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Attachments: NYSDEC Comments NRC Draft GEIS 01 12 2010 (w Atts).pdf

Attached please find the comments of the New York State Department of Environmental Conservation to the NRC's Draft Revised Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants (NUREG-1437).

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

COMMENTS ON

THE NRC STAFF'S DRAFT REVISION OF THE GENERIC ENVIRONMENTAL IMPACT STATEMENT
FOR LICENSE RENEWAL OF NUCLEAR PLANTS, NUREG-1437

submitted to the United States Nuclear Regulatory Commission

January 12, 2010

INTRODUCTION

The New York State Department of Environmental Conservation (NYSDEC) submits these comments on the draft revision of the Generic Environmental Impact Statement (Generic EIS) for License Renewal of Nuclear Plants, NUREG-1437, originally published by the United States Nuclear Regulatory Commission (NRC) in 1996.

Environmental review, and the environmental impact statement process, is required to play a key role when the NRC considers license renewal applications for nuclear generating facilities. The review is mandated by the federal National Environmental Policy Act (NEPA). The draft revised Generic EIS needs substantial revision if it is going to meet NEPA's requirements. Even given the clear mandate under federal law, the analysis in the draft revised Generic EIS is illusory. This key step in the license renewal review falls short of what it should achieve. Instead, numerous issues that have been repeatedly raised by the State of New York remain unaddressed. Statements submitted by the State of New York in 1991 in the original Generic EIS process regarding upgrading technologies to reduce and mitigate environmental impacts at nuclear generating facilities are even more relevant in 2010. Unfortunately, they are going as unheeded now as they were twenty years ago. As the record demonstrates, the NRC has narrowly drafted regulations, processes, and procedures that do not address key environmental issues in meaningful ways.

A. The Draft Generic EIS Avoids Thorough Analysis of the Environmental Impacts for License Renewals of Nuclear Power Plants in the United States.

The publication of this draft Generic EIS illustrates the significant procedural and substantive hurdles that the NRC has put in the way of public review and participation in the license renewal proceedings of nuclear generating facilities. The State of New York has participated in the license renewal proceeding for Indian Point Units 2 & 3, and yet fundamental environmental issues have not been adequately addressed in that forum. With the release of the revised Generic EIS, those issues will not be analyzed, addressed, or reviewed for Indian Point or any other facility. The process demonstrates that in whatever forum an interested party raises an issue, the NRC claims that it is never the proper forum. The review process, although ostensibly open to all, in reality is a carefully constructed "shell game." Parties attempting to participate in the reviews have to know what they need to know before they need to know it. The NRC process on license renewal effectively deprives the public from meaningfully participating in the consideration of environmental issues in what is mandated by law to be a comprehensive environmental review process. When there are significant impacts to waterways, such as the Hudson River, and alternatives such as closed-cycle cooling technology are available, the NRC's failure to consider those alternatives means that the environmental impacts will never be adequately considered for operation of the nuclear facility.

The NRC has established a two-part environmental review process for the license renewal of nuclear power plants in the United States. The Generic EIS is intended to address environmental impacts that are common to numerous plants. In addition to this Generic EIS, a Supplemental EIS process for individual plants is intended to address environmental impacts at specific facilities. In practice, however, a thorough and comprehensive review of issues is thwarted by this two-part process because they are out of sync with each other.

The draft revision at issue here is for the 14-year-old Generic EIS. Parties engaged in license renewal proceedings, and who have gone through the “contentions” process seeking a hearing on the already-filed license renewal applications, must deal with the woefully outdated Generic EIS that was originally published in 1996. The NRC’s regulations require the Generic EIS to be reviewed on a ten-year cycle, and updated if necessary. Many years later, the NRC has published a draft revision. But yet again, the NRC fails to fully analyze key issues, and punts many key issues to other parts of the process, having precluded the possibility of the issue being addressed in the NEPA review. Public review is further complicated by the fact that the “record” available to interested parties seeking a hearing on a particular license renewal proceeding is incomplete when “contentions” are required to be filed. Moreover, the Supplemental EIS when published many, many months after the NRC’s imposed deadline to file contentions almost ensures that the “missing” pieces of the record will also not be considered in the proceeding. These factors collude to complicate consideration of important issues, which is especially true for impacts on aquatic resources.

The draft revised Generic EIS misses critical and well known environmental issues and effectively precludes their review. For example, the NRC mentions in this draft Generic EIS that impingement and entrainment impacts from cooling water intake systems will be fully assessed in a site-specific Supplemental EIS. As a participating party in the license renewal proceeding for Indian Point Units 2 & 3, it is clear to the NYSDEC that this is not true in that proceeding. Therefore, the NYSDEC has concluded that the woeful experience with that site-specific Supplemental EIS provides a compelling need for the NRC to set out more guidelines in the revised Generic EIS. Not only has New York State had to deal with such a stale Generic EIS, but, as demonstrated below, the NRC has drafted a site-specific Supplemental EIS in the Indian Point license renewal proceeding based upon faulty data and analyses. This result must be corrected for the Indian Point license renewal process, and importantly, not be allowed to be repeated at other plants because the revised Generic EIS is so deficient.

