an option to satisfy section 316(b) by existing power plants. *Riverkeeper, Inc. v. U.S.E.P.A.*, 475 F.3d 83, 109 (2d Cir. 2007) (*Riverkeeper II*). The Second Circuit stated:

> We agree with the petitioners that Riverkeeper I held that the Agency's decision to permit restoration measures in the Phase I Rule was not "based on a permissible construction of the statute," *Chevron*, 467 U.S. at 843, 104 S. Ct. 2778, and that this holding applies equally here.

Riverkeeper II, 475 F.3d at 109.

On this point, it also appears that the NRC Staff is relying upon the draft SPDES permit for Indian Point issued by the New York State Department of Environmental Conservation for a conclusion that is not legally permissible. In the Draft Supplemental EIS, the NRC Staff state

> Under the terms of the draft SPDES permit, Entergy may propose a different approach that would reduce adverse environmental impacts to an equivalent level (NYSDEC 2003b). The alternative proposed in this section [of the NRC Staff's Draft Supplemental EIS] combines the existing once-through cooling system with alternative intake technologies and additional restoration alternatives so that the net impact of the IP2 and IP3 cooling water intake structures is equivalent to the impact from the operation of a new closed-cycle cooling system.

Draft NUREG-1437, Supplement 38 at 8-16. The NRC Staff, however, has not proposed any alternative intake technologies that go beyond the technologies in the HRSA – and which still cause massive numbers of fish to become entrained and impinged at Indian Point. *New York*

128-i-AL contd.

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State wishes to be very clear here: The draft SPDES permit does not and would not allow Entergy to implement restoration measures to satisfy section 316(b) of the Clean Water Act.

Because the Second Circuit held that mitigation via restoration is *not* allowed to meet the standard of CWA section 316(b), the wetlands restoration and the fish stocking alternatives analyzed by NRC Staff are not legally permissible under Clean Water Act section 316(b) to offset the severe impacts from once-through cooling.[2] The reason for this is obvious and simple: wetlands restoration and fish stocking do nothing to address the significant harm to the fish from the impingement and entrainment that occurs from the intake of 2.5 billion gallons of Hudson River water each day at Indian Point. The fish are still impinged and entrained in record numbers.

The NRC Staff's Proposed Restoration Alternative Also Fails to Credibly Analyze the Adverse Environmental Impacts It Would Cause.

Setting aside the legal prohibition of restoration measures, the proposal by the NRC Staff also contains numerous analytical flaws. The Draft Supplemental EIS underestimated the level of adverse environmental impacts to land use, aquatic ecology, terrestrial ecology, and waste caused by the restoration of wetlands and shallows in the Hudson River estuary and the construction and operation of the fish hatchery.

Glaring omissions exist in the restoration alternative, which undermine the NRC Staff's analysis. Chief among these omissions is information about the location(s) and quantity of wetlands and shallows that would be required to offset the adverse impacts caused by the continued operation of Indian Point's once-through cooling system. The Hudson River estuary is a vast and complicated estuarine ecosystem, and the failure to address the comparative size and scale of an alternative that could restore it renders the suggestion almost meaningless.

128-i-AL contd.

Land Use Impacts

The NRC Staff claim that impacts to land use would be SMALL for the restoration/mitigation of wetlands on the Hudson River. However, the existing lands most likely available for restoration are uplands owned and managed by New York State. It would be an understatement to say that New York State would not make these lands available to mitigate

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[2] The NRC Staff also incorrectly states in the Draft Supplemental EIS (p. 8-4) that the Second Circuit "mandated the conduct of a cost-benefit analysis under Section 316(b) of the CWA" on the remand of EPA's Phase II Rule in *RiverkeeperII*, 475 F.3d 83 (2d Cir. 2007). In fact, the Court made it clear that a cost-benefit analysis was *not* allowed under Section 316(b) of the CWA. *Riverkeeper II.*, 475 F.3d at 114. As the Second Circuit stated

> [C]ost benefit analysis is not consistent with the requirement of § 316(b) that cooling water intake structures "reflect the best technology available for minimizing adverse environmental impact." Indeed, the statutory language requires that the EPA's selection of BTA be driven by technology, not cost.

Id. This issue is presently before the United States Supreme Court.

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the adverse impacts caused by the continued operation of Indian Point. Moreover, these public lands support many terrestrial based recreational uses, and the loss of these recreational uses may in fact result in impacts that are MODERATE to LARGE.

The NRC Staff claims that potential impacts to aquatic ecology would be MODERATE during construction but SMALL for operation. The NRC Staff fail to mention, though, that as one type of habitat is created, it replaces an existing type of habitat at that location that had provided aquatic habitat functions. Since the NRC Staff have not identified how many acres of shallows and wetlands would need to be created or restored to offset the fish killed by continued operation of the existing Indian Point once-through cooling system, the Staff's analysis cannot determine how many acres of other aquatic habitats may be lost. This could lead to larger long-term operational impacts on aquatic ecology than the NRC Staff considered.

In addition, any mitigation through restoration of tidal wetlands and shallows would likely be temporary given accelerated sea-level rise in low lying areas along the Hudson River. *See Climate Risk Information*, New York City Panel on Climate Change (Feb. 17, 2009) at 17 (estimating that sea-level rise in the Hudson River will be similar to New York harbor, i.e., increases of 2-5 inches by the 2020s, 7-12 inches by the 2050s, and 12-23 inches by the 2080s, and further states that if ice melt were factored in, these amounts would be significantly higher). See also, Craft, et al. (2009), *Forecasting the effects of accelerated sea-level rise on tidal marsh ecosystem services*, Front Ecol Environ; 7(2): 73–78 (indicating that freshwater tidal wetlands will be seriously impacted by accelerated sea-level rise).

Terrestrial Ecology Impacts

The NRC Staff claims that terrestrial ecology would suffer few impacts by the restoration of tidal wetlands and shallows. However, conversion of terrestrial habitats to aquatic habitats can have a direct impact on terrestrial threatened and endangered species by the permanent removal of habitat. Bald eagle nesting and roosting areas, cerulean warbler nesting areas, non-tidal freshwater wetland habitats, and rare and threatened plants occur in many terrestrial locations along the Hudson River estuary shore. Balancing the terrestrial habitat impacts has been a significant issue in siting and conducting Hudson River tidal wetland habitat restoration. While the NRC Staff claims such impacts would be SMALL, they would in fact be MODERATE to LARGE based on past restoration efforts having nothing to do with closed cycle cooling at Indian Point.

Waste Impacts

The NRC Staff incorrectly claims that the adverse impact of waste generation and handling would be SMALL for the restoration alternative. In fact, however, the transport and disposal of the potentially contaminated dredged and excavated materials associated with wetland and shallows creation would be difficult and costly. Since the NRC Staff determined that the removal and disposal of two million cubic yards of rock and soil would have a SMALL to LARGE impact on the waste aspect of installing closed cycle cooling, the dredging, excavation, and disposal associated with habitat creation would likewise have similar levels of adverse impacts. *Draft NUREG-1437, Supplement 38* at Table 8-1. The NRC Staff also fails to recognize

128-i-AL contd.

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that contaminated sediments are an issue throughout the Hudson River estuary. From 1947 to 1977, as much as 1.3 million pounds of polychlorinated biphenyls (PCBs) were released into the Hudson River resulting in the designation of the Hudson River between Hudson Falls and Battery Park in Manhattan as a U.S. EPA Superfund site.

In addition, the NRC Staff considers the volume of material generated for this alternative as being "easily" managed. Yet, without the information about the number of acres of habitat that would need to be created to "mitigate" Indian Point's massive killing of fish, this determination is baseless. If the NRC Staff properly analyzed this issue, it would likely determine that the contaminated sediment disposal and the volume of disposal materials would have a LARGE adverse environmental impact.

Inability to Assess the Success of the NRC Staff's Proposed Alternative

Not only has the NRC Staff proposed an alternative that is prohibited by the Clean Water Act, its success after implementation could never be evaluated. To illustrate, the NRC Staff claims that the only way to assess if this alternative achieves its goal of reducing the adverse impacts caused by the continued operation of the once-through cooling system at Indian Point by 93-95% would be through rigorous monitoring. This rigorous monitoring would require population assessments, which the NRC Staff already claimed in Chapter 4.0 and Appendix H are difficult at best to determine cause and effect. Whether a response in a given fish population is due to a restoration project would be next to impossible to determine given the spatial challenges the NRC Staff claimed to have understood in assessing the adverse impacts that will likely result from the continued operation of Indian Point.

Without the ability to establish a clear baseline and identify tangible goals, neither the NRC Staff nor anyone else could feasibly determine the effectiveness of its proposed alternative.

Other Adverse Impacts

Additionally, the long-term operation of a stocking program presents potential impacts that the NRC Staff failed to consider. In recent years, fish hatchery operators have identified several highly infectious and damaging diseases in their facilities throughout the state. Hatchery operators have implemented disinfection and eradication controls to prevent the spread of these diseases. Thus, the NRC Staff needs to analyze the potential for release of diseased fish to the Hudson River.

The NRC Staff Selected the Wrong Fish to Stock

Moreover, setting aside that stocking fish in the Hudson River is not an appropriate mitigation measure, the NRC Staff has also chosen the wrong species for stocking. The three fish species that the NRC Staff identified as having the greatest potential to be adversely impacted by the license renewal of Indian Point are bluefish, hogchoker, and white perch. *Draft NUREG-1437, Supplement 38* at Table H-17. Yet, the NRC Staff proposes to stock the Hudson River with striped bass, a species for which it concluded that the impact of license renewal was determined

128-i-AL contd.

17 of 40

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to be SMALL. Simply stated, adding striped bass to the Hudson River will *not* offset the adverse impacts that the NRC identified in Table H-17.

4. Summary of the Department's Position

The NRC Staff's analysis of impingement and entrainment impacts from the once-through cooling water intake system at Indian Point does not satisfy its obligations under NEPA. The Staff has (1) ignored a determination issued by the New York State Department of Environmental Conservation in a parallel proceeding for the renewal of the applicant's SPDES permit, which rejected a population-based analysis of harm and was in line with rulings from the Second Circuit, and (2) it has proposed an illegal restoration alternative, which it did not even fully analyze.

128-i-AL contd.

B. Thermal and Heat Shock Impacts from the Operation of Indian Point.

Indian Point's 40-year-old cooling water intake design uses massive quantities of Hudson River water when operating, and it returns significantly heated water back to the river. The NRC Draft Supplemental EIS fails to analyze the limited data that are available, fails to acknowledge that other data are unavailable because of the applicant's failure to produce it, and reaches unsupportable conclusions regarding the adverse impacts from the thermal plume produced by the operation of Indian Point.

In its Scoping Comments, New York State urged the NRC Staff to fully analyze the thermal and heat shock impacts from an additional 20 years of operation with the outdated once-through cooling water system at Indian Point. *NY Scoping Comments* at 7. New York's regulations repeat the mandate of the Clean Water Act that impacts of facilities like Indian Point be minimized to support a "balanced and indigenous" fish population. *CWA § 316(a), 33 U.S.C. § 13269a); 6 N.Y.C.R.R. § 704.1(a).*

In the license renewal proceeding, the State demonstrated that the thermal discharges from Indian Point currently violate New York's water quality criteria. *See New York State Petition to Intervene, Contention 30* at 271; *Declaration of David W. Dilks*, sworn to on Nov. 28, 2007, ¶¶ 16-20 ("*Dilks Decl.*"). The State further demonstrated that the applicant failed to demonstrate either that it meets New York's water quality standard for thermal impacts or that it has received a waiver pursuant to Clean Water Act § 316(a). *NYS Petition to Intervene* at 271.

The Draft Supplemental EIS concluded that the thermal impacts from the once-through cooling at Indian Point would result in SMALL to MODERATE impacts. Specifically, NRC Staff states in the Draft Supplemental EIS that

> In the absence of specific studies, and in the absence of effects sufficient to make a determination of LARGE impacts, the NRC staff concludes that the thermal impacts . . . could range from SMALL to MODERATE depending on the extent and magnitude of the thermal plume, the sensitivity of various species and lifestages likely to encounter the thermal plume, and the probability of an encounter occurring that could result in lethal or sublethal effects.

128-j-AE

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Draft NUREG-1437, Supplement 38 at 4-27.

As demonstrated below, the NRC Staff's Draft Supplemental EIS gives a patina of legitimacy to the applicant's steadfast refusal to provide data. A higher level of acuity is necessary on this issue, and NRC Staff should not attempt to hide the obvious in its NEPA analysis: that it treated the applicant's refusal to provide data in the applicant's favor without working to learn the real facts underlying this environment, as NEPA requires. Therefore, the NRC Staff has failed to address fully the thermal impacts presented from the once-through cooling system at Indian Point.

128-j-AE contd.

1. The NRC Staff Has Insufficient Data to Conclude that the Thermal Impacts from Indian Point Will Produce Small to Moderate Impacts.

In New York's view, the NRC Staff's thermal impacts analysis fails in two major respects: the Staff failed to evaluate both the available thermal impacts data and the very fact that other data are not available, as well as the reason for that unavailability. Thus, the NRC Staff's assessment of thermal impacts falls short of the analysis required under NEPA.

The NRC cannot assess the full level of impact without additional data. New York State has demonstrated to the NRC throughout the licensing renewal proceeding that the applicant's operation of Indian Point's once-through cooling system causes the applicant to violate New York's water quality criteria. *Dilks Decl.* at ¶¶ 16-20. In the draft SPDES permit, the State has correctly put the burden on the applicant to perform a triaxial study of the Hudson River in the vicinity of Indian Point to determine if the applicant is violating the water quality standard itself. *Indian Point Draft SPDES Permit, NY- 0004472.* The applicant, however, refuses to conduct this study and therefore, it cannot provide the results for the required NEPA analysis.

128-k-AE

Even though the NRC Staff concludes that the thermal impacts would likely be SMALL to MODERATE, the impact might very well be LARGE. The NRC Staff cannot say that the effects are absent, only that the *studies* are absent. In other words, that the studies are absent does not mean that no or minimal thermal impacts would result from the operation of Indian Point. And, although the applicant is to blame for the absence of this information, the NRC Staff, for unexplained reasons, gives the benefit of the doubt to the applicant.

2. The NRC Staff Has No Basis to Reach Different Conclusions than the State of New York on Thermal Impacts from the Discharges at Indian Point.

Not only has the NRC Staff unfairly treated Entergy's stubborn refusal to provide additional data on thermal impacts, the NRC Staff's successful attempt in the license renewal proceeding to punt this issue to the State to assess thermal impacts in the context of the State's SPDES permit renewal proceeding does not then permit the NRC to arrive at a different conclusion. The NRC cannot have it both ways: use a tortured legal argument to keep the State's issues out of the license renewal proceeding under the guise of deferring to a parallel State SPDES permit proceeding and then not give full deference to the State's review and conclusions drawn from that proceeding.

128-l-AE

19 of 40

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Here, the State has concluded that the applicant is violating the State's water quality criteria for thermal impacts and that the applicant should provide additional data to assess the full extent of those impacts. The NRC Staff should continue to defer to the State on this issue.

128-l-AE contd.

3. The NRC Has Repeated the Conclusory Misstatements of the Applicant.

Finally, the State would also point out that the NRC Staff has repeated the applicant's position on thermal impacts, which are incorrect as a matter of law. In Chapter 4, the NRC Staff refers to claims on thermal impacts made by the applicant:

> The applicant concludes that "continued operation in a manner required by the current SPDES permit and the associated agreement to continue implementation of the Fourth Consent Degree [sic] ensures that thermal impacts will satisfy the requirements of CWA 316(a) and thus remain SMALL during the license renewal term. Therefore, no further mitigation measures are warranted.

Draft NUREG-1437, Supplement 38 at 4-26.

Although the NRC Staff does not draw specific conclusions about the applicant's claims, they are incorrect as a matter of law for two reasons. First, the Fourth Consent Decree to which the applicant refers expired on February 1, 1991. *NYS Reply* at 159-60. Second, no operator of Indian Point, much less Entergy, has ever received a waiver under CWA section 316(a). Indeed, the State demonstrated that the applicant has never presented a section 316(a) waiver. *Id.* The reason for this omission is simple: no such waiver exists. Without that waiver, the applicant cannot rely on CWA Section 316(a) as providing any safe harbor for the thermal impacts from its operations.

128-m-AE

4. Summary of the Department's Position

The NRC's Draft Supplemental EIS analysis of the thermal impacts is baseless and more a legal conclusion than a scientific assessment of environmental impact. No data exists to support the NRC conclusion that thermal impacts from the operation of Indian Point are small in the NRC NEPA analysis.

128-n-AE

C. The NRC Staff Has Failed to Adequately Assess the Impacts to Endangered and Candidate Threatened Species from the Continued Operation of Indian Point's Once-through Cooling System.

The federal Endangered Species Act (ESA) became the law of the United States to stop the disappearance of species in jeopardy of extinction. The NRC must implement and follow this important legal obligation in the license renewal application process. Operation of Indian Point impinges shortnose sturgeon - an endangered species - and impinges and entrains the Atlantic sturgeon, a candidate threatened species under the Act. The Draft Supplemental EIS has failed to fully assess the environmental impacts of the operation of Indian Point on these species, and thus has not met its obligations under either the ESA or NEPA.

128-o-TS

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In its Scoping Comments, the State of New York informed the NRC that (1) shortnose sturgeon (a federally-listed endangered species) were present in the vicinity of Indian Point and are adversely affected by impingement resulting from the massive amounts of water sucked into the once-through cooling system at Indian Point; (2) Entergy did not have an incidental takings permit for the impingement of shortnose sturgeon and thus was violating the federal Endangered Species Act; and (3) the once-through cooling system at Indian Point also adversely affects the Atlantic sturgeon, a candidate threatened species.

The NRC Staff concludes in the Draft Supplemental EIS that "the continued operation of IP2 and IP3 for an additional 20 years could adversely affect the population of shortnose sturgeons in the Hudson River through impingement." *Draft Supplemental EIS, Appendix E* at E-98 – E-99. However, the NRC Staff further stated that it "cannot assess the extent to which the installation of modified Ristroph screens might reduce the impact." *Id.*

The NRC Staff further states that "the installation of cooling towers could reduce impingement, entrainment, and thermal impacts for all aquatic resources, including those that are Federally listed." *Draft NUREG-1437, Supplement 38* at 4-53. The NRC Staff ultimately concludes that the impacts on federally listed aquatic species could be SMALL to LARGE. *Draft NUREG-1437, Supplement 38* at 4-52.

128-o-TS contd.

1. The Draft Supplemental EIS Does Not Include the Required Endangered Species Biological Assessment for Continued Operation of Indian Point that Is Complete or Complies with the National Marine Fisheries Services Requirements.

In the Draft Supplemental EIS, the NRC Staff included an incomplete biological assessment. Draft Supplemental EIS, App. E. The Endangered Species Act requires the NRC Staff to undertake this assessment. *16 U.S.C. § 1536(c)(1), ESA Section 7(c)(1).* The NRC Staff had earlier requested the National Marine Fisheries Service (NMFS) to inform it whether any listed species were in the vicinity of Indian Point. The National Marine Fisheries Service informed the NRC Staff that both a listed species, shortnose sturgeon, and a candidate species, Atlantic sturgeon, were in the vicinity of Indian Point and should be considered for potential impacts in the NRC's review of Entergy's license renewal application. *See Letter from D.J. Wrona, NRC, to M.A. Colligan, National Marine Fisheries Service* (Dec. 22, 2008). The identification of these species is consistent with the endangered species concerns raised by the State of New York in its Scoping Comments. *NY Scoping Comments* at 10-11. The National Marine Fisheries Service had also previously informed the applicant's consultant of the presence of these species. *Letter from M. Colligan, National Marine Fisheries Service, to J.A. Thomas, Enercon Services, Inc.* (Jan. 23, 2007).)