Thus, NYSDEC advances a novel proposition -- the Indian Point Supplemental EIS should inform the NRC to provide more guidance in the Generic EIS for the preparation of site-specific Supplemental EISs. If the NRC takes such a step, and heeds the comments of New York State from both 1991 and now, a more meaningful review of critical environmental issues can be possible for the license renewal applications for nuclear generating facilities. That meaningful review will also comply with NEPA.

B. The Draft Generic EIS Fails to Provide Key Guidance for Addressing Impacts to Aquatic Resources in the Development of Supplemental EISs for Individual Nuclear Power Plants that Are or Will Undergo License Renewal.

One of the NRC’s stated purposes of the draft revised Generic EIS is to “defin[e] the number and scope of impacts that need to be addressed in plant-specific EISs.” Draft GEIS, p. iii (emphasis added). In the Summary of the draft revised Generic EIS, the NRC states the following:

The GEIS is intended to improve the efficiency of the license renewal process by (1) providing an evaluation of the types of environmental impacts that may occur from renewing commercial nuclear power plant

operating licenses, (2) identifying and assessing impacts that are expected to be generic (the same or similar) at all nuclear plants (or plants with specified plant or site characteristics), and (3) defining the number and scope of environmental impact issues that need to be addressed in plant-specific EISs. Draft Generic EIS, p. S-1 (emphasis added).

In our view, the draft revised Generic EIS does not adequately define the scope of environmental impacts to aquatic resources that should be addressed in the plant-specific EISs.

Although the NRC has correctly determined that aquatic impacts caused by the operation of cooling water intake systems using a “once-through” system will need to be addressed in plant-specific EISs (a Category 2 issue), it has included little about the scope or breadth of the analyses that will be required. The conclusion of Section 4.6.1.2 is simply that the NRC will perform facility specific impact assessments for nuclear power facilities that use a once-through cooling water system. Thus, the NRC does not provide much-needed details in the draft revised Generic EIS to indicate

- how it will make this assessment;
- the data that it will require from the licensee;
- the type of analysis that it will conduct; and
- what it will require if an impact is determined to be moderate or large.

The lack of these details makes this section of the draft useless as a guidance document for NRC staff to use in making these very important and complex impact assessments. Additionally, the draft makes little, if any, changes to required assessments and mitigation of impacts caused by the cooling water intake systems at nuclear power facilities.

The NRC briefly discusses “[v]arious methods that have been used to reduce impingement” (Draft Generic EIS, p. 4-83). This discussion is extremely brief and misleading given that there has been over three decades of technology development and application. Many mitigative technologies are not mentioned, while the stated effectiveness of others is overemphasized. For example, as discussed in more detail below, the NRC makes statements on the effectiveness of sound deterrent systems that exaggerate the actual effectiveness of that technology.

The draft revised Generic EIS also contains no discussion of the impact reductions associated with a number of other mitigative technologies: wedgewire screens, barrier nets, and most importantly, closed cycle cooling. The NRC then states in Section 4.6.2 that the few mitigative alternatives that are discussed will cause the following impacts: “fugitive dust; impingement and entrainment of fish and other aquatic organisms; heated effluent from cooling water discharge and blowdown; . . . boiler blowdowns; . . . cooling tower drift (fogging and ice); salt deposition; maintenance of transmission line ROWs; bird collisions; and wildlife avoidance behavior due to operational activities and noise” Draft Generic EIS, p. 4-114. Therefore, the NRC has effectively developed an excuse for doing nothing if aquatic impacts are determined to be moderate to large. According to the draft Generic EIS, mitigating these impacts would only result in additional moderate to large impacts. However, the Generic EIS must provide a context for the impact and identify appropriate ways to minimize or mitigate impacts that are

moderate to large.

C. In the Draft Generic EIS, the NRC Perpetuates and Compounds the Flaws in Its Assessment of Impacts on Aquatic Resources in the License Renewal for Indian Point.

Having participated in the license renewal process for Indian Point Units 2 & 3, the NYSDEC is concerned with (1) the environmental impacts from the extended operation of those plants, (2) the NRC's failure to adequately assess the environmental impacts at those plants, and (3) whether future license renewal proceedings conducted under the revised Generic EIS would follow what is being done for the license renewal of Indian Point Units 2 & 3. In the Indian Point license renewal proceeding, the NRC released a draft Supplemental EIS (specific to Indian Point). The NYSDEC identified flaws in the NRC's approach for the aquatic impact assessment for Indian Point Units 2 & 3, and the State conveyed its concerns in its comments to the draft Supplemental EIS. Those comments are attached to this document as *Attachment A*.