128-p-TS

The Draft Supplemental EIS only partially addressed the National Marine Fisheries Service's concerns. In a letter to the NRC Staff, dated February 24, 2009, the National Marine Fisheries Service told the NRC Staff that it would not begin a consultation process as the NRC Staff requested, because the NRC Staff did not provide sufficient information in the biological assessment that it submitted to the National Marine Fisheries Service on December 22, 2008. *Letter from M.A. Colligan, National Marine Fisheries Service, to D.J. Wrona,* Nuclear Regulatory Commission (Feb. 24, 2009).

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The National Marine Fisheries Service further noted that the NRC Staff provided a summary of the available information on impingement of shortnose sturgeon, and it indicated that a summary was not sufficient. *Draft NUREG-1437, Supplement 38, App. E., Table 2.* Accordingly, the National Marine Fisheries Service requested the NRC Staff to provide the following additional information:

(a) for each year, indicate the level of monitoring effort (e.g. weekly for six months, etc.);
(b) for each year when there is no number recorded, indicate whether that was due to a lack of monitoring, or due to a lack of capture;
(c) indicate the date of impingement; and
(d) indicate the size and condition (i.e., alive, injured or dead) of the impinged fish.

Letter from M.A. Colligan, National Marine Fisheries Service, to D.J. Wrona, Nuclear Regulatory Commission (Feb. 24, 2009), at 2. When the NRC Staff responds to this request for additional information, it will do so outside of the process for public comment thus far established in this case. In other words, the information will be provided, if at all, after the public has had the present opportunity to comment on the Draft Supplemental EIS.

The National Marine Fisheries Service also expressed concern about the NRC Staff's statement that it could not assess the impacts of impingement because of the lack of current impingement data. *Id.* For instance, National Marine Fisheries Service noted that no impingement monitoring data has been conducted since Ristroph screens were installed at Indian Point in 1991. *Id.* The National Marine Fisheries Service logically and correctly inquired whether the NRC Staff would require the applicant to resume monitoring to support the license renewal application. *Id.* If the NRC Staff would not require the applicant to provide that new data, the National Marine Fisheries Service then requested the NRC Staff to calculate the numbers based on the existing data from past monitoring "in conjunction with data on the effectiveness of Ristroph-type screens to calculate this estimate." *Id.*

The National Marine Fisheries Service further requested that the "NRC provide an estimate of the mortality rate for impinged shortnose sturgeon," and it told the NRC Staff that it "expects this rate could be calculated based on available mortality rate data for other similar species and/or other facilities where similar screen types have been installed." *Id.*

By providing incomplete information on shortnose sturgeon in the Draft Supplemental EIS, and by drawing the conclusions that it does from that incomplete information, the NRC Staff has failed to fulfill its responsibilities under NEPA and the federal Endangered Species Act.

Moreover, by focusing on the installation of the Ristroph screens, the NRC Staff is focusing on the wrong question. The question is whether a listed species is impinged by the intake of 2.5 billion gallons of water each day at Indian Point. While Ristroph screens might reduce the *mortality* impacts of impingement on shortnose sturgeon, they do not lessen the incidents of impingement. In other words, while the fish that are impinged might be returned to the Hudson River because of the Ristroph screens, they are still impinged.

128-p-TS contd.

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Impingement and entrainment are directly related to the velocity and volume of the cooling water being sucked into the facility, and that velocity and volume are much greater in a once-through cooling system than in a closed-cycle system. U.S. EPA estimates that a closed-cycle system uses up to 98 percent less water than a once-through cooling system, resulting in a reduction in entrainment and impingement by 96 percent or greater. *EPA 821-R-02-003 Technical Development Document for the Proposed Section 316(b) Phase II Existing Facilities Rule.*

The failure of the NRC Staff to submit a complete and thorough biological assessment means that the Draft Supplemental EIS is incomplete. The NRC has set a strict schedule for the submission of comments to the Draft Supplemental EIS. And yet, it does not include an adequate key document – the biological assessment – upon which New York and other parties would comment. Public comment and participation in the environmental review process is thus being short-circuited.

Moreover, as for Atlantic sturgeon, which is not now a listed endangered or threatened species, it is a candidate threatened species and deserves careful review. The NRC Staff, however, states in the Draft Supplemental EIS that while it recognizes that Atlantic sturgeon are in serious decline in the Hudson River, it does not have enough information to determine the level of impact caused by continued operation of Indian Point. As the National Marine Fisheries Service has recommended for shortnose sturgeon, the NRC Staff could also extrapolate the impact from past data to project the impact from continued operation of Indian Point.

Because of the incompleteness of the Draft Supplemental EIS, the NRC Staff should reissue the document — this time including a complete biological assessment – hold another public meeting, and allow the parties an opportunity to submit further comments.

128-p-TS contd.

2. **The Draft Supplemental EIS Is Incomplete Because NRC Staff Failed to Submit an Essential Fish Habitat Assessment, as It Is Required to Do under the Magnuson-Stevens Fishery Conservation and Management Act, and Thus, It Is Not Acceptable for Public Review and Comment under NEPA.**

The Magnuson–Stevens Fishery Conservation and Management Act requires the NRC Staff to consult with the Secretary of Commerce, here through the National Marine Fisheries Service, regarding essential fish habitats that would be adversely affected by a federal action.

Here, the Hudson River is home to essential fish habitats for the following species: Atlantic sea herring, Atlantic butter fish, black sea bass, bluefish, red hake, summer flounder, winter flounder, and windowpane. *See Summary of EFH Designations – Hudson River Estuary,* http://www.nero.noaa.gov/hcd/nj4.html; *See also Letter from P. Colosi, NMFS, to Rani Franovich, Nuclear Regulatory Commission* (Feb. 28, 2008) at 2.

On.December 22, 2008, the NRC Staff transmitted the Draft Supplemental EIS to the National Marine Fisheries Service, pointing out that the NRC Staff's biological assessment, prepared pursuant to section 7 of the federal Endangered Species Act, was set forth in Appendix E. *Letter from D.J. Wrona, NRC, to M.A. Colligan, NMFS* (Dec. 22, 2008) at 1. In that same letter, the NRC Staff told the National Marine Fisheries Service that it was preparing the Essential Fish Habitat

128-q-AE

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("EFH") assessment and would transmit it "under a separate cover letter." *Id.* To date, the NRC Staff has not submitted the Essential Fish Habitat assessment and it has informed New York State that it does not expect to do so for several weeks.

Similar to the position that New York State voiced above, the NRC Staff's failure to submit the Essential Fish Habitat assessment means that the Draft Supplemental EIS is incomplete and thus, fails to meet NEPA's environmental review requirements regarding impacts on aquatic species. The NRC Staff's failure to include this key document has precluded public comment.

The remedy for the failure to submit the Essential Fish Habitat assessment is the same as the remedy for the NRC Staff's failure to include a complete biological assessment: the NRC Staff should reissue the Draft Supplemental EIS – this time including the Essential Fish Habitat assessment – hold another public meeting, and allow the parties an opportunity to submit further comments.

128-q-AE contd.

3. Summary of the Department's Position

The Endangered Species Act requires a full and thorough NEPA analysis, especially when specified species are identified by a sister federal agency. The National Marine Fisheries Services has specified further requirements for this review. Instead of complying with these requirements, the NRC Staff offered an incomplete and partial analysis that fails to address important environmental issues. The NRC Staff has also failed to submit an Essential Fish Habitat assessment, as required by the Magnuson-Stevens Fishery Conservation and Management Act. For these reasons, the Draft Supplemental EIS is incomplete and not acceptable for public review and comment under NEPA.

IV. Spent Fuel Pools and the Threat of Terrorist Attack

The Generic Environmental Impact Statement and the Draft Supplemental EIS for Indian Point fail to address the environmental impacts that would result from an intentional attack on Indian Point's spent fuel pools. The spent fuel pools store a significant volume of radioactive material, far more than is inside the active nuclear reactors, but they have no containment structure. The spent fuel pools are also vulnerable to attack. The NRC asserts that if a radiological release occurred from these pools, it "would be no worse than expected from internal events." There is absolutely no basis for this statement, and it does not justify avoiding analysis and review of this crucial environmental, public health, and safety issue.

In its October 31, 2008 scoping comments, the State of New York identified extensive new information, not taken into account in the Generic EIS, related to the potential impacts from an act of terrorism, and sought consideration of these issues on a site-specific basis in the Supplemental EIS for Indian Point. NRC Staff explicitly declined to consider "deliberate malevolent acts or terrorism" in the Draft Supplemental EIS. NRC Staff Scoping Summary at 315. *Staff's arguments are unpersuasive in the context of this NEPA review. Experts agree that this analysis is needed, and the NRC Staff have failed to conduct that analysis, as the State of New York requested in its Scoping Comments.*

128-r-SM/UF

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A. The NRC's Generic EIS and the Draft Supplemental EIS Fail to Review the Safety of the On-Site Storage of Spent Fuel and the Consequences of a Terrorist Attack on the Spent Fuel Pools at Indian Point.

The 1996 NRC Generic EIS and the 2008 Draft Supplemental EIS do not analyze and examine the safety and vulnerability to terrorist attack of the storage of spent fuel at Indian Point. The three spent fuel pools are located outside the reinforced containment structure. Should a terrorist attack be successful, it could result in the release of substantial amounts of radiation that threatens the environment and public health – in one of the most heavily populated areas of the western hemisphere and the financial capital of the world – the New York metropolitan area.

The information regarding the vulnerability of these spent fuel pools, and particularly regarding the Indian Point facility, became widely known and available after the September 2001 terrorist attack on the United States. Thus, the vulnerability of these facilities, and the particularly unique circumstances of Indian Point could not have been, and were not assessed in the 1996 Generic EIS. Therefore, it is appropriate that the significant amount of information on this topic be considered in the Supplemental EIS for the license renewals of Indian Point.

The State of New York set forth its arguments regarding the Spent Fuel Pools in its Petition to Intervene in the license renewal for Indian Point. The Atomic Safety and Licensing Board rejected this Contention on the grounds that it was neither an aging issue to be reviewed under NRC regulations, nor a requirement to be reviewed under NEPA. The Board relied on the NRC's administrative precedent and not on the precedent established by the Ninth Circuit in *Mothers for Peace*. Merely citing to the NRC's *Oyster Creek* decision, the ASLB stated: "NEPA does not require the NRC to consider the environmental consequences of hypothetical terrorist attacks on NRC-licensed facilities." *ASLB Memorandum and Order (Ruling on Petitions to Intervene and Requests for Hearing)* at 120 (July 31, 2008).

The NRC Staff, along with the Atomic Safety and Licensing Board, have misinterpreted NEPA. Moreover, they have mischaracterized the potential impacts as stemming from a "hypothetical" occurrence. New Yorkers are painfully aware that there is nothing hypothetical about a terrorist attack. The State has demonstrated that this scenario could happen, as demonstrated by the events of 9/11, and would result in significant environmental impacts. Thus, the significant environmental impacts from a terrorist attack on the spent fuel pools need to be examined under NEPA.

1. Substantial Evidence Exists that the Threat of a Terrorist Attack Is Real, Yet It Has Never Been Included in Any Environmental Review for Indian Point.

The State of New York's expert, Dr. Richard T. Lahey, served on a committee of the National Research Council of the National Academy of Sciences that studied the issue of the vulnerability of spent fuel pools at nuclear power plants around the United States.[3] The committee was

128-r-SM/UF contd.

[3] The Declaration of Dr. Lahey, and the State's Petition to Intervene, set forth Contention 27 regarding the license renewal proceeding for Indian Point on this issue, which was not admitted into the

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officially called the "Committee on the Safety and Security of Commercial Spent Nuclear Fuel Storage of the Board of Radioactive Waste Management," and it reported directly to the United States Congress.

In 2005, the National Research Council published both public and classified reports of the Committee's study, which Dr. Lahey co-authored. The public report is titled "Safety and Security of Commercial Spent Nuclear Fuel Storage." National Research Council of the National Academies, *Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report*, 2006 (hereinafter called the *Safety and Security Study*.) The Committee studied various possible terrorist attack scenarios and concluded that spent fuel pools, such as those at Indian Point, are indeed vulnerable to terrorist attacks.

Specifically, based upon information provided by the NRC, the National Academy of Sciences judged that "attacks with civilian aircraft remain a credible threat." Id. at 30. The *Safety and Security Study* noted that terrorists might choose to attack spent fuel pools because they are "less well protected structurally than reactor cores" and "typically contain inventories of medium- and long-lived radionuclides that are several times greater than those contained in individual reactor cores." Id. at ¶ 36. The National Academy of Sciences concluded that the storage pools are susceptible to fire and radiological release from a wide range of conditions, including intentional attacks with large civilian aircraft. Id. at ¶¶ 49, 57.

In its regulations, the NRC established a list of impacts that it would be required to assess in a site-specific environmental review. Under the heading "Postulated Accidents," the NRC has included a Category 2 impact of "offsite radiological impacts (individual effects from *other than the disposal of spent fuel* and high level waste)." *Emphasis added. Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants,"* 10 C.F.R. Part 51, App. B to Subpart A.

The NRC's explanatory note for the Category 2 issue of "Severe accidents" states

> The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives. See [10 C.F.R.] § 51.53(c)(3)(ii)(L).

Id. The NRC's Draft Supplemental EIS further supports this conclusion, stating that

> NRC staff has not identified any new and significant information with regard to the consequences from severe accidents during its independent review of the IP2 and IP3 ER (Entergy 2007a), the site visit, the scoping process, or evaluation of other available information. Therefore, the NRC staff concludes that there are no impacts of severe

128-r-SM/UF contd.

proceeding by the Atomic Safety and Licensing Board. The Petition and the cited Declarations were submitted to the NRC on November 30, 2007. These comments cite directly to the Declarations filed by the State of New York in support of its Petition to Intervene in that proceeding.

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accidents beyond those discussed in the GEIS.

Draft NUREG-1437, Supplement 38 at 5 – 4. The Draft Supplemental EIS's extremely limited analysis of accidental radiological release is Entergy's severe accident mitigation analysis (SAMA) evaluation, and the NRC's review of that evaluation set forth in the Draft Supplemental EIS. Thus, the NRC has effectively insulated itself from consideration of this potentially significant environmental impact.

The tragic events on September 11, 2001, palpably demonstrate the incorrectness of the NRC's characterization of the "probability weighted consequences" as "small." On September 11, 2001, terrorists hijacked four jet airliners and crashed three of them into their intended targets. The impact of the fuel-laden planes caused explosions and large, long-lasting fires. Those explosions and fires destroyed a portion of the Pentagon in northern Virginia and caused the collapse of the World Trade Center towers and nearby buildings in New York City. *See Nat'l Comm'n on Terrorist Attacks Upon the U.S.* ("9/11 Commission"), The 9/11 Commission Report (2004) (E 264).

Directly to the point here, two of the hijacked planes flew near or over Indian Point, located a mere twenty-four miles north of New York City. See *Id.* at 32 (E 300). The wind direction at the time of the attacks was towards the southeast – that is, from Indian Point towards New York City. *See Id.* at 285 (E 316-A). The terrorist attacks of 9/11 caused nearly 3,000 deaths. *The 9/11 Commission Report*, at 311 (E 316-B). In comparison, a 2004 study by the Union of Concerned Scientists concluded that a major release of radiation from the Indian Point nuclear power plant could kill as many as 44,000 people within a week and more than 500,000 people over time. *See* Edwin Lyman, *Chernobyl on the Hudson? The Health & Economic Impacts of a Terrorist Attack at the Indian Point Nuclear Plant at* 23 (2004) (E 387). Extrapolating from 2000 census information, more than seventeen million people live within fifty miles of the Indian Point reactors and spent fuel pools. *Id.*

This critical information was not available to the NRC staff in 1996 when it drafted the Generic EIS. The State of New York, however, submitted it to the NRC on several occasions. This information was submitted to the NRC in New York State's Scoping Comments in October 2007. *NY Scoping Comments, Section III. B* at 14, ML073090588. An analysis of this information was not incorporated into the NEPA review. In the intervening months between the Scoping Comments and the December 2008 release of the Draft Supplemental EIS, the State of New York presented to NRC the detailed Declaration of Dr. Lahey supporting Contention 27, referenced above, in its November 30, 2007 Petition to Intervene in the license renewal proceeding for Indian Point. The voluminous and comprehensive information, analysis, and documentary submissions were not addressed by the NRC. Thus, this critical information -- even when available -- has not been analyzed in either the license renewal or the NEPA process. Despite the NRC's repeated refusal to address the evidence on this issue, it is clear and compelling on the spent fuel safety issue.

128-r-SM/UF contd.

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2. The Numerous Efforts by the Government and Others to Report and Analyze the Threat of a Terrorist Attack at Indian Point Demonstrate That It Is Credible and Real.

The 9/11 Commission's report revealed that the mastermind of the terrorist attacks originally planned to hijack additional aircraft to crash into targets on both coasts, including nuclear power plants. *The 9/11 Commission Report*, at 154 (E 304). As late as July 2001, the terrorists were considering attacking a specific nuclear facility in New York, which one of the pilots "had seen during familiarization flights near New York." Id. at 245 (E 308). That facility was most likely Indian Point.

In the years since September 11th, the federal government has repeatedly acknowledged that there is a credible threat of intentional attacks on nuclear power plants, including the specific threat of an aircraft attack. For instance:

> On January 23, 2002, the NRC issued an alert to the nation's nuclear power plants warning of the potential for an attack by terrorists who planned to crash a hijacked airliner into a nuclear facility. Kenneth R. Bazinet & Richard Sisk, *Plant Attacks Feared*, N.Y. Daily News (Feb. 1, 2002), at 5, *available* at 2002 WL 3165383.
>
> In his 2002 State of the Union address, President Bush stated that "diagrams of American nuclear power plants" had been found in Afghanistan, suggesting that Al-Qaeda may have been planning attacks on those facilities. *The President's State of the Union Address* (Jan. 29, 2002), http://www.whitehouse.gov/news/releases/2002/01/20020129-11.html.
>
> On May 14, 2002, Gordon Johndroe, a spokesman for the Office of Homeland Security, noted that "we know that Al-Qaeda has been gathering information and looking at nuclear facilities and other critical infrastructure as potential targets." Bill Gertz, *Security Boosted at Nuke Facilities*, Wash. Times (May 14, 2002), http://www.ohiocitizen.org/campaigns/electric/pre2003/ boosted.htm.
>
> On May 24, 2002, the NRC reported that the nation's nuclear power plants had been placed on heightened alert as a result of information gained by the intelligence community. *Wide-Ranging New Terror Alerts*, CBS News.com (May 26, 2002), http://www.cbsnews.com/stories/2002/05/24/attack/ main510054.shtml.
>
> On November 15, 2002, the FBI sent a bulletin to law enforcement agencies, warning them that Al-Qaeda's "highest priority targets remain within the aviation, petroleum, and nuclear sectors." *Text of FBI Terror Warning*, CBSNews.com (Nov. 15, 2002), http://www/cbsnews.com/stories/2002/ 11/15/attack/main529501.shtml.
>
> On May 1, 2003, the FBI issued a Threat Communication warning the nuclear plant operators to remain vigilant about suspicious activity that could signal a potential terrorist attack. *FBI Warns of Nuke Plant Danger*, CBS News.com (May 1, 2003), available at http://www.cbsnews.com/stories/ 2003/09/04/attack/main571556.shtml.