The impacts to aquatic resources from the once-through cooling systems at Indian Point are well known. In the license renewal proceeding, NYSDEC submitted expert declarations in support of its contentions detailing the impacts to aquatic resources with New York State's Notice of Intention to Participate and Petition to Intervene (November 30, 2007). New York's submission included the declarations of Roy A. Jacobson, Jr. (dated November 29, 2007) and David W. Dilks, Ph.D. (dated November 28, 2007). These declarations are attached to this document as *Attachments B and C*, respectively. The issues raised in these declarations are very relevant to the Generic EIS. Although they detail the significant and persistent adverse impacts from once-through cooling at Indian Point, they tell the unfortunate story for once-through cooling water intake systems nationwide. This unfortunate story is summarized below:

Summary of Impingement and Entrainment Contention - Indian Point License Renewal

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. This relentless process has continued relatively unabated for almost 40 years, and the applicant now seeks 20 more years. This must not continue because the environmental costs are too high. The NRC must fully consider the alternative of closed cycle cooling to mitigate these significant adverse impacts in this license renewal proceeding.

Summary of Heat Shock/Thermal Contention - Indian Point License Renewal

Indian Point's 40-year-old design uses massive quantities of Hudson River water when operating, and this system returns significantly heated water back to the river. The Hudson River would be a far more productive estuarine ecosystem if the heat shock/thermal impacts from Indian Point could be mitigated. Tens of millions of fish

are impacted – from behavioral and growth impacts to fatalities. These impacts cannot be mitigated and they violate the requirements of the Clean Water Act. The State of New York contends that these impacts must be fully analyzed and addressed in this license renewal proceeding.

Summary of Endangered Species Contention – Indian Point License Renewal

The Endangered Species Act 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 applicant argues that Indian Point does not jeopardize these fish. The State of New York contends that there are serious questions about the applicant's views. The Endangered Species Act and common sense dictate that a full and thorough analysis is needed before the NRC makes a decision that could determine the fate of the sturgeon in the Hudson.

Despite the extensive analysis submitted into the NRC record regarding the Indian Point license renewal, NYSDEC is dismayed and concerned that the NRC perpetuates and compounds its prior flaws in the draft revised Generic EIS here. Specifically, the draft revised Generic EIS does not account for the flaws identified by the NYSDEC in the Indian Point plant-specific draft Supplemental EIS, which can be replicated for any number of plants throughout the country. Included among the flaws in the NRC's environmental review for Indian Point in the draft Supplemental EIS that the NYSDEC identified are the following:

- The impingement data that Entergy provided to the NRC for Indian Point were erroneous. Nevertheless, the NRC conducted analyses and based its impact assessment on these erroneous data. This error was discovered by New York State and the National Marine Fisheries Service after the draft Supplemental EIS for the re-licensing of Indian Point Units 2 & 3 was released for public comment. The NRC will now need to reevaluate these impacts with the corrected data, which may lead to a delay in completing the Supplemental EIS for Indian Point Units 2 & 3.
- Some of the results of the impact assessment made by the NRC are contrary to the conclusions made by New York State biologists and many fisheries biologists familiar with the Hudson River estuary. For example, the NRC concluded that the re-licensing of Indian Point Units 2 & 3 will result in a *large* impact on bluefish populations. However, very few adult bluefish are impinged, and few, if any, bluefish eggs and larvae have been entrained by Indian Point Units 2 & 3. If adult bluefish are impinged, survival off the Ristroph-type traveling screens is high, on the order of 85 percent. In addition, bluefish stocks have been increasing in recent years.
- The NRC recommended *illegal* restoration activities to offset the Clean Water Act Section 316(b) impacts. This is contrary to what the NRC states in the draft revised Generic EIS that all Clean Water Act Section 316(b) issues will be handled by the EPA and not the NRC. See Draft Generic EIS, p. 4-86, fn "a".

- The NRC could not make final adverse impact assessments on several of the fish species it considered due to the lack of adequate information. Specifically, the adverse impacts to Atlantic sturgeon, shortnose sturgeon, Atlantic menhaden, gizzard shad, and blue crab could not be determined. Therefore, the NRC has no idea what the impact to these species will be if the licenses for Indian Point Units 2 & 3 are renewed for another 20 years because it did not obtain adequate data and information from the licensee.
- One of the species that the NRC did not have enough information on was the shortnose sturgeon – a federally listed endangered species. The NRC was aware that the licensee would be required to address Endangered Species Act issues, and the NRC appears to have known that Entergy had no recent data to ensure that an adequate assessment of the impacts on this species was made. The NRC never took the initiative to require the licensee to collect adequate data even though both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service requested this information early on.

Recommendations:

In the context of the NRC’s draft Supplemental EIS on the license renewal of Indian Point Units 2 & 3, additional information is required for the Generic EIS to meet the requirements of NEPA. Specifically, the NRC must incorporate the following information into the final Generic EIS:

- The NRC should specify the information on aquatic resources that it will require the licensees to provide.
- The NRC should list the specific aquatic species data required for both listed and non-listed aquatic species.
- Data need to be collected during appropriate times of the year and be recent enough to account for biological changes that have occurred over time in many aquatic systems throughout the country.
- The NRC should also address quality assurance and quality control to avoid repeating the errors that occurred with the impact assessment at Indian Point Units 2 & 3.
- The NRC must provide details about the types of analyses that NRC staff will undertake to make impact assessments and what the NRC will require of a licensee if any impacts are determined to be “moderate” or “large.”
- To address potential thermal impacts caused by the thermal discharge of nuclear plants operating once-through cooling water systems, licensees should be required to undertake a thermal study to accurately estimate the potential species-specific thermal impacts. Many of these nuclear facilities have received power uprates since they were originally licensed, and some water bodies have warmed. Thermal studies conducted 10, 20, or more years ago obviously could not have accounted for these changes.

Lastly, given our experience with the NRC's handling of the Indian Point license renewal proceeding, we question why the NRC goes through the trouble to make any facility-specific assessment of impingement and entrainment impacts on non-listed species given the statement in footnote "a" on page 4-86. NRC staff is spending a significant amount of time and resources conducting fish population impact analyses to determine impacts that the NRC has a history of not addressing during the license renewal process. This is particularly egregious in the case of Indian Point Units 2 & 3 where erroneous data were used. The NRC then shirks its duty under NEPA and other relevant law when it determines that its action will likely lead to a moderate or large impact on an aquatic resource and then proceeds to renew the license without requiring the mitigation or minimization of the impact that the NRC identified.

For example, with Indian Point Units 2&3, the NRC has identified several moderate to large impacts but then indicated that these impacts will be minimized or avoided through the New York State Pollutant Discharge Elimination System (SPDES) permit program. However, the licensee has challenged the draft SPDES permit requiring the minimization of these impacts claiming that no such impact exists. Therefore, by challenging New York State, the licensee is in fact disagreeing with the NRC findings and is delaying or avoiding any mitigation for the aquatic impacts identified by the NRC. This delay provides the necessary cover for the NRC - enabling it to continue with a license renewal proceeding without ever having to confront the necessary issues on impacts to aquatic resources. In the end, however, simply deferring to the agencies responsible for the issuance of permits and approvals does not satisfy the NRC's legal obligations mandated under NEPA.

D. The Draft Generic EIS Fails to Adequately Assess Aquatic Impacts in Specific Key Areas.

Numerous specific statements in the draft revised Generic EIS need to be addressed by the NRC. These include the NRC's portrayal of the Clean Water Act section 316(b) Phase III rules, the viability of acoustic deterrent systems at plants in Belgium and New York, the role of the consultation process under the federal Endangered Species Act, and the environmental consequences of alternatives to license renewal.

1. Clean Water Act Section 316(b) - Phase III Rules

The NRC's Statement:

Phase III applies to existing manufacturing facilities with a design intake flow of at least 50 million gpd (189 million L/d) and new offshore and coastal oil and gas extraction facilities designed for withdrawing at least 2 million gpd (7.6 million L/d). Draft Generic EIS, p. 3-54, lines 13-16.

The NYSDEC's Response:

This statement is incorrect or at least misleading. The Final Phase III rule applies only to new oil and gas extraction facilities. Existing manufacturing facilities using 50 MGD or more are still decided on a case-by-case, best professional judgment basis:

This rule establishes categorical section 316(b) requirements for intake structures *at new offshore oil and gas extraction facilities* that have a design intake flow threshold of greater than 2 million gallons per day and that withdraw at least 25 percent of the water exclusively for cooling purposes. For existing Phase III facilities, EPA determined that uniform national standards are not the most effective way at this time to address cooling water intake structures at these facilities. Instead, EPA believes that it is better to continue to rely upon the existing National Pollutant Discharge Elimination System (NPDES) program, which implements section 316(b) for existing facilities not covered under the Phase II rule on a case-by-case, best professional judgment basis. 71 Fed. Reg. 35006 (June 16, 2006) (emphasis added).

This NRC statement is also irrelevant to the license renewal of nuclear power plants since no EPA rule covers existing nuclear power facilities.

2. Acoustic Deterrent System at Plant in Belgium

As illustrated in this and in the following point, the NRC also greatly exaggerates the effectiveness of sound deterrent systems as a mitigation measure for impingement.