128-r-SM/UF contd.

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On September 4, 2003, the United States General Accounting Office ("GAO") issued a report noting that the nation's commercial nuclear power plants are possible terrorist targets and criticizing the NRC's oversight and regulation of nuclear power plant security. GAO, *Nuclear Regulatory Commission: Oversight of Security at Commercial Nuclear Power Plants Needs to Be Strengthened*, GAO-03-752 (2003) (E 241-57); *see also* GAO, Testimony Before the Subcomm. on Nat'l Security, Emerging Threats, & Int'l Relations, House Comm. on Gov't Reform, *Nuclear Power Plants Have Upgraded Security, But the NRC Needs to Improve Its Process for Revising the DBT*, GAO-06-555T, at 1 (2006) (E 964) (stating that, "[a]ccording to the [NRC] . . . , there continues to be a general credible threat of a terrorist attack on the nation's commercial nuclear power plants, in particular by al Qaeda and like-minded Islamic terrorist groups").

On July 1, 2004, the FBI issued a bulletin to 18,000 law enforcement agencies nationwide warning that recent intelligence continued to show al-Qaeda's interest in attacking a range of facilities, including nuclear plants. *FBI's 4th Warning*, CBSNews.com (July 2, 2004) http://www.cbsnews.com/stories/2004/07/08/national/printable628204.shtml.

The Federal Emergency Management Agency, another federal agency responsible for assuring the safety and security of the public, has taken actions signifying that it considers an aircraft attack on a nuclear power plant to be a credible threat. For instance, during a June 2004 exercise to assess emergency preparedness at Indian Point, the agency simulated a suicide attack by using a large cargo jet. Fed. Emergency Mgmt. Agency, *Final Exercise Report: Indian Point Energy Center* at 101-02 (Oct. 25, 2004) (E 341-42).

Additionally, post-September 11th scientific studies confirm that nuclear plants remain vulnerable to airborne attacks that could have catastrophic results. The German Reactor Safety Organization, a scientific-technical research group that works primarily for nuclear regulators in Germany, found that large jetliners crashing into nuclear facilities under a variety of scenarios could cause uncontrollable situations and the release of radiation. German Reactor Safety Org., *Protection of German Nuclear Power Plants Against the Background of the Terrorist Attacks in the U.S. on Sept. 11, 2001* (Nov. 27, 2002), *translation available at* http://www.greenpeace.org/raw/ content/international/press/reports/protection-of-german-nuclear-p.2.pdf.

128-r-SM/UF contd.

3. The Analyses of Radiological Release from the Containment Structures of Indian Point, and the Resulting Conclusions, Do Not Apply to the Spent Fuel Pools.

The NRC Staff's extrapolation of the risk of a terrorist attack on spent fuel pools based upon comparison to the risk of a terrorist attack on containment structures is wrong for several reasons.

First, while Entergy's "assurances" – and the NRC's acceptance of them -- may be true for a terrorist attack on or within the primary containment structure, they are not true for a terrorist attack on the spent fuel pools at Indian Point. *Lahey Decl.* ¶ 34. As Dr. Lahey stated, "Indeed, far more radioactivity is present in the spent fuel located in the three spent fuel storage pools at Indian Point than there is in the active core of the two nuclear reactors." *Id.*

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Second, the spent fuel pools are *not* enclosed by a leak-tight containment structure. *Id.* ¶ 35. Rather, they are surrounded by only a confinement building, which is not a leak-tight containment structure. *Id.* Thus, a terrorist attack that leads to pool drainage and a propagating zirconium fire would disperse a significant amount of radiation to the environment. *Id.* The plume of radiation could create significant adverse environmental and health effects and property damage in and around Indian Point and the immediate tri-state area, especially New York City. *Id.* The approximately twenty million people who reside or work within a 50-mile radius of NYC, as well as the trillions of dollars of property in the tri-state region, could be seriously disrupted. *Id.*

As the record in this license renewal proceeding shows, the potential for a terrorist attack on the spent fuel pools at Indian Point is real, and the consequences and environmental impacts could be severe. The following summarizes Dr. Lahey's expert opinion:

> The three Indian Point spent fuel pools are located outside the containment buildings and contain large quantities of radioactive material. *Lahey Decl.* at ¶¶ 32, 35.
>
> Spent nuclear fuel remains extremely radioactive after it is used in nuclear reactors to generate energy. *Id.* at ¶ 32.
>
> Far more radioactivity is present in the spent fuel located in the three spent fuel storage pools at Indian Point than there is in the active core of the two nuclear reactors. *Id.* at ¶ 34.
>
> Spent fuel pools (large "swimming-pool-like structures") were intended to only store fuel temporarily, to allow the fuel to cool sufficiently so that it could then be transferred to a final disposal site in the United States. *Id.* at ¶ 32.
>
> A terrorist attack could lead to pool drainage and a propagating zirconium fire, which means that a significant amount of radiation could be released to the environment. *Id.* at ¶¶ 32, 35.

Dr. Lahey's expert opinions are formed from his years of experience and his recent tenure on the Committee of the National Research Council that examined the safety of on-site storage of spent fuel at nuclear power plants in the United States and their very real susceptibility to the threat of a terrorist attack.

4. The NRC Staff Should Consider Mitigation Measures in the NEPA Review that Address the Threat Posed by the Vulnerability of the Spent Fuel Pools at Indian Point.

Although the *Safety and Security Study* made several recommendations for mitigation, including the rearrangement of the spent fuel in the storage pools and spray cooling, Entergy did not indicate in its initial license renewal application that it adopted these mitigation measures for any of the spent fuel pools at Indian Point. Moving some spent fuel from the spent fuel pools to dry cask storage does not completely mitigate the threat because the pools for the two active

128-r-SM/UF contd.

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reactors at Indian Point will always have spent fuel in them, and that spent fuel is more radioactive than the spent fuel that goes to dry cask storage. In Dr. Lahey's words,

> the two active reactors will continually generate more spent fuel during the proposed renewal period, and because of its decay heat and radioactivity, this spent fuel must remain in the spent fuel pools for some time before it can be moved to dry cask storage (i.e., the natural convective cooling by air in dry cask storage can not keep this fuel cool enough).

Lahey Decl. at ¶ 36. In any event, these or other possible mitigation measures have never been addressed in the NEPA process, precluding public review. *See 40 C.F.R. §§ 1502.14(f), 1502.16(h).*

Despite NRC's refusal to address spent fuel pools (and, as discussed *infra*, evacuation planning) in the NEPA review for Indian Point, it has analyzed some "severe accident mitigation alternatives" (SAMAs) in the Draft Supplemental EIS. These SAMAs, however, do not address the spent fuel vulnerability issue. For example, regarding Indian Point Unit 2, they include creating a reactor cavity flooding system (SAMA 9), providing a portable diesel-driven battery charger (SAMA 28), using fire water as a backup for steam generator inventory (SAMA 44), keeping both pressurizer power-operated relief valve blocks valves open (SAMA 53), installing a flood alarm (SAMA 54), keeping residual heat removal and other valves open (SAMA 56), providing added protection against flood propagation from stairwell 4 and the deluge room (SAMA 60 and 61), and upgrading the alternate safe shutdown system (SAMA 65). *Draft NUREG-1437, Supplement 38* at 5 -9.

Further, regarding these SAMAs, even though NRC concludes several may be cost beneficial, "these SAMAs do not relate to adequately managing the effects of aging during the period of extended operation" and thus, they "need not be implemented as part of the license renewal." *Draft NUREG-1437, Supplement 38* at 9-5. Thus, while the importance of these alternatives is apparently not in issue, their relevance to the spent fuel pool issue clearly is in issue. As the State's expert made clear, the spent fuel pool vulnerability exists because the pools are located *outside* the containment structure. Thus, the SAMAs identified in the Draft Supplemental EIS which address containment structure issues provide no mitigation value whatsoever for spent fuel pools and their vulnerability to terrorist attack.

5. Summary of the Department's Position

Despite the clear legal requirement for assessing all environmental impacts within the context of NEPA review, overwhelming evidence of a threat to the spent fuel pools at Indian Point, the potentially devastating consequences of their failure, and the fact that mitigation measures may exist for such impacts, the NRC has failed to address these concerns in the Draft Supplemental EIS. The Ninth Circuit has held that NEPA requires the NRC to study how its actions are affected by the risk of terrorism. *See San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), *cert. denied*, 127 S. Ct. 1124 (2007). Nonetheless, the NRC continues to find ways to avoid such an analysis, and does so in this case by asserting that the volume of information on the record in the license renewal case is not "new and significant" information. This

128-r-SM/UF contd.

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information was not available in the 1996 review, and has never been considered in any NEPA review for nuclear generating facilities license renewals.

128-r-SM/UF contd.

V. EMERGENCY EVACUATION PLANNING

The Generic EIS and the Draft Supplemental EIS fail to address and analyze the environmental impacts and mitigation measures of an off-site radiological release from Indian Point. The surrounding communities are home to 20 million people and include the financial capital of the world, New York City. Any radiation release scenario is sure to be a complex and profound event, particularly if it is sudden and fast moving. Indian Point is a unique facility in terms of its location, in proximity to millions of people, and to the densely settled area with its complex road network. The challenge presented by these unique facts were not addressed in the Generic EIS, nor in the Draft Supplemental EIS despite the NEPA obligations to do so. The law, prudence, and common sense dictate that the NRC conduct an environmental review of the relevant evacuation plans for Indian Point.

A. THE NRC'S GEIS AND THE DRAFT SUPPLEMENTAL EIS FAIL TO REVIEW THE ADEQUACY OF THE EMERGENCY EVACUATION PLAN FOR INDIAN POINT.

The Draft Supplemental EIS and the Generic EIS that it relies upon did not address either evacuation planning or mitigation measures to address environmental impacts resulting from an evacuation scenario for the communities surrounding Indian Point. It is fortuitous that Indian Point has not had a catastrophic radiological release requiring evacuation of the surrounding communities in the three plus decades it has been operating. These surrounding communities are home to twenty million people and include the financial capital of the world, New York City. Any radiation release scenario is sure to be a complex and profound event, particularly if it is sudden and fast moving. The thorough review, analysis, and consideration of the evacuation planning and mitigation strategies must be addressed for Indian Point because of the unique nature of its location and its heavily populated surrounding areas. The NRC has never undertaken this analysis despite NEPA's mandate for such review.

128-s-EP

The population and infrastructure challenges facing the Indian Point site are unique and significant, and would result in a denial of a new license application if it were pending today. The site would not be able to meet key license criteria, particularly with regard to population density and its implications for evacuation planning. *10 CFR 100.21(h).* This information has been known for some time at the NRC. "I think it is insane to have a three-unit reactor on the Hudson River in Westchester County, 40 miles from Times Square, 20 miles from the Bronx . . . [it is] one of the most inappropriate sites in existence," Robert Ryan, NRC's Director of the Office of State Programs, *Report of the Office of the Chief Counsel on Emergency Preparedness to the President's Commission on the Accident at Three Mile Island, October 31, 1979.* The events that have occurred since this 1979 NRC official's statement demonstrate the relevance of its conclusion today. What is clear is that the implication of the siting of Indian Point in its current location, particularly regarding evacuation planning, has *never* been studied by the NRC for either the initial license issuance in the 1970s, or during the 1996 Generic EIS, or in the currently pending license renewal application or in the Draft Supplemental EIS.

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1. The Indian Point Evacuation Planning Issues Have Not Been Addressed in Either the Generic EIS for Nuclear Power Plant License Renewals, or in the Draft Supplemental EIS.

The State of New York's concerns with the Draft Supplement EIS are the same concerns that the State expressed throughout the license renewal proceeding. In fact, the State has raised many issues and concerns with the 1996 Generic EIS, and had submitted a detailed Contention in the license renewal proceeding. The Atomic Safety and Licensing Board did not accept this Contention in the license renewal proceeding. The Board rejected the Contention on the grounds that the NRC adopted a regulation precluding the necessity of any new findings on emergency preparedness in the context of the NRC's review of a license renewal application. *ASLB Memorandum and Order (Ruling on Petitions to Intervene and Requests for Hearing)* at 129 (July 31, 2008). Concerning NEPA, the Board ruled that emergency planning is a Category 1 issue, addressed in the 1996 Generic EIS, which does not need to be addressed in the Draft Supplemental EIS. *Id.* at 130. New York State has demonstrated, however, that NEPA requires a review of this issue given the unique circumstances of location, population, traffic, etc., relative to the Indian Point facility.

A discussion of the failings of the Generic EIS are particularly relevant to the discussion of the Draft Supplement EIS, and thereby to the overall NEPA process for Indian Point. In the Generic EIS, the NRC categorized impacts as either Category 1 – "generic" impacts or Category 2 – "plant specific" impacts. *Footnote 2, 10 CFR §51, Subpt. A, App. B.* The NRC regulations specifically categorize "Postulated Accidents," which include Design Basis Accidents and Severe Accidents. *Id.* The scope of the Generic EIS reviews these "Environmental Impacts of Postulated Accidents," which includes evacuation planning, and acknowledged the importance of this issue regarding license renewal applications for nuclear facilities. As the Generic EIS makes clear:

> Each licensee is required to establish emergency preparedness plans to be implemented in the event of an accident, including protective action measures for the public. The NRC, as well as other federal and state regulatory agencies, review the subject plans to ensure the condition of on- and off-site emergency preparedness provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. Among the standards that must be met by these plans are provisions for two emergency planning zones (EPZs). A plume exposure pathway EPZ (requiring preplanned evacuation procedures) of about 16 km (10 miles) in radius and an ingestion exposure pathway EPZ (where interdiction of foodstuffs is planned) of about 80 km (50 miles) in radius are required. Other standards include appropriate ranges of protective actions for each of these zones; provisions for dissemination to the public of basic emergency planning information; provisions for rapid notification of the public during a serious reactor emergency; and methods, systems, and equipment for assessing and monitoring actual or potential off-site consequences in the event of a radiological emergency condition.

Generic EIS, § 5, NUREG-1437 Vol. 1 at 5.2.3.3. The analysis of accidents at nuclear generating facilities in the Generic EIS, however, is replete with a statistical and analytical approach to the

128-s-EP contd.

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probability of accidental release, not the consequences of how a community is going to react or be directed. *Generic EIS §§ 5.3.2; 5.3.3.* The Generic EIS specifically notes that "For Indian Point units, NRC staff evaluations also indicated that external events could significantly contribute to severe accident risks." *Id. at § 5.3.3.1.* The Generic EIS discusses the emergency planning and factors it into these risk calculations, but it fails to directly address the mechanisms, efficacy, and effectiveness of actual evacuation plans. The methodology undertaken and the discussion of evacuation planning in the Generic EIS analysis underscore the point.

> Evacuation can have a significant influence on early fatality risk but a much more limited impact on latent fatality risk. *Generic EIS § 5.3.3.2.1.*
> Although there are other secondary factors (e.g. source term and dose response relationship) that can influence risk and were not specifically analyzed on a plant-specific basis in this GEIS, these factors were not ignored as their impact is included in the FES analysis whose results are the basis for the GEIS analysis. Consequently, their effects are indirectly considered in the prediction of future risks and are reflected within the uncertainty bounds generated by the regression of the FES risk values. To ensure that the existing FES analyses cover a range of secondary factors representative of the total population of plants, the more significant secondary factors were examined as discussed below. The secondary factors area as follows:
>
> > Average annual precipitation,
> > Residential population within a 50-mile (80km) radius of the plan,
> > General terrain, and
> > Emergency planning.
>
> **Evacuation Planning.** Even in the event of a release of radioactive material from a plant, protective actions can be taken to move or shelter members of the public in the projected path of the radioactive cloud. The success of these actions in preventing exposure of members of the public to the radioactive material is dependent upon the warning time available prior to the release and the time it takes to carry out the protective actions. In general, this latter item (the time to carry out the protective action) is mostly influenced by the size of the population around the plant. Each FES that addresses severe accidents considers the effects of site-specific emergency planning in calculating exposures and risks to the public. Since the FES plants include sites with populations that reasonably cover the range of populations at all 74 sites, a range of emergency planning is considered in the data used for the predictions of early and latent fatalities during the license renewal period. Thus, the GEIS analysis should reasonably account for the effects of emergency planning.

Id. In sum, the Generic EIS never addressed the specific situations and challenges posed by evacuation for Indian Point. And, the document that is site-specific – the Draft Supplemental EIS – does not do it, either. Thus, it is clear from the record that there has been no NEPA analysis of the efficacy and effectiveness of evacuation planning for Indian Point.

In their response to the State's Petition to Intervene, NRC Staff argued that "the GEIS specifically considers the environmental impacts of postulated accidents, and treat this as a

128-s-EP contd.

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Category 1 issue such that it need not be addressed in a site-specific ER . . . Thus, this issue has been resolved by the Commission's regulations adopting the GEIS and is not appropriate for further consideration in this license renewal proceeding." *NRC Staff Response at 83–84.* The NRC conclusion, again supported the incredibly restrictive scope of the Generic EIS, and restricts further consideration of this critical issue despite the wealth of information and plethora of sources that offer insight into the analysis, and potential mitigation strategies. In addition to the significant failings of the evacuation plan itself, the location of Indian Point is unique among licensed nuclear generating facilities in the United States. Such unique attributes and their implications for emergency planning were not addressed in the Generic EIS and the NRC position is that they do not have to be reviewed. The law, however, requires that these alternatives to mitigate severe accidents be considered for all plants that have not considered such alternatives. *See 10 C.F.R. § 51.53(c)(3)(ii)(L). 10 C.F.R. Part 51, Appendix B, Table B-1; Robertson v Methow Valley Citizens Counsel, 490 U.S. 332, 335 (1989).* In fact, the only passing reference in documents in this license renewal application involve the applicants *Environmental Report* and its passing mention "severe accidents on the surrounding environment and members of the public" in its SAMA analysis. *Entergy Environmental Report § 4.21.5.1.3.*

In addition to the independent review performed for the State of New York and submitted to NRC in the license renewal proceeding, the actions of municipal governments responsible for the health and public safety of the communities surrounding Indian Point must also be taken into consideration regarding the environmental impacts of an evacuation scenario. Since 2003, three of the four counties immediately surrounding Indian Point, which are responsible for actually implementing the evacuation plan for Indian Point, have refused to *certify* the emergency plan to the federal government. *See New York State Petition, Contention 29* at 268–70, *Williams Decl. at ¶¶ 19, 20.* In fact, on November 29, 2007, Westchester County, the host county to the Indian Point facility, decided it would no longer participate in State and federal drills of the Indian Point evacuation plan, stating that "until the Nuclear Regulatory Commission or FEMA, or both, compel Entergy to commit the attention, personnel, technology and funding necessary to ensure offsite emergency preparedness . . .[I]t was demonstrated that Entergy was not serious about its participation. Entergy's staffers assigned to the practice drill were unprepared to participate, unfamiliar with the process and uninformed about the drill scenario." *Letter from Andrew Spano, County Executive, Westchester County to Chairman Dale E. Klein, USNRC (Nov. 27, 2007), EDATS#: SECY-2007-0561.* These actions by local officials clearly establish their conclusion that severe accident risks are not mitigated by the evacuation plan.

128-s-EP contd.

2. The Unique Situation and Challenges Posed by Indian Point Require a Full Review of the Emergency Evacuation Plan in the Supplemental EIS.

By most almost every measure, Indian Point is not a common nuclear generating facility. Indian Point is unique by virtue of where it is located, and the 1996 Generic EIS analysis of evacuation issues applied to 74 nuclear facilities across the United States cannot account for these unique local characteristics. The siting of the facility in a location with a tangle of roads, a high population density, and a major transportation challenge posed by corridors that are easily rendered impassable, demonstrates the uniqueness of Indian Point. The 2003 independent review of the off-site emergency preparedness at Indian Point produced a report that methodically analyzed the evacuation plan and sets forth its major deficiencies related to the

35 of 40

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Emergency Planning Zone.[4] *Review of Emergency Preparedness of Areas Adjacent to Indian Point and Millstone* by James Lee Witt Associates ("2003 Witt Report"); updated by the *Declaration of Raymond C. Williams ("Williams Decl.")* at ¶. 6.

> Our traffic studies, and extensive travel in the area while preparing the 2003 Witt Report, highlighted the inadequacy of the road system to handle a sizeable evacuation. Thus the road system made the implementation of evacuation difficult as a protective action strategy. At the same time the population density made the consequences of ineffective implementation of protective action strategies more serious.

Williams Decl. at ¶. 21.

> The dose saving standard used by NRC makes sense and on its face may seem to be uniformly applicable to all nuclear power plants in the United States. But the barriers to effective evacuation plans must be taken into account, particularly with regard to unique situations posed by nuclear facilities like Indian Point. Thus, if the barriers to attaining dose savings through effective evacuation are greater at Indian Point, then the evacuation plans and actions taken need to be more effective and fully reflective of the unique challenges posed by Indian Point.

Williams Decl. at ¶. 24. This represents the only comprehensive review of its type ever undertaken for Indian Point. In fact, even the Indian Point Independent Safety Evaluation report, undertaken at the behest of the applicant "did not attempt to assess the details or projected effectiveness of evacuation planning." *Indian Point Independent Safety Evaluation*, July 31, 2008 at 8, 23. The 2003 Witt Report represents a comprehensive expert evaluation of these evacuation planning issues and it concluded that the failures at Indian Point are real, credible, and tangible issues that must be addressed. Since they pose significant site-specific environmental impacts, they must be reviewed in the Supplemental EIS for Indian Point.

Experts who have reviewed in detail the evacuation plan for Indian Point have concluded that the infrastructure and roadways render the evacuation plan almost meaningless.[5] These same experts have also concluded that in major evacuation scenarios, even first responders presumed to remain where directed and perform their duties may not heed or obey direction, but instead flee the vicinity of the disaster with their family and seek shelter elsewhere.

128-s-EP contd.

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[4] The ten- and fifty-mile Emergency Planning Zones were designated based upon a joint NRC – EPA study entitled, *"Planning Basis for the Development of State and Local Government Radiological Emergency Preparedness Plans in Support of Light Water Nuclear Power Plants,"* NUREG-0396, 12/78; 10 CFR § 50.47(c)(2).

[5] The Declaration of Raymond Williams, and the State's Petition to Intervene, set forth Contention 29 regarding the license renewal proceeding for Indian Point on this issue, was not admitted into the proceeding by the Atomic Safety and Licensing Board. These comments cite directly to the Declarations filed by the State of New York in support of its Petition to Intervene in that proceeding.

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> We were surprised how many first responders within the EPZ told us in 2002 that, because they believe that the evacuation plans cannot work, they intend to get their family to safety before performing the emergency related requirements of their position. Making the situation worse and more complicated is the notable degree to which the local populace indicates that they will not take actions recommended by the plant and/or local jurisdictions.

Williams Decl. at ¶. 23. As Mr. Williams noted regarding the purpose of the evacuation plan, *"The overall objective of emergency response plans is to provide **dose saving** (and in some cases **immediate life savings**) for a spectrum of accidents that could produce off-site doses in excess of Protective Action Guides." Emphasis added. Williams Decl.* at ¶ 21; *"Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,"* NUREG 0654/ FEMA REP-1, Rev. 1, March 1987 (emphasis added). Moreover, "variations in plants and surrounding communities … make dose savings [from radiation release] through application of existing standards problematic." *Williams Decl. at* ¶21. For Indian Point, unique considerations make protective actions more difficult and they make the consequences of failure greater. *Williams Decl. at* ¶ 21.

In 2007, James Lee Witt Associates conducted another review to determine if any changes are warranted to the conclusions about the failures of the evacuation plan originally identified in the 2003 Witt Report. Unfortunately for the surrounding communities and the millions of people in them, many of the deficiencies remain.

> [T]here were substantial issues with planning, training, and exercises that had to be resolved to ensure the safety of citizens in the surrounding areas from a significant radiological release from Indian Point. In particular, JLWA raised issues about outdated and ineffective aspects of the planning process, inadequate public outreach and education, outdated communications systems and hazard assessment technologies, lack of first responder confidence in plans, problems associated with spontaneous evacuation, the inadequacy of the road system, and the high population density within the ten-mile Emergency Planning Zone. *Williams Decl.* at ¶ 7.

The 2003 Witt Report highlighted "significant planning inadequacies, expected parental behavior that would compromise school evacuation, difficulties in communications, outdated vulnerability assessment, the use of outdated technologies, lack of first responder confidence in the plan(s), problems caused by spontaneous evacuation, the nature of the road system, the thin public education effort, and how these issues may impact an effective response in a high population area." The report concluded that

> [N]one of these problems, when considered in isolation, precludes effective response. When considered together, however, it is our conclusion that the current radiological response system and capabilities are not adequate to overcome their combined weight and protect the people from an unacceptable dose of radiation in the event of a release from Indian Point. We believe this is especially true if the release is faster or larger than the typical exercise scenario.

128-s-EP contd.

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Williams Decl. at ¶ *8.* As was the case in 2003, the emergency evacuation plan fails to adequately address the challenges of an evacuation response to an off-site radiological release from Indian Point.

> The issues that the 2003 Witt Report raised about the road infrastructure surrounding Indian Point still exist. Based on information received by the counties, the road system around Indian Point is still not sufficient for a large-scale evacuation.
> The most recent figures from 2006 indicate that in aggregate the counties grew 4.49 percent from 2000 to 2006, with Orange County experiencing the greatest growth at 10.26 percent and Westchester the least at 2.8 percent. Population growth in areas served by rural roads makes the evacuation problems more difficult.

Williams Decl. at ¶. *11.* Detailed analysis has concluded that the constraints of the roadways are significantly greater than earlier believed and that increases in population and population density further exacerbate the inability of the plan to adequately evacuate the population surrounding Indian Point. As a 2003 evacuation time estimate makes clear, "a 66% increase in the estimated time an evacuation would require in favorable weather conditions." *Williams Decl.* at ¶. *12.* The timeliness of evacuation warnings should the siren systems fail and the narrow roads and hilly terrain within the ten-mile Emergency Planning Zone would make safe evacuation highly unlikely, if not impossible. The level of detail and analysis regarding the location specific characteristics of Indian Point was neither available nor used during the original license proceeding, nor was this information used in the 1996 Generic EIS. Thus, the conclusions reached in that Generic EIS based upon a lack of information that makes the unique attributes of Indian Point plain and evident, and that categorizes emergency planning as an area not needing site specific review, must be rejected.

128-s-EP contd.

3. The Legal Conclusion that First Responders Will Perform as Trained Is Undercut by Actual Experience during Hurricane Katrina and by Information Received from First Responders Located in the Communities Surrounding Indian Point.

The emergency planning and evacuation failures experienced during Hurricane Katrina further demonstrate the real world inadequacies of Indian Point's evacuation plan and its underlying assumptions. *See generally* Cooper and Block, *Disaster, Hurricane Katrina and the Failure of Homeland Security*, Times Books (2006); *A Failure of Initiative, Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina*, Report No. 109-377 (2006). Serious questions exist about how first responders would react in responding to a radiological release based upon the Hurricane Katrina disaster.

> [T]he Katrina event validates our findings in the 2003 Witt Report, to the effect that first responders might provide for the safety of their families before they responded to the event. In this connection, it is interesting to note that, in general, the public is more fearful about radiation and radiological releases, particularly from nuclear power plants, than about the consequences to them and their families from hurricanes.

Williams Decl. at ¶ *29.* A survey of local emergency responders further demonstrates the potentially significant challenges facing the effective implementation of the evacuation plan.

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> A survey was conducted by Ecology and Environment, Inc. for the New York State Emergency Management Office in July 2004 and February 2005 to provide a baseline, and again in July 2006 to determine changes. In 2004, 69 percent of respondents indicated that they would not follow advice from public authorities. The follow-on survey conducted in 2006 saw that number drastically increase to 91 percent. First responder intentions and attitudes found among the general populace work together to make it even less likely that the evacuation plans will be effectively implemented.

Williams Decl. at ¶ 23. For these reasons, legal and factual conclusions asserting that the first responders will respond appropriately and according to plan are of questionable value.

4. Mitigation Measures that Address Emergency Evacuation Planning Concerns for Indian Point Exist and Must Be Considered in the NEPA Review.

In support of its Petition to Intervene in the License Renewal Proceeding, the State of New York has submitted to the NRC information about numerous mitigation measures that could be implemented to improve the effectiveness of emergency planning at Indian Point. Several of identified mitigation measures are within the power of Entergy to help implement. *Williams Decl. at* ¶¶ 15-25. These mitigation measures include:

> region-wide process to engage stakeholders in developing emergency planning guidelines and performance outcomes;
>
> improved school evacuation procedures; and
>
> if the barriers to attaining dose savings through effective evacuation are greater at Indian Point [which they are], then the evacuation plans and actions taken need to be more effective and fully reflective of the unique challenges posed by Indian Point.

Williams Decl. at ¶¶ 15, 17, 18, 24.

The Entergy *Environmental Report*, in its generic discussion of evacuation planning and the Draft Supplemental EIS, which purports to be Indian Point specific, similarly fail to consider any of the carefully developed and authoritative suggestions for mitigating severe accident consequences for Indian Point set forth by the State of New York. By excluding this review and analysis in the Draft Supplemental EIS, the NRC Staff has not met its obligations under NEPA.

5. Summary of the Department's Position

The NRC concluded that it has "not identified any information that is both new and significant related to Category 1 issues that would call into question the conclusions of the GEIS." Draft NUREG-1437, Supplement 38, at 9-4. Issues that the NRC identifies as Category 1 in its 1996 Generic EIS do little more than provide a baseline NEPA environmental review for the 74 nuclear generating facilities in the United States, without addressing any information regarding unique situations for facilities like Indian Point. The NRC argues that the Category 1 and Category 2 structure which narrows the scope of review for the GEIS is appropriate. The

128-s-EP contd.

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restrictive scope of this 1996 NRC review renders the generic conclusions meaningless for a facility as unique as Indian Point. As the State of New York has set forth in these comments, and repeatedly on the record in the license renewal proceeding, this generic approach does not include the necessary detailed analysis regarding the deficiencies and failures of the evacuation plan for Indian Point.

The reasons that the evacuation plan must be subject to full NEPA public review are many. They include complex and questionable assumptions regarding the evacuation of school children, the impacts of shadow and spontaneous evacuation of people and families living and working in areas surrounding the nuclear power plant, and they go to the significant and dramatic lack of faith of the emergency services providers that the plan can be implemented. These emergency planning issues, and consideration of the identified mitigation measures for such potentially significant adverse environmental impacts, which are normally the subject of NEPA EIS review, have not been addressed for Indian Point. NRC must address these issues and fully analyze and study mitigation measures prior to issuing the final Supplemental EIS for Indian Point.

128-s-EP contd.

V. CONCLUSION

The record is clear in this case that the NRC's Draft Supplemental EIS does not adequately, accurately, or completely address the issues raised in the State's Scoping Comments. Yet, despite these shortcomings, or perhaps because of them, the Draft Supplemental EIS concludes that the current level of environmental impacts do not need to be altered or changed, and further that these impacts should not serve as an impediment to license renewal for Indian Point. This conclusion, which is based upon a partial and unsatisfactory Draft Supplemental EIS analysis, raises many levels of concern.

The NRC Staff's conclusion contradicts the NRC's deference to the State's Clean Water Act delegated permitting process, through which the State issued a draft permit requiring Indian Point to install newer and more modern cooling water intake systems if the license renewal is granted. It also fails to adequately address crucial environmental impacts -- such as impingement and entrainment, thermal impacts, impacts to endangered and other species, the impacts from a terrorist attack on the spent fuel pools, and the impacts from an inadequate emergency evacuation plan -- all caused by the current operation of Indian Point. This is critical because granting a license renewal without addressing these environmental concerns will ensure that they continue for another 20 years.

In sum, the NRC's Draft Supplemental EIS is not complete, is inadequate, and therefore does not comply with NEPA. The NRC must fully, thoroughly, and properly address the issues raised by the State of New York in the Final Supplemental EIS for the Indian Point license renewal application. NEPA requires that the State's concerns be addressed and taken into consideration as part of the NRC's decision-making process.

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COMMENTS SUBMITTED BY THE NEW YORK STATE OFFICE OF THE ATTORNEY GENERAL ON THE DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT PREPARED BY THE STAFF OF THE NUCLEAR REGULATORY COMMISSION FOR THE RENEWAL OF THE OPERATING LICENSES FOR INDIAN POINTS UNITS 2 AND 3, BUCHANAN, NEW YORK

submitted to the United States Nuclear Regulatory Commission
March 18, 2009

1

TABLE OF CONTENTS

1

COMMENTS SUBMITTED BY THE NEW YORK STATE OFFICE OF THE ATTORNEY GENERAL ON THE DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT PREPARED BY THE STAFF OF THE NUCLEAR REGULARLY COMMISSION FOR THE RENEWAL OF THE OPERATING LICENSES FOR INDIAN POINTS UNITS 2 AND 3, BUCHANAN, NEW YORK

March 18, 2009

PRELIMINARY STATEMENT

On April 30, 2007, the Nuclear Regulatory Commission ("NRC") received an application from Entergy Nuclear Operations ("Entergy" or the "applicant") dated April 23, 2007, for renewal of the operating licenses of Indian Point Units 2 and 3 in the Village of Buchanan, New York. As part of its license renewal application obligations, the applicant submitted an Environmental Report which informs, but does not supplant, the NRC's obligation to assess the potential environmental impacts of granting the license pursuant to the National Environmental Policy Act ("NEPA").

The 1996 Generic Environmental Impact Statement

The NRC has created a dual-track NEPA system which includes a generic look at certain issues which NRC believes to be applicable to every licensed reactor regardless of site-specific conditions (called Category 1 issues), and a site-specific supplement which addresses other issues local to each facility's environmental conditions (Category 2 issues). In May 1996, the NRC produced a Generic Environmental Impact Statement ("GEIS") for License Renewal of Nuclear Plants. *See* NUREG-1437, "*Generic Environmental Impact Statement for License Renewal of Nuclear Plants*" (May 1996); *see also* 61 Fed. Reg. 28,469 (June 5, 1996); 61 Fed. Reg. 66,546 (Dec. 18, 1996). According to the

129-a-LR

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NRC, "[a]n applicant for license renewal may adopt the conclusions contained in the GEIS for Category 1 impacts, absent new and significant information that may cause the conclusions to fall outside those of the GEIS." NRC, Environmental Impact Statement Scoping Process Summary Report Indian Point Nuclear Generating Station Unit Nos. 2 and 3, Village of Buchanan, New York (Dec. 2008), ML083360115 ("Scoping Summary Report").[1] Despite its age and the many changes that have taken place since its creation, the GEIS still forms the basis for the NRC's NEPA review of relicensing applications. Moreover, the Commission has failed to undertake a ten-year review of the GEIS as it obligated itself to do when it promulgated the GEIS in 1996. *See* Part 51, Subpart A, Appendix B. Accordingly, the Commission must thoroughly review all environmental impacts associated with license renewal.

129-a-LR contd.

[1]The GEIS defines the purpose of the major federal action of renewing a nuclear power plant license as providing "an option that allows for power generation capability" beyond the term of the current license "as such need may be determined by State, utility and, where authorized, Federal (other than NRC) decision makers. GEIS at § 1.3. While this statement of purpose may be an accurate description of the process that occurs in other states, this statement of purpose is inapplicable to New York State. Under the current legal system in this State, the New York State Public Service Commission does not commence a separate process to review the renewal of an operating license of a power reactor. By inaccurately defining the purpose of license renewal as giving an option to a non-existent state determination of need, the NRC may be shirking its responsibility to fully analyze the impacts of license renewal because it assumes that the plant may never operate into its license renewal term if another party determines there is no need for its capacity.

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The Draft Supplemental Environmental Impact Statement

On August 10, 2007, the NRC published a Notice of Intent in the Federal Register to notify the public of the Staff's intent to prepare a draft plant-specific supplement to the GEIS ("DSEIS") regarding the renewal application for the Indian Point Unit 2 and Unit 3 operating license. 72 Fed. Reg. 45075 (Aug. 10, 2007). In this Notice, the NRC sought scoping comments from the public and interested governmental agencies.

On October 31 and November 30, 2007, New York State Executive Agencies and the New York State Office of the Attorney General (the "State") submitted extensive scoping comments to the Nuclear Regulatory Commission ("NRC") arguing, among other things, that: the National Environmental Policy Act ("NEPA") required the NRC to perform an Indian Point-specific environmental impact statement ("EIS"); the Generic EIS on which NRC has relied for over a decade is stale and void; and that the NRC must fully assess issues including: the environmental consequences of a terrorist attack or other unplanned release of radioactive materials from the facility; the potential impacts of an earthquake in the New York region, which has recently been shown to be more likely than the NRC had previously believed; the potential long-term environmental impacts of keeping spent fuel on the Indian Point site for many decades; and the alternatives to keeping Indian Point open for another 20 years. The State also reminded the NRC of its obligation to assess the potential impacts of low-level radioactive waste in light of the closure of the nation's only disposal facility for such waste.

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On December 31, 2008, NRC Staff noticed the DSEIS in the Federal Register for public comment. *See* 73 Fed. Reg. 80440 (Dec. 31, 2008). The State now submits comments on the DSEIS.[2]

Background: The National Environmental Policy Act

The National Environmental Policy Act of 1969 ("NEPA") "places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action," and "ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Baltimore Gas & Elec. Co. v. Natural Res. Def. Counsel, Inc.*, 462 U.S. 87, 97 (1983). NEPA requires that federal agencies take a "hard look" at the environmental impacts of proposed actions, specifically

> (i) the environmental impact of the proposed action,
>
> (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
>
> (iii) alternatives to the proposed action,
>
> (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
>
> (v) any irreversible and irretrievable commitments of resources which would be involved if the proposed action should be implemented.

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[2]Today, the New York State Department of Environmental Conservation also submits under separate cover written comments on various aspects of the DSEIS including impacts to aquatic organisms and habitats, emergency planning and evacuation, and security issues. The Office of the New York State Attorney General adopts by reference those additional comments.

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42 U.S.C. § 4332.

COMMENTS

I. The DSEIS Should Examine the Potential Environmental Impacts From Long-Term On-Site Storage of Spent Nuclear Fuel, Since the NRC Has Recently Changed Its Position on Waste Storage

The Commission has determined that the applicant's Environmental Report need not discuss any aspect of storage of spent fuel for the facility that is within the scope of 10 C.F.R. § 51.23(a)'s generic determination that spent nuclear fuel can safely be left on-site, and in accordance with 10 C.F.R. § 51.23(b). The Commission based its determination based on the Nuclear Waste Policy Act of 1982 and the Commission's Waste Confidence Rule, 10 C.F.R. § 51.23. However, the Commission has recently "updated" its Waste Confidence Decision in a way that fundamentally changes its underpinnings with respect to the long-term storage of nuclear power plant spent fuel. The State submitted extensive comments challenging the Commission's Waste Confidence Decision Update and proposed changes to 10 C.F.R. § 51.23 on February 6, 2009. As the State argued in its February 6, 2009 comments, the Waste Confidence Decision Update violates NEPA, the Administrative Procedure Act, and the Atomic Energy Act, and as a result, the NRC is obligated here to consider the potential environmental impacts from leaving spent nuclear fuel on the Indian Point site, 24 miles north of New York City, and in proximity to 20 million people, for an indefinite period of time.