The NRC's Statement:

At the Doel nuclear power plant on the Scheldt Estuary in Belgium, an acoustic deterrent system decreased total impingement of estuarine fishes by about 60 percent. Draft Generic EIS, p. 4-83, lines 19-20.

The NYSDEC's Response:

The NRC is wrongly applying the narrow results of the experience at the plant in Belgium. Sonic deterrent systems have only been demonstrated to be effective on clupeids, and in fact, the two species impinged at the Belgium facility are clupeids. The NRC has no basis to state that the use of a sonic deterrent system reduced the impingement of "estuarine fishes" by about 60 percent – one would interpret this to mean that sonic deterrent technology is effective on *all* estuarine fish species, which is not supported by the data. The NRC needs to be more accurate in presenting "facts" and should only present information on fish species found in the United States and nuclear facilities they regulate. We also note that one of the species at issue in the Belgium plant (*Sprattus sprattus*) is a European species not found in United States waters.

3. Sound Deterrent System at Fitzpatrick

The NRC's Statement:

At the Fitzpatrick plant in New York, the sound deterrent system reduced the density of fishes near the intake by as much as 96 percent (Ross et al. 1993). Draft GEIS, p. 4-83, lines 27-28.

The NYSDEC's Response:

The NRC repeats the mistake it made with its reference to the plant in Belgium. This statement is misleading and overstates the results of the sound deterrent system at another plant. When these studies were conducted in May 1991 at J.A. Fitzpatrick Nuclear Power Plant in New York State, alewives comprised a majority of the impingement mortality at the plant. As the Department stated in the previous comment, sonic deterrent systems are *only* effective on clupeids. By stating that this system has shown a "96 percent reduction in density" again leads one to believe that *all* fish species are affected by this technology. Moreover, although alewives still make up a portion of the impingement mortality, the alewife population on Lake Ontario has crashed in recent years. See Mills et al., 2003. Can. J. of Fish. Aquat. Sci. 60:471-490. Thus, NYSDEC would not expect to see those prior results replicated with the current population.

In fact, the sonic deterrent system fails to affect many other fish species impinged at Fitzpatrick. Recent impingement studies (2006-2007) have demonstrated that over 200,000 fish are impinged annually at Fitzpatrick. These are mostly three-spine stickleback that do not respond to the sonic deterrent system. In sum, with a functional sonic deterrent system, yearly impingement mortality of alewife should be reduced by 86 percent, but it does not follow that a sonic deterrent system will reduce the impingement mortality of other fish species.

4. Endangered Species Act Consultation Process

The NRC's Statement:

Prior to license renewal, the NRC should consult with the USFWS and NMFS to determine the presence of and possible impacts on any ESA-listed aquatic species. . . . The NRC should also contact the NMFS for license renewal applications for plants located in areas that may contain EFH for Federally managed marine or anadromous fisheries or for plants that may have an effect on protected marine mammals. Draft Generic EIS, p. 4-113, lines 18, 21-23.

The NYSDEC's Response:

By using the word "should" in this statement, the draft revised Generic EIS makes the consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service on Endangered Species Act and Essential Fish Habitat issues appear to be precatory and discretionary. Consultation is mandatory under the Endangered Species Act, and the text must reflect this. NYSDEC recommends the following changes as necessary to address this significant oversight:

- Change the sentence on line 18 to read as follows: "Prior to license renewal, the NRC *shall* consult with the USFWS and NMFS to determine the presence of and possible impacts on any ESA-listed aquatic species."
- Change the sentence on lines 21-23 to read as follows: "The NRC *shall* also contact the NMFS for license renewal applications for plants located in areas that may contain EFH for Federally managed marine or

anadromous fisheries or for plants that may have an effect on protected marine mammals.”

5. Environmental Consequences of Alternatives to the Proposed Action

The NRC's Statement:

In Section 4.6.2, the NRC states that any alternative to license renewal of an existing facility would likely have a greater environmental impact than simply renewing the license of an existing facility. Draft Generic EIS, p. 4-114.

The NYSDEC's Response:

The basis for this NRC conclusion is not explained. Indeed, it is contradicted by other sections of the draft revised Generic EIS. For example, in Section 4.6.1.2, the NRC states that the operation of a cooling water intake system may cause moderate to large impacts on aquatic organisms:

[T]he NRC concludes that the impingement and entrainment of aquatic organisms over the license renewal term at nuclear plants with once through cooling or cooling ponds could be small, *moderate, or large* and is considered a Category 2 issue. Draft Generic EIS, p. 4-86. *Emphasis added.*

The NRC fails to discuss, assess, or analyze potential benefits to aquatic resources by known and readily identifiable alternatives to the extension of licenses for existing nuclear generating facilities. By not renewing the license of a facility that uses a once-through cooling system, entrainment and impingement would no longer occur at that facility, which means that this impact would be significantly lessened. Similarly, such impacts would be significantly lessened if, by not renewing the license of an existing facility, a new power plant must be constructed with a closed-cycle cooling system, which the NRC has determined would be a Category 1 issue (closed-cycle cooling systems result in a small impact to aquatic resources). Moreover, impingement and entrainment impacts are not exclusively Clean Water Act Section 316(b) issues. The NRC can consider other alternatives than simply not renewing an operating license, such as requiring closed-cycle cooling or other mitigative technologies to minimize Endangered Species Act and Essential Fish Habitat impacts.