129-b-UF

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10 C.F.R. § 51.23(a) states that the NRC has confidence that a mined geologic disposal site for spent fuel would be available by 2025 and that no adverse environmental impacts would be associated with the continued storage of spent fuel at power reactor sites for 30 years after cessation of operation. *See* 10 C.F.R. § 51.23(a); 55 Fed. Reg. 38472 (Sept. 18, 1990). Based on this confidence, 10 C.F.R. § 51.23(b) does not require the environmental impacts of spent fuel storage to be examined in connection with the issuance of an operating license for a power reactor. *See* 10 C.F.R. § 51.23(b). This finding is reflected in the 1996 Generic Environmental Impact Statement (NUREG-1437) and 10 C.F.R. Part 51, Appendix B, Table B-1. However, on October 9, 2008, the Commission "remove[d] its expectation that a repository will be available by 2025." *See* 73 Fed. Reg. 59551 (Oct. 9, 2009)(Waste Confidence Decision Update). At the same time, the Commission also stated that it "retains confidence that spent fuel can be safely stored with no significant environmental impact until a repository can reasonably be expected to be available and that the Commission has a target date for the availability of the repository in that circumstance." *See* 73 Fed. Reg. 59558. The Commission proposed amending 10 C.F.R. § 51.23 to reflect these revised policies, stating in an open-ended fashion and without a date certain that "spent fuel generated in any reactor can be stored safely and without significant environmental impacts beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent fuel

129-b-UF contd.

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storage installations until a disposal facility can reasonably be expected to be available." 73 Fed. Reg. 59547 (Oct. 9, 2008)(Temporary Storage Rule).

The October 9, 2008 statements constitute new and significant information as that term is defined under NEPA and regulations promulgated by CEQ and the NRC. Pursuant to 10 C.F.R. § 51.95, post-construction supplemental environmental impact statements at the license renewal stage must address the same issues as required by § 51.71. *See* 10 C.F.R. § 51.95(c)(1). 10 C.F.R. § 51.71 requires a draft environmental impact statement to including "consideration of major points of view concerning the environmental impacts of the proposed action and the alternatives, and contain an analysis of significant problems and objections raised by other Federal, State, and local agencies, by any affected Indian tribes, and by other interested persons." 10 C.F.R. § 51.72(a)(2) requires an update to the supplemental environmental impact statement if "[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. 10 C.F.R. § 51.72(a)(2); *see also* 10 C.F.R. § 51.95.

NRC Staff, in the DSEIS, did not acknowledge that the NRC had changed its view concerning the length of time for which spent fuel is expected to be stored on the Indian Point site. Thus, NRC Staff did not consider significant new information as it is required to do under NEPA and its regulations.[3] Since the NRC has now removed the

129-b-UF contd.

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[3]In fact, in Section 6.1 of the DSEIS, NRC Staff states that it "has not identified any new and significant information during its independent review of the IP2 and IP3 (continued...)

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basis that existed for the findings contained in § 51.23 and the GEIS but has yet to legally replace them with any new findings, the Staff is obligated to address any unresolved environmental impacts that may be caused by the indefinite storage of spent fuel at Indian Point. The failure to examine such new and significant information violates NEPA and regulations promulgated by CEQ and the NRC. 42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1502.9(c)(1)(I); 10 C.F.R. § 51.72(a)(2).

The State of New York recognizes that this Board, as well as other Atomic Safety and Licensing Boards have rejected contentions based on the storage of spent fuel at power reactor sites. *See In the Matter of Entergy Nuclear Operations, Inc.*, Docket Nos. 50-247-LR and 50-286-LR, ASLBP No. 07-858-03-LR-BD01 (Indian Point Units 2 and 3), Memorandum and Order (Dec. 18, 2008); *In the Matter of Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.*, Docket No. 50-271-LR; ASLBP No. 06-849-03-LR; LBP-06-20 (Vermont Yankee Nuclear Power Station), Memorandum and Order (Sept. 22, 2006); *Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc.*, Docket No. 50-293-LR; ASLBP No. 06-848-02-LR; LBP-06-23 (Pilgrim Nuclear Power Station), Memorandum and Order (Oct. 16, 2006). However, no court has had the opportunity to evaluate the sufficiency of an environmental impact statement in the context of license renewal since the NRC has changed its course

129-b-UF contd.

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[3](...continued)
ER, the site audit, the scoping process, or evaluation of other available information" that must be brought to the Board's attention. DSEIS at 6.1. That statement reflects a total disregard of the significant new information reflected by the Commission's October 9, 2008 finding.

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regarding waste disposal and the length of time for which spent fuel will remain on-site. The State submits that earlier caselaw, based on 10 C.F.R. § 53.21 as it contemplated the availability of a waste repository within a finite period of time, is no longer applicable to the current, changed circumstances regarding waste storage at Indian Point. As discussed below, the DSEIS's discussion of potential impacts on land use is also insufficient, both because it fails to discuss off-site land use impacts, and it fails to take into account new information regarding the length of time for which waste will remain on-site.

129-b-UF contd.

II. The DSEIS's Discussion of the Environmental Impact of Possible Long-Term On-Site Storage of Low-Level Radioactive Waste is Insufficient

The State brought issues related to the storage of low-level waste to the NRC Staff's attention in its scoping comments dated November 23, 2008, but the NRC Staff failed to respond to them in the Scoping Summary Report. *See* generally Scoping Summary Report. In the Environmental Report, Entergy described how low-level radioactive waste is temporarily stored on-site and then ultimately shipped to disposal facilities in Barnwell, South Carolina and Clive, Utah after the wastes have been processed at facilities in Tennessee. *See License Renewal Application, Appendix E* at page 3-19. However, on November 2, 2007, after Entergy's ER had been completed, the State of South Carolina announced that the Barnwell facility would only accept low-level radioactive waste from generators in the three states, Connecticut, New Jersey and South Carolina, that are part of the Atlantic Low-Level Waste Compact. On the same

129-c-RW

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date, the NRC issued a press release acknowledging the challenge of handling low-level radioactive waste:

> Those challenges include the anticipated closure to most of the nation in 2008 of the Barnwell, S.C., LLW disposal facility. Barnwell is currently the nation's only commercial disposal option for certain wastes, and its closure could force licensees to store waste on-site until other disposal options become available. In addition, operation of new uranium enrichment facilities, potential nuclear fuel reprocessing facilities and commercial nuclear power plants will create additional demand for LLW disposal capacity.

NRC Press Release 07-146 (Nov 2, 2007).

Barnwell's closure coupled with the increased demand for disposal space triggered by the construction or renewal of facilities that also will generate additional low level radioactive waste, underscore the need to examine the environmental impacts caused by the storage, disposal, or transportation of low level radioactive waste generated by Indian Point during the 20 to 27 year term of a renewed license – as well as the low level radioactive waste already stored at the site from previous and ongoing operations.[4] Commissioner Jaczko recently stated that "it is important that the generation, management, and disposal of low-level waste be done in a manner that has the confidence of the public" and that "[t]he only way to gain that confidence is to have an honest and open debate that ensures the public understands these issues." *See* Public

129-c-RW contd.

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[4]Indeed, according to Edward Sproat, then-director of the Energy Department's Office of Civilian Radioactive Waste Management, low-level waste is a "bigger issue than high-level nuclear waste." *See* Katherine Ling, N.Y. Times, Low-level waste emerges as hurdle for new nuclear reactors, *available at* http://www.nytimes.com/gwire/2009/03/16/16greenwire-lowlevel-waste-emerges-as-hurdle-for-new-react-10146.html (Mar. 16, 2009).

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Confidence Needed for Successful Low-Level Waste Management, Prepared Remarks for The Honorable Gregory B. Jaczko, Commissioner, USNRC, Waste Management Conference, Phoenix, Arizona (Mar. 2, 2009). The State submits that public confidence in low-level waste management cannot be achieved without NRC Staff making explicit, to communities surrounding each reactor and the nation as a whole, through vehicles like the instant DSEIS, what will become of each reactor's low-level radioactive waste.

The DSEIS gives only the most cursory attention to this challenging problem. NRC staff apparently learned in discussions with Entergy during an NRC environmental site audit that Entergy is considering storing all future low level radio waste on-site, despite the fact that one disposal facility in Utah remains open to receive Class A wastes. DSEIS at 2-20 - 21. According to the DSEIS, Entergy assured NRC staff that it would be able to safely store its low level radioactive waste on site in existing buildings in the near term. There is no analysis for the basis of this assurance, which NRC staff apparently accepted at face value.

The DSEIS states that Entergy is "developing a comprehensive plan to address the potential need for long-term storage." *Id.* Long-term, on-site storage of low-level nuclear waste at Indian Point is an environmentally substantial change from Entergy's previous operations, when much of its low-level radioactive waste was moved off-site to disposal facilities. However, the DSEIS provides no details or analysis of Entergy's

129-c-RW contd.

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undefined plan to store low-level radioactive waste.[5] Before relicensing Indian Point and allowing it to accumulate low-level radioactive waste on-site for 20 years, the NRC should analyze, in the DSEIS, the possible environmental consequences of long-term storage.[6] The DSEIS's incomplete approach to this problem is insufficient.

129-c-RW contd.

III. The DSEIS Does Not Analyze Off-Site Land Use Impacts, Including the Impact of the Continued Operation of IP2 and IP3 for Another 20 Years on Real Estate Values in the Surrounding Areas

In its Environmental Report, Entergy limited its analysis of the impact of license renewal on off-site land use to plant-related population growth or to land development driven by tax revenues generated by the plant during the license renewal period and concluded that the impact of relicensing on off-site land use would be small. The Licensing Board in this case rejected Entergy's narrow focus and determined that Entergy should have considered the effect of license renewal on the real estate values in the surrounding area, as New York urged in its Contention 17. Memorandum and

129-d-AL/LU

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[5]The management of low-level radioactive waste is in active litigation in other licensing proceedings as well. For example, a contention alleging that an applicant's combined operating license is incomplete because the FSAR fails to consider how the applicant will comply with NRC regulations governing storage and disposal of LLRW in the event an off-site waste disposal facility remains unavailable when the facility begins operation was recently admitted in the Vogtle proceeding. *See In the Matter of Southern Nuclear Operating Co.*, Docket Nos. 52-025-COL and 52-026-COL, ASLBP No. 09-873-01-COL-BD01 (Vogtle Electric Generating Plant, Units 3 and 4), Memorandum and Order (Mar. 5, 2009), at 20-27.

[6]For example, this increased presence of low level waste at the Indian Point site coupled with the additional high level waste at the site could exacerbate the adverse impact on the adjacent land values and underscores the substantial benefit that would accrue to the adjacent land owners from the no-action alternative. *See* Section III.

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Order, *In the Matter of Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3)(July 30, 2009) at 83.

In its DSEIS, NRC Staff also concluded that the impact of relicensing on off-site land uses would be small by limiting its analysis to the same two impacts that Entergy considered – a cramped analytical approach that the Licensing Board has already rejected. The DSEIS is thus defective because it fails to consider the negative impact of relicensing on real estate values and the positive impact on real estate values of the no action alternative – not relicensing IP 2 and 3. The DSEIS also ignored the impact on real estate values of additional storage of radioactive waste on site for another 20 years.

A more detailed description of the impact on real estate values that will occur under either relicensing or the no-action alternative is set forth in the report of Stephen A. Sheppard, PhD., *Potential Impacts of Indian Point Relicensing on Property Values*, November 2007 (appended to Declaration of Stephen C. Sheppard, sworn to November 28, 2007).[7] In sum, based on studies in peer reviewed scholarly journals of the effect of electric utility generating unit location on adjacent land values, Dr. Sheppard concluded that the current operation of IP2 and IP3 has suppressed land values below what they would otherwise be for a distance of up to two miles from the plant.[8] These properly

129-d-AL/LU contd.

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[7]The declaration of Stephen A. Sheppard, Ph.D. and its appendices were submitted to the ASLB in support of New York's Contention 17 and are incorporated in these comments.

[8]The Commission's existing waste confidence findings stated that by 2025 there will be a permanent off-site high level waste repository sufficient to handle all the

(continued...)

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done studies support the contention that a nuclear power plant may have a significant, not a small, impact on adjacent land values.

Data from the 2000 Census demonstrate that, at the time of that census, the total value of residential property within 2 miles of the facility was about $2.2 billion. *Potential Impacts of Indian Point Relicensing on Property Values*. *Id.* at 4. According to Professor Sheppard's calculations, the current market value of residential property within 2 miles of the facility is slightly over $4.3 billion (an increase of 93% from the first quarter of 2000). *Id.* Professor Sheppard calculated, conservatively, that removal of the facility and its spent fuel would increase property values within 2 miles of Indian Point by $576,026,601. *Id.* Plainly, land use impacts of more than a half billion dollars cannot be considered "SMALL" or even "MODERATE."

In addition, extending the license for an additional 20 years will require additional storage for spent fuel generated during the extended period. The spent fuel pools at Indian Point are not sufficient to contain this additional spent fuel and thus on-site dry cask storage is required. This dry cask storage of high level nuclear wastes will create further impacts on the value and potential use of adjacent lands beyond the impacts of the operating nuclear plants. The DSEIS contains no analysis of the impact on adjacent land values that will be associated with the construction and long term

129-d-AL/LU contd.

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[8](...continued)
wastes that will have been generated by IP1, IP2 and IP3 during their years of operation through 2015. The NRC is now reconsidering this expectation, raising the possibility that nuclear waste will be stored on-site indefinitely into the future. In that event, adjacent land values may be suppressed even more than they now are.

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operation of a dry cask storage facility at the Indian Point site of a size sufficient to handle the spent fuel from extended operation of either reactor.

In contrast to the continued operation of IP2 and IP3, the no-action alternative will increase rather than suppress adjacent land values. If IP2 and IP3 are not relicensed, they could be decommissioned within 6 years after their current license expires. The purpose of decommissioning nuclear facilities "is to take the facility safely from service and to reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of license." FGEIS on decommissioning of nuclear facilities, NUREG-0586 (Aug. 1988) § 1.3. Under current regulation, the Commission has decided, *see* 10 C.F.R. § 51.23, that by 2025 there will be a permanent off-site high level waste repository sufficient to handle all the wastes that will have been generated by IP1, IP2 and IP3 during their years of operation through 2015. Therefore, once the plants are decommissioned and the stored waste is removed from the site, the no action alternative will substantially increase the beneficial uses for land adjacent to (within 2 miles) of the Indian Point site and will increase the value of that land. In other words, under the current regulatory structure, if the licenses for IP2 and IP3 are not extended, owners and potential purchasers of land adjacent to Indian Point can contemplate that the site will be cleared of all nuclear materials and facilities by 2025. Thus, they can begin now to consider development of the adjacent property without concern that the site remains either an operating nuclear facility and/or a storage site for nuclear wastes beyond 2025.

129-d-AL/LU contd.

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On the other hand, extended operation of IP2 or IP3 will deprive adjacent lands of the economic recovery that they would otherwise enjoy under the no action alternative. Thus, the DSEIS fails to consider reasonable alternatives to mitigate off-site land use impact as required by 10 C.F.R. § 51.53(c)(3)(ii)(I) such that the commission cannot find that the applicable requirements of Appendix B of Subpart A of 10 C.F.R. Part 51 have been satisfied. 10 C.F.R. § 54.29(b).

Moreover, as discussed in Point I *supra*, the NRC has recently changed its position regarding waste storage, indicating a preference for longer-term on-site storage than has previously been contemplated. Previously, and when 10 C.F.R. § 51.23 was adopted and the GEIS prepared, the NRC's policy was that the wastes would be transported from the reactor sites within a relatively short period of time to a repository or an Independent Spent Fuel Storage Installation. Now, the Commission has adopted, or plans to adopt, an alternative approach that essentially disregards when the waste repository will be ready because the NRC is confident that the spent fuel can stay at the site for a longer, if not indefinite, period of time without any safety or radiological concerns. The NRC must now address the impact on off-site land use of the indefinite storage of spent fuel at the site of each reactor since it has never been addressed. The need for this analysis has only recently arisen, since the NRC's former policy did not involve long-term storage on the reactor site. As Appendix B to 10 C.F.R. Part 51 acknowledges, a site-specific analysis is required to address all impacts on off-site land use value including the potentially significant impacts of this long-term storage of spent

129-d-AL/LU contd.

-16-

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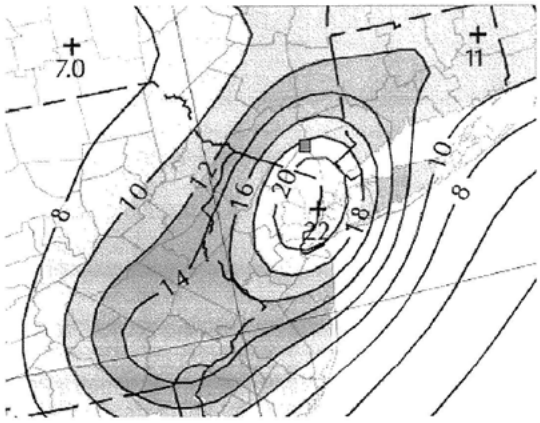
fuel at the Indian Point site, as well as the benefits that would flow from the no-action alternative, that is, denial of the renewed license and restoration of the site.

129-d-AL/LU contd.

IV. The DSEIS Does Not Take Into Account New Information About the Increased Seismic Hazard Around Indian Point

The DSEIS omits any mention of noteworthy new seismic information released last year. For example, it does not mention recent efforts by the United States Geological Survey (USGS), which has developed probabilistic seismic ground motion map for the New York Seismic Zone including the area around Indian Point. The contoured values which appear on the map reflect peak ground accelerations (PGA measured as % of the Earth's gravitational acceleration, g, for an exceedance probability of 2% in 50 years). The USGS tabulated PGA for the IP site is 0.19g. An excerpt of the USGS seismic map follows:



Source: Portion of the USGS probabilistic seismic ground motion map for the region including the Indian Point site (red square).

129-e-SM

-17-

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The DSEIS also does not account a recent study published by scientists at Columbia University. In August of 2008, seismologists at Columbia University's Lamont-Doherty Earth Observatory published the results of their study on earthquakes in the greater New York City Area, indicating the existence of a new fault line that could "significantly increase" the probability of an earthquake in the greater New York City Area. Lynn R. Sykes, John G. Armbruster, Won-Young Kim, and Leonardo Seeber, *Observations and Tectonic Setting of Historic and Instrumentally Located Earthquakes in the Greater New York City–Philadelphia Area*, Bulletin of the Seismological Society of America, Vol. 98, No. 4, pp. 1696–1719 (Aug. 2008). More significantly, the study found that the Indian Point nuclear power plants sit at the previously unidentified intersection of two active seismic zones. *Id.* The recently identified seismic feature runs in northwest-southeast line from Stamford, Connecticut to Peekskill, New York where it intersects the southwest-northeast oriented Ramapo Fault a few miles north of the Indian Point site. As stated by Dr. Lynn Sykes of Columbia University's Lamont Doherty Earth Observatory, "Indian Point is situated at the intersection of the two most striking linear features marking earthquake activity in [the New York City Seismic Zone] and also in the midst of a large population that is at risk in case of an accident to the nuclear plants. This is clearly one of the least favorable sites in the [the New York City Seismic Zone] from an earthquake perspective." Statement of Lynn R. Sykes, Ph.D.(Nov. 29, 2007), at p. 6 (submitted in support of New York State's Petition).

129-e-SM contd.

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The study also found that historic activity of earthquakes of a magnitude more than 5 has been higher in southeastern New York than in many other areas of the central and eastern United States, and that the fault lengths and stresses suggest magnitude-6 quakes, or even 7 – which would be 10 and 100 times bigger than magnitude 5 – are "quite possible." *Id.; see also* Robert Roy Britt, *Large Earthquake Could Strike New York City* (Aug. 21, 2008), *available at* http://www.livescience.com/environment/080821-new-york-earthquakes.html.[9] The DSEIS omits discussion of any of this new and significant information, in violation of NEPA.

It is particularly important to evaluate this new seismic information in light of Indian Point's aging systems, structures, and components some of which are part of the Indian Point Unit 1 facility which was constructed in the late 1950's – before the Atomic Energy Commission promulgated seismic siting criteria. Although the NRC approved the mothballing of the reactor in IP1, the Indian Point Nuclear Power Station continues to use various IP1 components. According to the 1980 decommissioning plan for the IP1 reactor, "Unit 1 contains *extensive common facilities that are required for the continued operation of Units 2 and 3.*" *See* Decommissioning Plan for Indian Point Unit 1, § 2.1 (October 1980) (emphasis added). For example, the Indian Point Nuclear Power Station uses several IP1 systems, including without limitation: water supply, service boilers,

129-e-SM contd.

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[9]The report correctly states that "[m]uch new seismological information is available since their initial approvals in 1973 and 1975. Nevertheless, the U.S. Nuclear Regulatory Commission so far has not permitted any new information to be used or old information on which the original licenses were based to be contested in considering extensions of licenses." *Id.* at 1717.

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electricity, integrated radwaste system, and nuclear steam generator blowdown purification system. *Id.* In 1988, ConEd told the NRC that Unit 1 "constitutes an *integral part* of power generating operations at the Indian Point site." *See* Supplemental Environmental Information in Support of Indian Point Unit No. 1, p. 2 (March 1988)(emphasis added).[10] The seismic fragility of Unit 1 was confirmed by a recent submission to NRC about a spent fuel crane wherein Entergy stated: "No response spectra were specifically generated for the Unit 1 site during original design." *See* Reply to Request for Additional Information (RAI) Regarding Indian Point 1 License Amendment Request (LAR) for Fuel Handling Building Crane, p. 12 of 24 (October 3, 2007) Indian Point, Unit No.1, Docket No. 50-003, ML073050247.

The DSEIS should have examined the seismic risks and hazards posed by the continued use of the systems, structures, and components used in Unit 2 and Unit 3, whose construction began in the late 1960's. As confirmed by a 1977 Atomic Licensing Appeal Board decision concerning Indian Point operating licenses, IP2 and IP3 were constructed to meet a design safe shutdown ground acceleration of 0.15g.[11] However, the recently developed USGS probabilistic seismic ground motion map for the New

129-e-SM contd.

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[10]Both of the referenced 1980 and 1988 documents may be found in the License Renewal Application within "Indian Point No. 1 Safety Analysis Report," which can be found under the file entitled "unit-1-ufsar.pdf."

[11]*Consolidated Edison Co.*, (Indian Point Units 1, 2 and 3) 6 N.R.C. 547, 550 (ALAB 1977). This decision also confirms that IP1's seismic construction was built to "a lesser value" and that, as constructed, it could not sustain an acceleration of even 0.15g. 6 N.R.C. at 550 & 585.

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York Seismic Zone posits a peak ground acceleration of 0.19g, which exceeds the design criteria that was confirmed in the 1977 ALAB decision.

129-e-SM contd.

V. The DSEIS Does Not Adequately Analyze Energy Alternatives, Including Conservation, Efficiency, Transmission, and Connection Enhancements

Pursuant to 10 C.F.R. § 51.71(b), a draft environmental impact statement must include "consideration of major points of view concerning the environmental impacts of the proposed action and the alternatives, and contain an analysis of significant problems and objections raised by other Federal, State, and local agencies, by any affected Indian tribes, and by other interested persons." 10 C.F.R. § 51.71(b). 10 C.F.R. § 51.71(a) explains that the scope of the Staff's environmental review encompasses the requirements to which the Applicant is held in its Environmental Report, which under 10 C.F.R. § 51.53(c)(3)(iv) requires the Applicant (and by reference, Staff) to examine significant new information. *See* 10 C.F.R. § 51.71(a); 10 C.F.R. 51.53(c)(3)(iv); 10 C.F.R. Part 51, Subpart A, Appendix B; *see also* 10 C.F.R. § 51.95.

129-f-AL

Appendix A to Subpart A to Part 51 requires analysis of the no-action alternative. Part 51, Subpart A, Appendix A, Section 4. Pursuant to 10 C.F.R. § 51.71 the DSEIS must analyze the evidence offered regarding the availability and environmental impacts of alternatives which would likely be implemented if no action were taken to relicense either IP2 or IP3. Appendix A to 10 C.F.R. Part 51 emphasizes the importance of the examination of alternatives: "This section is the heart of the environmental impact statement. It will present the environmental impacts of the proposal and the

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alternatives in comparative form." Appendix A to 10 C.F.R. Part 51 at Section 5. CEQ regulations also require the agency to "include the alternative of no action." 40 C.F.R. § 1502.14(d)

In addition, CEQ's regulations require the agency to "[r]igorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 1502.14(a). Likewise, CEQ requires a supplement to a draft environmental impact statement if "[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R. § 1502.9(c)(1)(I).

Contrary to these regulatory obligations, the December 22, 2008 DSEIS ignores or fails to include consideration and analysis of substantial comments and information provided by the State of New York relating to the "no-action" alternative and the benefits of certain measures that would be taken if the no-action alternative were chosen compared to the detriments that would be caused by relicensing of IP2 and IP3.

Among the items which were identified by the State of New York in its previous filings in this proceeding and in scoping comments that have been ignored or not considered and analyzed in the DSEIS are the following:

- Information on the potential for energy efficiency and renewable energy resources, combined heat and power, and power plant repowering that was provided in the November 27, 2007 Report prepared by Synapse Energy Economics, Inc., and David Schlissel in support of the State of New York's Petition to Intervene (Supporting Declarations and Exhibits, Volume I, November 30, 2007 ("Synapse Report"));
- New York's 15x15 plan that has the goal of reducing the state's electricity usage by 15 percent by 2015, and the steps that are being taken by state agencies, such

129-f-AL contd.

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as the Public Service Commission, to implement that plan. Evidence of the efforts already underway to achieve these goals can be found at http://www.dps.state.ny.us/Phase2_Case_ 07-M-0548.htm, which is ignored in the DSEIS. For example, on January 16 2009, the New York State Public Service Commission issued combined Orders Approving "Fast Track" Utility-Administered Electric Energy Efficiency Programs with Modifications. *See* PSC Case 08-E-1003 - *Petition of Orange and Rockland Utilities, Inc. for Approval of an Energy Efficiency Portfolio Standard (EEPS) "Fast Track" Utility-Administered Electric Energy Efficiency Program.* In addition, in his January 2009 State of the State speech to the Legislature, Governor Paterson pledged to expand the 15x15 Program and the Renewable Portfolio Standards Program;

- The potential capacity and energy from combined heat and power;
- The potential capacity and energy that could be provided by repowering existing power plants in New York State (Synapse Report at 12-14);
- The potential for importing additional power from the PJM area[12] and/or New England (Synapse Report at 14-15);
- The potential for additional transmission system upgrades that would increase the capability to import power into downstate New York from PJM and NE, including increases in the capability to import power from PJM (*id.*);
- The reduced energy sales and peak loads being experienced by utilities in downstate New York as a result of the current economic recession (Schlissel Declaration).

129-f-AL contd.

Energy Conservation and Efficiency and Reduced Energy Consumption

In its November 30, 2007 petition for intervention, the State of New York presented evidence to the NRC concerning the State's program to increase energy efficiency and reduce energy use. Since then, the State has devoted significant time and resources to implement this program. On June 23, 2008, the Public Service Commission

129-g-AL

[12]The "PJM Area" is a interconnected regional electric system in 13 states and the District of Columbia. Pennsylvania and New Jersey are two states within PJM.

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adopted a goal of reducing electricity usage (as forecast in 2007) by 15% statewide by 2015. An Energy Efficiency Portfolio Standard ("EEPS") program was created for New York State to develop and encourage cost-effective energy efficiency over the long term, and immediately to commence or augment near-term efficiency measures. *See* PSC Case 07-M-0548, *Energy Efficiency Portfolio Standard (EEPS)*, Order Establishing Energy Efficiency Portfolio Standard and Approving Programs (issued June 23, 2008). Eight weeks ago, on January 16, 2009, the Public Service Commission Approved "Fast Track" Utility-Administered Electric Energy Efficiency Programs with Modifications. *See* PSC Case 08-E-1003, Orders Approving "Fast Track" Utility-Administered Electric Energy Efficiency Programs with Modifications. These orders will increase energy efficiency, including in the southern areas of New York near the Indian Point power reactors (including Zones H, I, J, and K).

The DSEIS artificially limits its analysis of energy conservation to a single study, the National Research Council of the National Academy of Sciences' report entitled *The Alternatives to the Indian Point Energy Center for Meeting New York Electric Power Needs* ("NAS 2006"), which while a useful document, is only one of many sources addressing the energy conservation potential in New York State. Information, including recent data that has become available since the 2006 NAS Report and that has been cited – today and previously in this proceeding – by the State of New York, demonstrates that: (1) with the volatile energy costs of the last few years, additional energy conservation is even more financially viable; (2) with strong directives from the Governor of New York

129-g-AL contd.

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State, institutional and other non-technical barriers to energy conservation are less of a problem; (3) with the recent shift in emphasis by the federal government and private business, energy conservation and efficiency will increase; and (4) with the current economic climate, the demand for energy will remain flat for several years, or, perhaps decline, thus prolonging the date by which energy conservation and renewable energy will have to be available to fully displace some or all of the demand now being met by IP2 or IP3. The DSEIS does not address this information. Contrary to the clear regulatory obligation imposed by 10 C.F.R. § 51.71(d), the DSEIS incorrectly assumes that energy conservation would only result in a savings of 800 MW and, based on that arbitrary conclusion that is contrary to recent evidence, fails to consider energy conservation as a full replacement for one or both of the units under the no-action alternative.

Moreover, the likelihood of the availability of energy efficiency and conservation measures (as well as alternative and renewable energy sources and transmission enhancements) has recently been greatly increased as a result of the recently-enacted American Recovery and Reinvestment Act of 2009, Public Law 111-5 (signed February 17, 2009). Although no final allocation has yet been made, the State of New York could receive approximately $120 million for the State Energy Program, approximately $18 million for Energy Efficiency and Conservation Block Grants to small cities and additional hundreds of millions for Energy Efficiency and Conservation Block Grants to large cities and counties – which would include Westchester County and the New York

129-g-AL contd.

-25-

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metropolitan area – and approximately $390 million for weatherization assistance, which has the potential to greatly reduce energy consumption through energy efficiency and conservation. *See* American Recovery and Reinvestment Act of 2009, Public Law 111-5. In addition, New York would be eligible to compete for an approximate $5 billion available nationwide for improvements in transmission and smart grid technology. *Id.* Furthermore, the State of New York's Regional Greenhouse Gas Initiative (RGGI) auction is anticipated to generate additional money to promote energy efficiency and increase renewable energy use. The New York State Energy and Research Development Authority (NYSERDA) recently released an *Operating Plan for Investments in New York under the CO2 Budget Trading Program and the CO2 Allowance Auction Program* (draft, Feb. 25, 2009). In the draft plan, NYSERDA estimates that $525 million in projected funds received from the RGGI carbon dioxide auctions could be allocated to further energy efficiency and renewable energy use within the State. The DSEIS should be substantially revised to include this new and significant information.

One the most significant pieces of significant new information which was not available when the GEIS was written and is ignored in the DSEIS is the central role of energy conservation in energy planning and its growing importance in providing for energy needs. For example, the State of New York has taken the lead in pressing the federal government to implement stronger efficiency standards for home appliances. *See* NYS Petition at 116-118; *see also NRDC v. Abraham, Secretary, U.S. Department of Energy*, 355 F.3d 179 (2d Cir. 2004); *State of New York v. Bodman, Secretary of U.S.*

129-g-AL contd.

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Department of Energy, No. 05 Civ 7807, Consent Decree (S.D.N.Y. Nov. 3, 2006). The DSEIS paid no attention to New York's efforts to improve energy efficiency and its actions to encourage the federal government to improve appliance efficiency standards. The fruits of these efforts by the State of New York can be found in actions taken by the New York State Public Service Commission (http://www.dps.state.ny.us/Phase2_Case_07-M-0548.htm) and the recent actions by the White House urging the U.S. Department of Energy to consider accelerating the dates on which these new standards for all appliances will be implemented. *See* February 5, 2009 White House Memorandum For The Secretary Of Energy Subject: Appliance Efficiency Standards. Like the State's own programs, these accelerated federal efficiency standards will further conserve energy within New York State and in Zones H, I, J, and K.

The enacted regulations and actual programs for energy efficiency undoubtedly will reduce energy consumption. Although the December 2008 DSEIS looks to 2006 and early 2007 data prepared by the U.S. Energy Information Administration (EIA), DSEIS 8-32 to 8-33, it does not take into account recent EIA projections which contain reduced demand projections. *See* EIA *Annual Energy Outlook 2008 with Projections to 2030 (AEO 2008)*, Report # DOE/EIA-0383 (2008) (released June 2008); EIA *Annual Energy Outlook 2009 Early Release Overview* (AEO-2009) Report # DOE/EIA-0383(2009) (released Dec. 17, 2008); EIA Press Release: *New EIA Energy Outlook Projects Flat Oil Consumption to 2030, Slower Growth in Energy Use and Carbon Dioxide Emissions, and Reduced Import Dependence* (Dec. 17, 2008), *available at* http://www.eia.doe.gov/neic/press/press312.

129-g-AL contd.

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html. Also, the DSEIS fails to take into account the current economic situation and the likelihood that energy consumption will decrease as a result. Nor does it account for the impact of the Fedreal Energy Independence and Security Act of 2007. *See* Public Law 110-140; *see also* 42 U.S.C. § 6295.

Energy conservation produces no carbon, no pollution, and requires the use of no fuel. Once an energy conservation measure is in place, its benefit continues without further capital or maintenance costs for a substantial period of time into the future. The DSEIS acknowledges that there is virtually no adverse environmental impact associated with energy conservation measures. DSEIS at 8-66 ("Impacts from conservation measures are likely to be negligible, as the NRC staff indicated in the GEIS (1996))." The DSEIS, however, ignores other information from credible sources, including those identified in the State of New York's previous submissions, that the energy conservation potential between now and 2012 equals at least 1,000 MW -- equivalent in size to the capacity of at least one of the IP units. By wholly failing to address this new information, which greatly enhances the potential benefits and substantially reduces the perceived adverse impacts of the no action alternative, the DSEIS violates NEPA.

129-g-AL contd.

Renewables

The DSEIS erroneously concludes, without any critical analysis and with only bare assertions regarding Staff beliefs, that there are too many obstacles to implementing sufficient renewable energy resources such that these sources could not provide anything more than 200 to 400 MW toward replacing the IP units. *See* DSEIS 8-

129-h-AL

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65 to 8-66 (Combination Alternatives 1 and 2). By making this assumption, the DSEIS's analysis incorrectly constrains and limits the potential benefits of the no-action alternative by undervaluing the ability of wind and other renewables to provide power in New York in general and southeastern New York area in particular. The DSEIS ignores recent projections by the federal Energy Information Administration that the coming years will see the increased use of renewable energy, including strong growth in the use of renewables for electricity generation. *See* EIA *Annual Energy Outlook 2009 Early Release Overview* (AEO-2009) Report # DOE/EIA-0383(2009) (released Dec. 17, 2008); EIA Press Release: *New EIA Energy Outlook Projects Flat Oil Consumption to 2030, Slower Growth in Energy Use and Carbon Dioxide Emissions, and Reduced Import Dependence* (Dec. 17, 2008).

The DSEIS's assertions ignore substantial evidence, offered by the State of New York and generally available, that the potential for renewable resources is much more viable. *See* Synapse Report at 7-12. By way of example, on February 26, 2009, the New York Independent System Operator announced that the combined wind energy generation output within New York State has reached 1,000 MW and that such output is expected to increase. *See* NYISO's February 26, 2009 statement concerning wind generation capacity in New York State, *available a*t http://www.nyiso.com/public/webdocs/newsroom/press_releases/2009/NYISO_Marks_Wind_Power_Milestone_02262009.pdf. The DSEIS also ignores the fact that New York has considerable wind resources as demonstrated by the wind resource maps prepared by AWS Truewind for

129-h-AL contd.

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the New York State Energy Research and Development Authority.[13] At present, there is 8,081 MW of additional wind power proposed for connection to the grid in New York State. *See Interconnection Requests and Transmission Projects/New York Control Area by the New York Independent System Operator* (Updated 3/2/09), NYISO Interconnection Queue, *available at* http://www.nyiso.com/public/services/planning/interconnection_studies_process.jsp (last visited Mar. 16, 2009).

The DSEIS also incorrectly discounts and then eliminates any contribution from hydro power or distributed geothermal energy. DSEIS at 8-61, 8-62, 8-65 to 8-66. The DSEIS minimizes the opportunity provided by solar energy resources. DSEIS at 8-62. The State of New York is also moving forward to increase the utilization of its solar energy resources. On February 27, 2009, the Long Island Power Authority announced plans to purchase 50 MW of solar energy generated on Long Island and for deliveries to begin between June 1, 2009 and May 1, 2011. *See Governor Paterson Announces Plans for the Largest Solar Energy Project in State History, available at* http://www.lipower.org/newscenter/pr/2009/022709_gov.html. By eliminating consideration of these energy sources in the portfolio of alternatives to IP2 and/or IP3, the DSEIS no action alternative analysis is skewed and arbitrary.

129-h-AL contd.

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[13]The New York Wind Resource Explorer (WRE) was developed by AWS Truewind LLC for NYSERDA. AWS Truewind has produced maps of mean annual wind speed at 30, 50, 70 and 100 meters above ground level. The New York Wind Resource Explorer and related maps prepared for NYSERDA may be accessed at http://windexplorer.awstruewind.com/NewYork/NewYork.htm.

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Indeed, as discussed in the November 28, 2007 Declaration of former Commissioner Peter Bradford, it would be reasonable to assume that a determination that one or both of the IP units will not be available after 2013 or 2015 would further stimulate the development and use of renewable energy sources in New York. *See* November 2007 Bradford Declaration at ¶¶ 10, 11, 12. Such a decision would increase the development of wind, solar, geothermal, hydro, biomass and wood energy sources.

129-h-AL contd.

The DSEIS also does not take into account Governor Paterson's recently-announced initiative to expand the 15x15 Program and the Renewable Portfolio Standards Program to further improve energy efficiency and the generation of renewable energy. In his January 7, 2009 State of the State Speech, the Governor unveiled the "45x15" Program:

> Today, I announce one of the most ambitious clean energy goals in America. By 2015, New York will meet 45 percent of its electricity needs through improved energy efficiency and clean renewable energy. We call this our "45 by 15" program.