In 1991, New York State made the following comment to the NRC on the 1996 Draft Generic EIS:

[T]he NRC [should] include consideration of current standards of mitigative technologies in the GEIS in that if nuclear plants are to be operating for an additional 20 years, then these license-extended plants should have their intake and discharge configuration reviewed as if they were a new facility. [S]ince many licensed and operating nuclear power plants received their condenser cooling system approval prior to the advent of new technologies . . . the best available technology . . . may be different given the additional 20 years of plant life. Thus, system retrofits

may be appropriate for mitigation of the [moderate to large] impacts.

The point raised by New York State in 1991 is just as valid as the points NYSDEC is raising in these comments in 2010. In conclusion, the NRC analysis presents a false choice. The result is that a viable and well-identified option -- closed cycle cooling -- is summarily dismissed instead of being discussed as part of a license renewal option. This approach does not meet NEPA requirements to adequately assess environmental impacts in the Generic EIS.

6. Miscellaneous Comment - Glossary Entries

To be consistent and accurate, the definitions in the glossary for *entrainment* and *impingement* should be the same as presented in the text box on page 4-80. See Draft Generic EIS, p 7-18; lines 6-7 & p 7-24; lines 33-34, respectively.

CONCLUSION

NEPA requires more of the NRC than the agency is providing in the license renewal process for nuclear power plants. The NRC's approach for reviewing license renewal applications from aging nuclear power plants -- many with once-through cooling water intake systems that have never undergone environmental review because they pre-dated NEPA -- does not achieve the goal of adequately assessing and mitigating environmental impacts as NEPA mandates. The NRC claims that the revised Generic EIS will provide guidance for assessing impacts in Supplemental EISs, which are conducted on a site-specific basis for each plant. As demonstrated above, however, this document hardly provides that guidance. The NYSDEC knows that the guidance is sorely needed, given the State's experience in the NRC's license renewal proceeding for Indian Point. The demonstrated inadequate draft Supplemental EIS for Indian Point should serve to instruct the NRC in crafting the revised Generic EIS. In that way, the data errors and the analytical failures abundant in the Indian Point license renewal proceeding will not be replicated nationwide.

Attachments

Attachment A - NYSDEC Comments on the NRC Staff's Draft Supplemental EIS for the License Renewal of Indian Point Units 2 and 3, Buchanan, New York, March 18, 2009

Attachment B - Declaration of Roy A. Jacobson, Jr. (November 29, 2007), submitted in support of the State of New York's Notice of Intention to Participate and Petition to Intervene (November 30, 2007) (Indian Point License Renewal)

Attachment C - Declaration of David W. Dilks, Ph.D., (November 28, 2007), submitted in support of the State of New York's Notice of Intention to Participate and Petition to Intervene (November 30, 2007) (Indian Point License Renewal)

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

Attachment A

NYSDEC 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.

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

II. NATIONAL ENVIRONMENTAL POLICY ACT

III. ANALYSIS OF AQUATIC IMPACTS

A. Entrainment and Impingement of Fish and Shellfish

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.
2. NEPA Requires an Accurate and Valid Analysis of Significant Impacts.
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.
4. Summary of the Department's Position

B. Thermal and Heat Shock Impacts from the Operation of Indian Point.

1. The NRC Staff Has Insufficient Data to Conclude that the Thermal Impacts from Indian Point Will Produce Small to Moderate Impacts.
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.
3. The NRC Has Repeated the Conclusory Misstatements of the Applicant.
4. Summary of the Department's Position

- 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

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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.

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.

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.

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.

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.

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,

- (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.

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

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.

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

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.

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.

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.

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

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.

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*.

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")*.

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

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.

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.

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*

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.

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

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.

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

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

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.

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.

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.

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.

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.

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.

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 Decree [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.

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.

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.

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.

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.)

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).

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.

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.

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

("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.

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.

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

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

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

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.

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.

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](http://www.cbsnews.com/stories/2003/09/04/attack/main571556.shtml).

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>.

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.*

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

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

information was not available in the 1996 review, and has never been considered in any NEPA review for nuclear generating facilities license renewals.

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.

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.

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

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 plant,
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

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.

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

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.

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.

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.

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.

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.

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

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.