Working in concert with this program, the New York Power Authority ("NYPA") will increase funding to school districts, local governments, and hospitals to increase energy efficiency. As part of the State's energy efficiency program, NYPA will provide capital for school districts, as well as eligible local governments and hospitals to retrofit and install clean distributed energy resources. NYPA's trustees have approved increasing financing for these projects to $185 million per year – up from $100 million – in support

129-i-AL

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of the State's clean energy agenda. *See generally* Energy Efficiency Fact Sheet, *available at* http://www.ny.gov/governor/press/fact sheet0107092.html.

129-i-AL contd.

Energy Transmission

Based on a 2006 U.S. Department of Energy determination, the DSEIS assumes that the Zones H, I J, K are a so-called "critical congestion area" and that this situation will continue indefinitely. *See* DSEIS at 8-32. The DSEIS however, fails to acknowledge that this DOE decision is the subject of a judicial challenge,[14] and more importantly that additional transmission capacity either has been installed, is in the process of being installed, or has been approved to be installed in Zones H, I, J, and K. For example,

- the Neptune Cable links the LIPA service are with New Jersey and energy sources in the PJM area. It provides up to 660 megawatts of electricity to Long Island. *See* LIPower.com.
- LIPA and Connecticut Light & Power Company are replacing the 300 megawatt electric transmission cable system that connects Long Island with southwest Connecticut. *See* LIPower.com.
- the Cross-Sound cable from Connecticut to Shoreham (Long Island) has been operating for several years.
- In addition, trans-Hudson and trans-Arthur Kill connections and interconnection upgrades are in the ISO interconnection queue. These project currently include the Brookfield Power U.S. Harbor Cable Project II (200 MW), the East Coast Power LLC interconnection upgrade (300 MW; Linden, Staten Island), and the Hudson Transmission Partners interconnection upgrade (660 MW) (linked to Sayreville, NJ). *See* NYISO Interconnection Queue *available at* http://www.nyiso.com/public/services/planning/interconnection_studies_process.jsp (last visited Feb. 27, 2009).

129-j-AL

The DSEIS does not address these transmission avenues.

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[14] *Wilderness Society et al. v. U.S. Department of Energy* (9th Cir. No. 08-71074).

-32-

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Combinations

In discussing the no action alternative, the DSEIS acknowledges that "[t]he power not generated by IP2 and IP3 during license renewal term would likely be replaced by (1) power supplied by other producers (either existing or new units) using generating technologies that may differ from that employed at IP2 and IP3, (2) demand side management and energy conservation, or (3) some combination of these options. DSEIS at 8-27. The DSEIS also primarily relies on the assumption, initially adopted more than 12 years ago, that the only way to replace a large generating unit like a nuclear power plant is with another similarly large generating unit. DSEIS at 8-33 to 8-55. Regardless of the validity of that assumption 12 years ago, it is definitely not valid today in the New York metropolitan area. *See, e.g.*, EPRI, *Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. (2010 - 2030)* (published Jan. 14, 2009).

129-k-AL/LR

Rather than preparing a comprehensive and detailed analysis of the development of a portfolio of means to provide power in lieu of IP2 and IP3, the DSEIS devotes considerable effort to proving that a 2,200 MW coal plant is not a good option in this service area. DSEIS at 8-33 to 8-45. The analysis of the impacts flowing from the construction of a new coal plant in Zones H, I, J, or K is besides the point and appears to be a "strawman" analysis. This analysis of the coal alternative (1) fails to acknowledge that no New York-based utility has a pending application for the construction of new

129-l-AL

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coal generation in Zones H, I, J, and K and (2) ignores objective evidence demonstrating the existence of other (*i.e.*, non-coal) sources of power generation and conservation.

To the extent that the DSEIS discusses natural gas production, DSEIS at 8-46 to 8-56, the NRC Staff tacitly acknowledges that IP2 and IP3 power reactors could be replaced by natural gas-fired combined-cycle generation either at the Indian Point site or elsewhere. Indeed, the record reflects that utilities have developed natural gas capacity in New York. For example, the Long Island Power Authority is completing the construction of its Caithness facility which is expected to come on line in the summer of 2009 (350 MW) and other new sources are coming on line or have been permitted. *See* Synapse Report, at 15-16 (identifying additional new generation facilities); *see also* LIPower.com; Independent System Operator 2008 Load and Capacity Data (Goldbook) (Apr. 2008). NRC Staff's analysis of natural gas is a tacit recognition that the continued operation of the IP2 and IP3 power reactors are not necessary. Thus, the DSEIS is flawed because it relies on outdated information about how utilities meet their energy needs. As a result of this flaw, the DSEIS is deficient in how it addresses new and significant information and how it addresses the consequences of the no-action alternative.

Moreover, Staff's comparative weighing of natural gas and two operable IP power reactors notes that a gas fired power plant would operate at higher thermal efficiencies, require less water, and need smaller cooling towers than the existing reactors. DSEIS at 8-46. Because of these differences, the DSEIS is flawed when its no

129-I-AL contd.

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action alternatives analysis concludes (DSEIS at 8-78) that a gas fired power plant would have "similar" impacts to the continued operation of IP2 and IP3.

Staff is required to consider and incorporate in the DSEIS significant new information with regard to any findings in the GEIS, which applies to the GEIS conclusion that only gas or coal are viable alternatives and that the only option must be stand-alone, single solution alternatives. While the DSEIS does suggest a couple of options in which combinations of energy sources are used, the options include one Indian Point reactor as part of the mix and/or a single 300 or 400 MW combined-cycle gas-fired plant at the Indian Point site. *See* DSEIS at 8-65 to 8-66. The two "combination alternatives" proffered by the DSEIS are artificially narrow and arbitrary and fail to take into account additional combinations of alternatives in violation of NEPA. A proper no-action alternative would consider a broader range of combinations.

For example, the following combinations, which are derived from the November 2007 Synapse Report, of energy options are achievable and environmentally-preferable to operating IP2 and IP3 and demonstrate that the no-action alternative is the preferable alternative to the two already selected by the DSEIS:

Combination 3:

- 1000-1200 MW from renewable resources like biomass and wind
- 1200-1400 MW from energy efficiency programs being implemented as part of New York State's 15x15 plan
- 100-200 MW from combined heat and power

129-I-AL contd.

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Combination 4:

- 400-600 MW from repowering an existing fossil-fired power plant in downstate New York as an efficient new gas-fired combined cycle unit
- 1200-1500 MW from energy efficiency
- 600-800 MW from renewable resources such as biomass and wind

See Synapse Report at 3 to15. Already existing and identified New York State programs are in place to achieve these results. *See* February 27, 2009 Declaration of David Schlissel, at ¶ 8. In addition, many other achievable combinations are environmentally preferable to the relicensing of Indian Point, including the construction of new, efficient natural-gas fired generation and transmission line alternatives and interconnection upgrades. *See generally* State of New York, Proposed Contention No. 33 (submitted Feb. 27, 2008); November 2007 Synapse Report.

The DSEIS's no-action alternatives analysis fails under NEPA because it fails to consider:

- The no-action alternative as to the relicensing of only one unit;
- The option of repowering existing power plants in the combination of alternatives that can be used if the no-action alternative is chosen and the environmental benefits of repowering existing power plants (*see* Declaration and Report of David A. Schlissel (Nov. 28, 2007), attached to the New York State Notice of Intention to Participate and Petition to Intervene);
- Combined heat and power as one of the combinations of alternatives that can be used if the no-action alternative is chosen and the environmental benefits of this choice (*see* Synapse Report);
- Purchase power as a viable stand alone alternative rather than the DSEIS analysis which is based upon a pessimistic and speculative group of assumptions about inter-state and intra-state transmission options. DSEIS at 8-56-8-57. In reaching

129-I-AL contd.

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this conclusion the DSEIS ignores the considerable contrary evidence contained in the Synapse Report and recent transmission enhancements;

- The demonstrated feasibility of providing upgraded transmission capability and interconnection upgrades that, in turn, would facilitate the use of alternatives to IP2 and IP3. On this point, the DSEIS accepts, without any evaluation, the assumption that various institutional restraints will impede the implementation of improved transmission capability and solely on that basis dismisses improved transmission capabilities. *See* DSEIS at 8-57. Thus, the DSEIS's dismissal of purchase power alternatives or the use of wind power generated outside of the IP2 and IP3 service area, based on the alleged constraints on transmission capabilities, is not rational because it does not address substantial evidence which contradicts the evidence upon which it relies. *See* Synapse Report.

For all of the above reasons, the alternatives analysis contained in Chapter 8 of the DSEIS is deficient and therefore does not comply with NEPA, CEQ regulations, and NRC's own Part 51 regulations.

129-l-AL contd.

VI. The DSEIS Incorporates Defects in the SAMA Analysis and the Use of an Inappropriate Air Dispersion Model With Inaccurate Input of Population Figures

The DSEIS improperly adopted Entergy's SAMA analysis and ignored deficiencies in its air dispersion modeling which were raised by New York 's Contention 16 and accepted as a subject of litigation by the Licensing Board. *See* Memorandum and Order, *In the Matter of Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3)(July 31, 2008). Pursuant to the FGEIS, an analysis of alternative methods of reducing the risk of severe accidents is a Category 2 issue, which must be specifically conducted for all plants, such as IP 2 and 3, that have not engaged in this analysis before. However, a risk mitigation method must only be considered for

129-m-SM

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implementation by the license renewal applicant if is cost-beneficial – that is, if the value of its reduction of risk expressed in monetary terms is greater than the cost of implementing the risk mitigation measure. The monetized cost of human exposure to radiation is expressed as $2,000 per person rem. In a SAMA analysis, the more people that are hypothetically exposed to radiation released in a severe accident, the more likely a risk mitigation method will be cost-effective because the dollar value of the risk reduction to which the mitigation cost will be compared will be higher than if fewer people are exposed.

Therefore, an accurate SAMA analysis depends on the accuracy of the estimates of human exposure to radiation from a severe accident. The accuracy of the human exposure estimate will critically depend on the validity of air dispersion models which predict the manner in which radiation will be geographically dispersed through the atmosphere and in what concentrations. The FGEIS recognizes that meteorological phenomena such as plume rise, precipitation and fallout from the plume "all have considerable impact on the magnitudes of early health consequences along with the distances from the reactors where these consequences would occur." GEIS, Vol. 1, § 5.3.4.3.

Entergy's SAMA analysis was defective because it incorporated an outdated air dispersion model that will not accurately predict the dispersion of radionuclides traversing a complex terrain over long distances. Because population densities vary substantially within a 50 mile radius of IP 2 and 3, an inaccurate air dispersion model

129-m-SM contd.

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may greatly underestimate the numbers of people exposed and therefore reduce the dollar value of the reduction in exposure that a mitigation measure may achieve.

In accepting New York State's Contention 16, the Licensing Board concluded that New York's challenge to the use of the ATMOS model raised questions about whether it would accurately estimate the numbers of people exposed. NRC staff brushed off these questions, adopted Entergy's SAMA analysis without any independent verification and accepted Entergy's rejection of most of the mitigation measures it analyzed on the ground that they were not cost-effective.

A detailed description of the deficiencies of the ATMOS model is set forth in the accompanying declaration of Dr. Bruce Egan, presented in support of New York's Contention 16. Those deficiencies and their impact on the SAMA analysis will be summarized here.

The ATMOS air dispersion model is one of the modules within the Melcor Accident Consequence Code System ("MAACS2 Code"), a model created by SANDIA National Laboratory for estimating the probabilities of a severe accident – *i.e.*, an escape of radionuclides from the containment building – and the severity of its consequences.

ATMOS uses a steady state straight line Gaussian plume model to calculate concentrations of radioactivity downwind of a release point. In effect, ATMOS assumes that any emissions from the Indian Point Station are embedded in an air mass having a single wind speed that flows for each period of simulation in a single straight line direction. The concentrations of contaminants within the plume are assumed to have a

129-m-SM contd.

-39-

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maximum value along the plume centerline and to fall off in a bell shaped, Gaussian distribution curve with distance away from the plume centerline.

The ATMOS model does not accurately depict the dispersion of pollutants from a source, because it does not accurately account for the complexity of the relationships of the processes that drive dispersion – wind speed, wind direction and atmospheric turbulence. It relies on dispersion rates developed in 1961 which do not take into account more recent scientific knowledge about how turbulence is created in the atmospheric layer directly above the earth' surface and how that affects the dispersion of a release of pollutants. As set forth below, ATMOS's simplistic assumptions directly affect its ability to accurate model the dispersion of radioactivity from the Indian Point Station.

129-m-SM contd.

ATMOS Cannot Accurately Model Dispersion in Complex Terrain

For purposes of categorizing appropriate air dispersion models for regulatory application, USEPA defines a complex terrain as a setting where nearby terrain heights exceed a facility's stack height. The Indian Point Station is located in such a "complex terrain." It is in the northwest corner of Westchester County on a point of land on the eastern bank of the Hudson River that protrudes into the river as it bends west. Dunderberg Mountain rises to a height of 1086 feet above sea level on the west side of the river approximately 2.5 miles north of the Indian Point Station. The eastern bank of the river north of the Station is formed by high ground reaching an elevation of 800 feet; to the west across the river, the Timp Mountains reach an elevation of 864 feet.

-40-

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Environmental Report, Appendix E at 2-1. Releases from the Station would be within 1-2 miles of the Dunderberg and Timp mountains that rise well above the facility and well above the top of the meteorological tower located onsite.

The use of a steady state straight line Gaussian plume model, such as ATMOS, is inappropriate for the complex terrain in which the Indian Point Station is located. Complex terrain will alter the turbulent diffusion rates and the flow trajectories that pass up and over or around hills and mountains, thus making a straight line flow assumption inaccurate. The straight line flow assumption will not account for the formation of local air circulations associated with mountain-valley upslope and down slope wind systems. An air dispersion model that ignores the presence of such air flows will provide erroneous information on the dispersion of the radioactivity.

129-m-SM contd.

ATMOS Cannot Accurately Calculate Dispersion Within a 50 Mile Radius of the Indian Point Station Beyond

In the DSEIS, NRC staff accepted Entergy's use of the ATMOS model to predict the dispersion of radionuclides in a 50 mile radius around the Indian Point Station. However, the US EPA does not consider steady state Gaussian plume models to be accurate for setting emissions limitations beyond 50 kilometers, or 32 miles. For distances beyond 50 kilometers, US EPA recommends using a "long range transport" model capable of simulating the effects of spatially varying wind directions. Such "long range transport models" generally use more than one source of meteorological data to

-41-

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define the spatial variations of the winds because the likelihood of observing changes in wind direction increases with downwind distances.

Since the determination of the cost effectiveness of a mitigation alternative is based in part on the total population radiation dose, and since the number of affected people increases substantially with the radial distance from the Indian Point Station, the SAMA results are disproportionately influenced by impacts at large distances from the source and those impacts will not be accurately estimated by the ATMOS air dispersion model.

Inaccurate Population Figures Were Input into the ATMOS Model

In addition, Entergy's projections of the 2035 population likely to be living within 50 miles of Indian Point appear to underestimate the potential exposed population. And the NRC accepted these projections without any further examination, despite the fact that the Licensing Board agreed that New York's Contention 16 raised a valid issue about the accuracy of Entergy's future population estimates.

For example, Table 2-5 State and County Population, 50-Mile Radius of IP2 and IP3 on page 2-36 of the ER contains a projection that in 2035 the population of New York County (Manhattan) will be 1,570,657. Entergy does not provide any explanation of the basis for this projection and it appears to contradict data from the U.S. Census. For example, the United State Census estimates that in 2007 Manhattan's population was 1,620,867, over 50,000 more than Entergy asserts would be at risk 29 years later. *See, e.g.*, U.S. Census Bureau, State and County QuickFacts, New York County, New York,

129-m-SM contd.

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available at http://quickfacts.census.gov/qfd/states/36/36061.html. Entergy provides no explanation for its projection that the population of Manhattan will actually shrink from 2000 to 2035.

Moreover, based on trends in population growth in New York City, there is every reason to believe that the population of New York in 2035 will be substantially more that the U.S. Census's estimate of the 2007 population. For example, comparisons of U.S. Census data for Manhattan in 2000 with the census estimates of the 2007 Manhattan population concludes that the population of Manhattan grew by 83,672 in 7 years, a growth of 0.7 percent per year. *See* http://www.nyc.gov/html/dcp/html/census/popcur.shtml. Entergy's future population estimates are inexplicably low when compared to the U.S. Census estimates of future population in the New York metropolitan area.

In sum, Entergy's SAMA analysis almost certainly understated the cost of a severe accident by reducing the number of people who might be exposed. The DSEIS should not have accepted these population estimates as an appropriate input into the ATMOS air dispersion model.

129-m-SM contd.

VII. The NEPA and SAMA Review Should Include an Accurate Assessment Of the Clean up and Decontamination Costs Associated with a Radiological Release from Indian Point

As the State noted in its scoping comments of November 23, 2008, the cost formula contained in the MELCOR Accident Consequence Code System (MACCS/MACCS2) computer program underestimates the costs likely to be incurred as a result

129-n-SM

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of a dispersion of radiation. NRC Staff did not incorporate the State's comments in the DSEIS, which remains inadequate as to decontamination costs, despite stating in its Scoping Summary Report that the State's comments on this point were "noted . . . [and that] Chapter 5 of the SEIS will discuss Environmental Impacts of Postulated Accidents and Severe Accident Mitigation Alternatives." *See* Scoping Summary Report at 188.

As the State suggested in its scoping comments and in Contention 12, which was accepted by the Board (see Memorandum and Order (July 31, 2008) at 61-65), the NRC should use the analytical framework contained in the 1996 Sandia National Laboratories report concerning site restoration costs. *See* D. Chanin and W. Murfin, "*Site Restoration: Estimation of Attributable Costs from Plutonium-Dispersal Accidents*," SAND96-0957, Unlimited Release, UC-502, (May 1996). The *Site Restoration* study analyzed the expected financial costs for cleaning up and decontaminating a mixed-use urban land and Midwest farm and range land. The decontamination costs identified in the report could be extrapolated to apply to the four counties in the 10-mile Emergency Planning Zone as well other cities and towns in the New York City-Connecticut-New Jersey metropolitan area that are within 50-mile Emergency Planning Zone.

The Sandia study recognized that it is extremely difficult to clean up and decontaminate small radioactive particles (*i.e.*, particles ranging in size from a fraction of a micron to a few microns). *See* SAND96-0957, at p. 5-7.[15] Such small-sized particles

129-n-SM contd.

[15]Although SAND96-0957 studied a scenario in which plutonium from a nuclear weapon is dispersed as a result of an accident resulting from a fire or non-nuclear

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adhere more readily to objects and become more easily lodged in small cracks, crevices, masonry, fabric, or grass and other vegetation. *Id.*, at 5-7 to 5-10. The study examined the costs for extended remediation for mixed-use urban land (defined as having the national average population density of 1,344 persons/km^2), Midwest farmland, arid western rangeland, and forested area, and concluded that accident costs would be highest for urban areas. *Id.*, Executive Summary, at x, xiii. Earlier estimates (such as those incorporated within the MACCS codes) of decontamination are incorrect because they examined fallout from the nuclear explosion of nuclear weapons that produce large particles and high mass loadings (*i.e.*, particles ranging in size from tens to hundreds of microns). *Id.*, 2-9 to 2-10, 5-7. In the words of SAND96-0957, "Data on recovery from nuclear explosions that have been publicly available since the 1960's appear to have been misinterpreted, which has led to long-standing underestimates of the potential economic costs of severe reactor accidents." *Id.*, at 2-10.

129-n-SM contd.

For an extended decontamination and remediation operation in an mixed-use urban area with an average national population density, the Sandia study predicted a clean up cost of $ 311,000,000/km^2 with on-site waste disposal and $402,000,000/km^2 with off-site disposal. SAND96-0957, at p. 6-4. For a so-called expedited clean up of a heavily-contaminated urban area, *i.e.*, one that it finished within one year, the cost was

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[15](...continued)
detonation of the weapon's explosive trigger device, as the Board has noted in admitting Contention 12, the study's methodology and conclusions to estimate decontamination costs are directly useful to the license renewal application. *See* Memorandum and Order (July 31, 2008), at 64.

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predicted to be $398,000,000/km^2 using off-site disposal and $309,000,000/km^2 using on-site waste disposal. *Id.*, at 6-5.[16]

The costs could be much higher. For a tourism, educational, transportation, and financial center such as the New York metropolitan area, the economic losses stemming from the stigma effects of the dispersion of radioactive material would likely be staggering. The Sandia study further recognized that:

> In comparing the numbers of cancer health effects that could result from a plutonium-dispersal accident to those that could result from a severe accident at a commercial nuclear power plant, it is readily apparent that the health consequences and costs of a severe reactor accident could greatly exceed the consequences of even a "worst-case" plutonium-dispersal accident because the quantities of radioactive material in nuclear weapons are a small fraction of the quantities present in an operating nuclear power plant.

Id., at 2-3 to 2-4. These costs must be taken into account.

In addition, many areas in the Indian Point EPZ have higher population densities and property values than those examined in the Sandia report. Accordingly, as part of its analysis, the NRC should revise the Sandia results for the densely populated and developed New York City area, incorporate the region's property values, and ensure that the resulting financial costs are expressed in present value (in 2008/2009/2010 dollars) and future value (until 2035, the likely term of any renewed operating license).

129-n-SM contd.

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[16]These Sandia projections are in 1996 dollars for an area of average population density and did "not include downtown business and commercial districts, heavy industrial areas, or high rise apartment buildings. Inclusion of these areas would increase costs." SAND96-0957, at p. 6-2.

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Two recent studies provide additional information concerning the appropriate cost inputs for evacuation, temporary housing, decontamination, replacement, and disposal activities. Beyea, Lyman, von Hippel, *Damages from a Major Release of ^{137}Cs into the Atmosphere of the United States*, Science and Global Security, Vol. 12, p. 125-136 (2004) (discussing Indian Point and four other sites); Lyman, *Chernobyl on the Hudson? The Health and Economic Impacts of a Terrorist Attack at the Indian Point Nuclear Power Plant*, Union of Concerned Scientists (September 2004).

These two studies and the economic model found in SAND96-0957 are currently available to NRC,[17] and yet Staff has apparently disregarded both the State's scoping comments and the Board's statements in admitting Contention NYS-12 in drafting the SEIS, which did not take this information into account. The results from this readily-available model, as updated and revised for the New York- Connecticut-New Jersey metropolitan area, should be included in the environmental review and incorporated into any SEIS for the consideration of federal decision makers.

129-n-SM contd.

VIII. NRC Staff is Required to Assess the Potential Environmental Impacts from a Terrorist Attack in the DSEIS

In its October 31, 2008 scoping comments, the State of New York identified extensive new information, not taken into account in the GEIS, related to the potential impacts from an act of terrorism, and sought consideration of these issues on a site-specific basis in the DSEIS. NRC Staff explicitly declined to consider "deliberate

129-o-SM

[17] *See* http://www.osti.gov/bridge/product.biblio.jsp?osti_id=249283&query_id=2.

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malevolent acts or terrorism" because this issue is either "outside the scope of the license renewal process . . . addressed by other NRC regulatory processes, or . . . fall[s] under the jurisdiction of other agencies or actors." Staff Scoping Summary at 315. Staff's arguments are unpersuasive in the context of NEPA: NEPA requires analysis of all environmental impacts from the proposed action, including any adverse environmental effects which cannot be avoided should the proposal be implemented and alternatives to the proposed action (42 U.S.C. § 4332(c)(i-iii)), and requires discussion of those impacts to be submitted for public comment. 10 C.F.R. § 51.73. And NRC has examined the impacts of sabotage in other contexts, including, but not limited to, the mixed oxide fuel context in the 1970's. Moreover, at least one federal circuit court has concluded that consideration of terrorism is proper in a NEPA review and not solely in another safety-related forum. *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), *cert. denied*, 127 S. Ct. 1124 (2007).

129-o-SM contd.

The NRC is Obligated to Consider the Environmental Impacts From an Airborne Terrorist Attack in the DSEIS

As the State argued in its scoping comments, much has changed since the completion of the GEIS in 1996. As the world knows, on September 11, 2001, terrorists hijacked four jet airliners and crashed three of them into their intended targets. The impact of the fuel-laden planes caused explosions and large, long-lasting fires. Those explosions and fires destroyed a portion of the Pentagon in northern Virginia and caused the collapse of the World Trade Center towers and nearby buildings in New

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York City. *See Nat'l Comm'n on Terrorist Attacks Upon the U.S.* ("9/11 Commission"), *The 9/11 Commission Report* (2004).

Two of the hijacked planes flew over or near Indian Point. *Id.* at 32. As late as July 2001, the terrorists were considering attacking a specific nuclear facility in New York, which one of the pilots "had seen during familiarization flights near New York." *Id.* at 245. This was most likely Indian Point.

Since then, government decision makers have recognized the risks to nuclear power facilities. Based on this information, it is imperative that the Supplemental EIS analyze the potential environmental impacts of a terrorist attack on Indian Point. A number of publicly known examples establish the need for this analysis. In his 2002 State of the Union address, President Bush stated that "diagrams of American nuclear power plants" had been found in Afghanistan, suggesting that Al-Qaeda may have been planning attacks on those facilities. *The President's State of the Union Address* (Jan. 29, 2002).[18] On September 4, 2003, the United States General Accounting Office ("GAO") issued a report noting that the nation's commercial nuclear power plants are possible terrorist targets and criticizing the NRC's oversight and regulation of nuclear power plant security. GAO, *Nuclear Regulatory Commission: Oversight of Security at Commercial Nuclear Power Plants Needs to Be Strengthened*, GAO-03-752 (2003); *see also* GAO, Testimony Before the Subcomm. on Nat'l Security, Emerging Threats, & Int'l

129-o-SM contd.

[18] *Available at* http://www.whitehouse.gov/news/releases/2002/01/20020129-11.html.

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Relations, House Comm. on Gov't Reform, *Nuclear Power Plants Have Upgraded Security, But the NRC Needs to Improve Its Process for Revising the DBT*, GAO-06-555T, at 1 (2006). Five major airports (Stewart, Westchester, Newark, Laguardia, Kennedy) are located within a few minutes flying time of Indian Point. The Federal Emergency Management Agency ("FEMA"), a federal agency responsible for assessing terrorist threats and for assuring the safety and security of the public, has taken actions signifying that it considers an aircraft attack on a nuclear power plant to be a credible threat. For instance, during a June 2004 exercise to assess emergency preparedness at Indian Point, the agency simulated a suicide attack by a large cargo jet. Fed. Emergency Mgmt. Agency, *Final Exercise Report: Indian Point Energy Center*, at 101-02 (Oct. 25, 2004). Last May, NRC conducted a similar aircraft drill at the San Onofre power station in California.

Based on this information, it is imperative that the NRC's Supplemental EIS analyze the potential environmental impacts of a terrorist attack on Indian Point. Of particular concern are the potential widespread environmental impacts if a terrorist attack damaged the reactor core, spent fuel pools, the storage casks, or other areas. *San Luis Obispo Mothers for Peace*, 449 F.3d 1016. This is particularly important at Indian Point, where the NRC at Entergy's request has relaxed fire safety standards. *See* 72 Fed. Reg. 55,254 (Sept. 28, 2007), 72 Fed. Reg. 56,798 (Oct. 4 2007) (exempting certain locations in Indian Point Unit 3 from the one-hour fire resistance requirement imposed by the NRC's fire safety regulations and, instead, imposing resistance requirements of

129-o-SM contd.

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thirty minutes for some of its electrical equipment and twenty-four minutes for other electrical equipment). This exemption could potentially make the facility more vulnerable to a fire that could disable safety systems designed to control nuclear fission and ensure the prompt shut down of the reactor in the case of an emergency, ultimately leading to a major radiation release. The NRC has granted other fire safety waivers to Indian Point in the past.

The NRC has implicitly recognized the gravity of the consequences of a terrorist air attack by requiring applicants for certain new nuclear reactors to consider such attacks. *See, e.g.*, 72 Fed Reg. 56,287 (Oct. 3, 2007). This concern over the damage that could be caused by an aircraft impact is reflected in other NRC documents as well. *See* NRC, *Evaluation of Aircraft Crash Hazards Analyses for Nuclear Power Plants*, NUREG/CR-2859 (1982); NRC, *Relay Chatter & Operator Response After a Large Earthquake*, NUREG/CR-4910 (1987); NRC, *Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants*, NUREG-1738, at § 3.5.2 (2001); *NRC: Nuclear Power Plants Not Protected Against Air Crashes*, Associated Press (Mar. 28, 2002). The NRC has acknowledged that almost every power reactor was not designed or built with the requirement that the facility withstand the impact of an aircraft impact. *See, e.g., NRC: Nuclear Power Plants Not Protected Against Air Crashes*, Associated Press (Mar. 28, 2002).

It has long been known that an airborne attack on a nuclear power plant could be catastrophic. A 1974 peer-reviewed study by a General Electric engineer, for example,

129-o-SM contd.

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concluded that if a plane weighing more than 12,500 pounds — a tiny fraction of the weight of today's commercial airliners[19] — were to hit a reactor building in the right place, it would likely breach the containment structure and damage the reactor core and cooling systems. Ian B. Wall, *Probabilistic Assessment of Aircraft Risk for Nuclear Power Plants*, 15 Nuclear Safety 276 (1974) [hereinafter *GE Study*].

Researchers at the Argonne National Laboratory reached similar conclusions in a 1982 study conducted for the NRC. NRC, *Evaluation of Aircraft Crash Hazards Analyses for Nuclear Power Plants*, NUREG/CR-2859 (1982) [hereinafter *Argonne Study*]. The report explained that "[n]umerous systems are required in order to provide reactor shutdown and adequate long-term cooling of the core. Although many of these safety-related systems are well protected within hardened structures (containment system, auxiliary building), some are not." *Id.* at 50. Thus, an aircraft crash that caused "rapid depressurization of the plant's secondary cooling system" as well as loss of electrical power would likely set off an accident sequence resulting in "serious damage if not total meltdown" of the core. *Id.* at 51-52.

The *Argonne Study* also determined that a Boeing 707 aircraft — slightly smaller than some of today's commercial aircraft — hitting a nuclear power plant could produce vibrations exceeding those experienced during an earthquake. *See id.* at 70.

129-o-SM contd.

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[19]A fully loaded Boeing 767 weighs nearly 400,000 pounds. *See* Boeing, *Technical Characteristics–Boeing 767-200ER, at* http://www.boeing.com/commercial/767family/pf/pf_200prod.html. The A-380, Airbus's new superjumbo airliner, has a maximum takeoff weight of 1,235,000 pounds. *See* Airbus, *Aircraft Families/A380 Specifications, at* http://www.airbus.com/en/aircraftfamilies/a380/ a380/specifications.html.

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This finding is significant because of a 1987 study commissioned by the NRC on the effects of earthquake forces on relays — electrical switches — at nuclear power plants. NRC, *Relay Chatter & Operator Response After a Large Earthquake*, NUREG/CR-4910 (1987). This study demonstrated that the vibrations associated with an earthquake could cause the relays to switch from the opened to closed position, from the closed to the open position, or even to cycle back and forth between positions. The relay repositioning would cause operating equipment to stop and standby equipment to start. The study concluded that if an earthquake were strong enough to cause loss of offsite power and relay chattering, core damage almost certainly would result. *See id.* at 6-5. Thus, because an aircraft crashing into a nuclear plant structure produces vibrations similar to those of an earthquake, the crash would have a high likelihood of causing reactor core damage — even without considering the effect of fires, explosions, or penetration of the aircraft through the containment structure.

Other studies conducted by or for the NRC prior to September 11, 2001 also concluded that an aircraft hitting a nuclear power plant could cause a reactor meltdown, damage spent fuel pools, and lead to the release of radiation. A study of safety at the Indian Point Energy Center in New York, for example, determined that a core meltdown could occur if either of the control buildings at the Indian Point nuclear power plant were hit by even a light aircraft. *See* Power Auth. of the State of N.Y. & Consol. Edison Co., *Indian Point Probabilistic Safety Study*, at 7.6-3 to 7.6-6 (1982). And an NRC study of spent fuel pools at decommissioning nuclear power plants, the final

129-o-SM contd.

-53-

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results of which the NRC published in 2001, concluded that aircraft damage could affect the structural integrity of spent fuel pools — which contain highly radioactive uranium and plutonium and are located outside the reactor's protective containment shells — or the availability of nearby support systems. NRC, *Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants*, NUREG-1738, at § 3.5.2 (2001) [hereinafter *2001 NRC Spent Fuel Pool Study*]. The NRC further found that one of two crashes would damage the spent fuel pool enough to uncover the stored fuel, which could lead to serious consequences from a zirconium cladding fire. *See id.*

Other studies identify the threat as a significant issue. Ian B. Wall, *Probabilistic Assessment of Aircraft Risk for Nuclear Power Plants*, 15 Nuclear Safety 276 (1974); Power Auth. of the State of N.Y. & Consol. Edison Co., *Indian Point Probabilistic Safety Study*, at 7.6-3 to 7.6-6 (1982). In 2005, the National Academy of Sciences released a report from a study it conducted at the request of Congress, with the sponsorship of the NRC and the Department of Homeland Security, of the security risks posed by the storage of spent fuel at nuclear plant sites. *See* Nat'l Acad. of Scis., *Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report* (2006). Based upon information provided by the NRC, the National Academy of Sciences judged that "attacks with civilian aircraft remain a credible threat." *Id.* at 30; *see also* German Reactor Safety Org., *Protection of German Nuclear Power Plants Against the Background of the Terrorist Attacks in the U.S. on Sept. 11, 2001* (Nov. 27, 2002).

129-o-SM contd.

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Following 9/11, NRC amended all existing reactor licenses, including the license for the Unit 3 reactor at Indian Point, "to address the generalized high-level threat environment in a consistent manner throughout the nuclear reactor community." *See generally* 67 Fed. Reg. 9,792 (Mar. 4, 2002). The amended licenses required the identification of mitigative measures to reduce the potential consequences of explosions or fire at nuclear plants, "including those that an aircraft impact might create." *See* Letter from J. Boska, NRC, to M. Balduzzi, Entergy Nuclear Operations (July11, 2007) ML 071920023; *see also* February 23, 2002 Interim Compensatory Order, 67 Fed. Reg. 9,792 (Mar. 4, 2002) (also referred to as the "B.5.b Order"). Thus, NRC cannot maintain that aircraft impacts are not foreseeable and it must examine the environmental consequences of such strikes not only to the spent fuel pools, but to the all aspects of the power generating facilities.

129-o-SM contd.

The NRC Has Established Mitigation Measures Regarding Spent Fuel Pool Safety Without Conducting a NEPA Analysis Subject to Public Comment in Violation of NEPA

The NRC has curiously established mitigation measures for spent fuel safety, while simultaneously maintaining that it need not analyze the potential impacts from a spent-fuel pool-related terrorist attack under NEPA. This "cart-before-the-horse" approach does nothing but deprive the public of review of a crucial environmental and

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public safety issue, and fails to meet NEPA's requirements of analysis before mitigation.[20]

According to the DSEIS, "[a]s set forth in the GEIS, Category 1 issues are those that meet *all* of the following criteria:

> (1) The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics.
>
> (2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal).
>
> (3) Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation.

DSEIS at Section 6.0, p.6-1 (emphasis added). "For issues that meet the three Category 1 criteria, no additional plant-specific analysis is required unless new and significant information is identified. Category 2 issues are those that do not meet one or more of the criteria for Category 1; therefore, additional plant-specific review of these issues is required." *Id.*

129-o-SM contd.

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[20]NEPA has "twin aims:" to give an agency "the obligation to consider every significant aspect of the environmental impact of a proposed action;" and to ensure "that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *San Luis Obispo Mothers for Peace*, 449 F.3d at1020 (quoting *Baltimore Gas & Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983).

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According to this definition, the environmental impacts of on-site storage are no longer Category 1 issues because, as the NRC recently indicated in a rulemaking concerning its policy regarding on-site storage of waste, it has required the implementation of site-specific mitigation measures at all of the nation's facilities. *See* 73 Fed. Reg. 59568 (Oct. 9, 2008)("the NRC has approved license amendments and issued safety evaluations to incorporate mitigation measures into the plant licensing bases of all operating nuclear power plants in the United States"), *citing Denial of PRMs,* 73 Fed. Reg. 46207–08 (Aug. 8, 2008).

Mitigation measures are only necessary to address adverse impacts. *See* 40 C.F.R. §§ 1502.14(f), 1502.16(h). Yet, although NRC in the DSEIS takes the position that it need not analyze the impacts of a terrorist attack at all, it has required implementation of mitigation measures, indicating that it has looked at such impacts in some fashion and concluded them to be adverse. The public has the right to know what impacts NRC has considered, and what the nature of its mitigation measures are. At least one federal circuit court of appeals has recognized that NRC's own efforts undercut its position that terrorism need not be examined. *See San Luis Obispo Mothers for Peace*, 449 F.3d at 1030-31.

Accordingly, New York State requests that the NRC analyze the environmental impacts of such acknowledged security risks, including an intentional air attack at the Indian Point facilities.

129-o-SM contd.

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CONCLUSION

For the above reasons, and the reasons set forth in the Department of Environmental Conservation's submission of today's date, the State of New York maintains that the December 2008 Draft Supplemental Environmental Impact Statement is inconsistent with the National Environmental Policy Act, the Council on Environmental Quality's regulations, and the NRC's own Part 51 regulations. Accordingly, the DSEIS needs to be thoroughly revised and reissued for additional public review and comment.

Respectfully submitted,

/s

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10. SUPPLEMENTARY NOTES

Docket Nos. 05000247 and 05000286, TAC Nos. MD5411 and MD5412

11. ABSTRACT *(200 words or less)*

This supplemental environmental impact statement (SEIS) has been prepared in response to an application submitted to the NRC by Entergy Nuclear Operations, Inc. (Entergy), Entergy Nuclear Indian Point 2, LLC, and Entergy Nuclear Indian Point 3, LLC (all applicants will be jointly referred to as Entergy) to renew the operating licenses for Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3) for an additional 20 years under 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." This SEIS includes the NRC staff's analysis which considers and weighs the environmental impacts of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts. It also includes the NRC staff's recommendation regarding the proposed action.

The NRC staff's recommendation is that the Commission determine that the adverse environmental impacts of license renewals for IP2 and IP3 are not so great that preserving the option of license renewal for energy planning decision makers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS, (2) the environmental report and other information submitted by Entergy, (3) consultation with other Federal, State, Tribal, and local agencies, (4) the NRC staff's own independent review, and (5) the NRC staff's consideration of public comments received during the scoping process and in response to the draft SEIS.

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