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.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
OFFICE OF THE SECRETARY

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

ENERGY NUCLEAR INDIAN POINT 2, LLC
ENERGY NUCLEAR INDIAN POINT 3, LLC
ENERGY NUCLEAR OPERATIONS, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 & 3

Regarding the Renewal of Facility Operating Licenses
No. DPR-26 and No. DPR-64 for an Additional 20-year Period

NRC Docket Nos.
50-247 & 50-286

ASLB No.
07-858-03-LR-BD01

DECLARATION OF ROY A. JACOBSON, JR.

I, ROY A. JACOBSON, Jr. declare under penalty of perjury that the following is true and correct:

1. I am employed by the New York State Department of Environmental Conservation (NYSDEC or DEC), Division of Fish, Wildlife and Marine Resources, as a Biologist 3 (Ecology). I am currently the Head of the Landscape Conservation Section within the Bureau of Habitat. Between 2003 and 2007, I was the leader of the Steam Electric Unit. The Steam Electric Unit takes the lead role for NYSDEC in evaluating the impacts on aquatic resources from cooling water use at power plants and other facilities with thermal discharges. As the Steam Electric Unit Leader, I was responsible for supervising technical staff and overseeing all biological reviews conducted in matters pertaining to the renewal of the New York State Pollutant Discharge Elimination System (SPDES) permits for electric power generating facilities across New York State. Specifically regarding generating stations on the Hudson River, I was

Attachment B

Declaration of Roy A. Jacobson, Jr. (November 29, 2007), submitted in support of the State of New York's Notice of Intention to Participate and Petition to Intervene (November 30, 2007)

directly involved with the development of draft SPDES permits for Roseton Generating Station, Bowline Generating Station, and the two operating nuclear reactors at the Indian Point Nuclear Generating Facility (Indian Point). Thus, I am familiar with the facts and circumstances surrounding the permitting issues at the Indian Point plants as they relate to both the federal Clean Water Act and New York State water quality regulations (6 NYCRR § 704.5). In addition, I am actively engaged with other Department staff in reviewing Entergy's application to the United States Nuclear Regulatory Commission (NRC) for a 20-year license extension for the two Indian Point plants. As part of this review, I have reviewed Entergy's Environmental Report. Attached as **Exhibit A** is a copy of my resume, which describes my professional background.

Indian Point Operations

2. Indian Point is located along the Hudson River in Buchanan, New York. The facility is composed of three units: Unit 1 (IP1), Unit 2 (IP2), and Unit 3 (IP3). IP1 is no longer in operation and was shut down in October 1974. IP2 and IP3 are still in operation and are now owned by Entergy Nuclear Operations, Inc.

3. IP2 and IP3 are rated at approximately 1000 megawatts each and use "once-through condenser cooling" to eliminate waste heat from the generating process. In this once-through cooling process, water is drawn from the Hudson River into the two active plants by twelve large pumps and is then passed through a vast network of tiny tubes known as condensers that cool and condense steam back into liquid water. The generation and condensation of steam turns turbines, which generate electricity.

4. Additional cooling water is drawn from the river using other pumps referred to as "service water pumps." Water from these pumps is used to cool bearings and other equipment within the facility. The heated water from condenser cooling and service water is then

discharged back into the Hudson River. Maximum cooling water demand occurs when generating full power during summer with each unit requiring 840,000 gallons per minute (GPM) of condenser cooling water and up to 30,000 GPM of service water. Thus, the total amount of water used each day for both units under these conditions is approximately 2.5 billion gallons. This volume of water is by far the greatest single industrial use of water in New York State and is more than the combined water use of two other major Hudson River power plants (Roseton Generating Station and Bowline Generating Station). Put another way, Indian Point uses all the water in a 450-acre lake (15 foot deep) *each day*.

Value of the Hudson River Ecosystem

5. IP2 and IP3 are located in the Hudson River Estuary. Estuaries are among the most productive aquatic ecosystems on earth where the freshwater that drains from the rivers mixes with ocean waters. Variable salinity and physical characteristics create a variety of plant communities and a wide array of habitats for aquatic organisms. Although salinity and habitat structure are critical components for the functioning of the estuary, productivity is driven by the nutrients entering the system from upstream and the regular mixing of nutrients caused by tidal currents. As a result of these processes, the Hudson River estuary supports a rich array of organisms, including

- a) small plants (phytoplankton) and small animals (zooplankton) that form the base of the food chain;
- b) mid-level consumers such as bay anchovy (*Anchoa mitchilli*) and herring (*Alosa spp.*); and
- c) top-level predators such as striped bass (*Morone saxatilis*), which in turn provide a regionally important sport fishery.

6. The Hudson River Estuary has long been recognized as a valuable state and local resource and is an integral part of the North Atlantic coastal environment. The New York State Legislature has declared the estuary “of statewide and national importance as a habitat for marine, riverine, freshwater, and migratory fish species.” L.1987, ch. 612, § 2. Over 200 species of fish are found in the Hudson, and they inhabit over 16,500 acres of river, including tidal brackish and rare tidal freshwater marshes, submerged aquatic plant beds, and estuarine deepwater. These habitats support several species of fish that migrate annually past Indian Point to carry out their life histories.

7. Indian Point is located in an area surrounded by several designated Hudson River Significant Tidal Habitats, including Hudson River Miles 44-56, Iona Island Marsh, Camp Smith and Annsville Creek, and Haverstraw Bay. To the north, Hudson River Miles 44-56 is the major spawning area along the Hudson for the striped bass. Just to the south of Indian Point, Haverstraw Bay provides extensive nursery grounds for migratory fish species including striped bass, American shad (*Alosa sapidissima*), and Atlantic sturgeon (*Acipenser oxyrinchus*). Haverstraw Bay also provides feeding grounds for bay anchovy, Atlantic menhaden (*Brevoortia tyrannus*), and blue claw crab (*Callinectes sapidus*). Many of these species, including American shad, striped bass, and Atlantic sturgeon, must migrate past Indian Point to breed up river and then they and their young must return down river to nursery grounds and the open ocean.

8. While at last count more than 200 different species of fish are found in the Hudson River, the diversity of the Hudson River fishery is relatively low since most of the River’s fish production is concentrated among only a few species (i.e., bay anchovy, striped bass, white perch and herring). See ASA Analysis and Communication, *2005 Year Class Report for the Hudson River Monitoring Program* (prepared for Dynege Roseton, LLC), attached as **Exhibit B**.

Moreover, despite increases in the numbers of different species, diversity, which includes the number and relative abundance of fish, has declined over time. See John R. Waldman, et al., *Biodiversity and Zoogeography of the Fishes of the Hudson River Watershed and Estuary*, American Fisheries Society Symposium, 51:129-150 (2006), attached as **Exhibit C**. In addition, several species of fish in the Hudson River estuary, such as American shad, white perch (*Morone americana*), and Atlantic tomcod (*Microgadus tomcod*) seem to be declining in abundance, and one species, rainbow smelt (*Osmerus mordax*), has been lost from the Hudson River. *Id.* Changes in species composition, changes in the diversity of fish, and declines in the abundance of several species raises concerns and questions regarding the health of the River's fish community. See New York State Department of Environmental Conservation, *Final Environmental Impact Statement Concerning the Application to Renew New York State Pollutant Discharge Elimination System (SPDES) Permits for the Roseton 1&2, Bowline 1&2, and Indian Point 2&3 Steam Electric Generating Stations, Orange, Rockland, and Westchester Counties*, June 2003 (hereinafter "2003 FEIS"), attached to the Declaration of William G. Little as **Exhibit L**.

Impacts of Once-through Cooling - Generally

9. Decades ago, once-through cooled plants were commonly constructed on large water bodies, such as the Hudson River estuary. At that time, effects on aquatic organisms from once-through cooling systems were not well understood nor well documented. However, research conducted on the Hudson River and elsewhere has shown that aquatic organisms suffer substantial mortality due to impingement and entrainment in the cooling water systems of power plants.

10. Impingement occurs when large aquatic organisms, such as fish, are trapped against intake screens that are used to keep debris from clogging the mechanisms of the plant. Screens at most electrical generating stations are constructed of 3/8 inch square wire mesh mounted in frames that are attached to chains and sprockets. Screens of this type are commonly referred to as "traveling screens" and can be rotated continuously or at regular intervals to wash off debris and aquatic organisms. Fish larger than about two inches long are trapped against the screens while smaller organisms pass through the screens.

11. Fish trapped on the screens can be killed or otherwise harmed from contacting both the screens and the debris that accumulates on the screens. In addition, as the screens are rotated for cleaning, fish may be trapped out of water for extended periods and deprived of oxygen, which causes them to suffocate. Substantial mortality can occur for some species, such as bay anchovy, even with continuously rotated traveling screens and a functioning system to return fish back to the waterbody. See Jinks, S., *A Review of Impingement Survival Studies at Steam-electric Power Stations*, pp. 219-41, Proceedings Report, Symposium on Cooling Water Intake Technologies to Protect Aquatic Organisms, USEPA (hereinafter "*Impingement Survival Studies*"). attached as **Exhibit D**. Between 1974 and 1990, when the impingement sampling was conducted at Indian Point, tens of thousands, and even millions, of Bay anchovy were impinged at IP2 and IP3 annually. See EA Engineering, Science, and Technology, *Final Hudson River Ecological Study in the Area of Indian Point, 1990 Annual Report* (prepared for Consolidated Edison of New York, Inc., and New York Power Authority)(hereinafter "*EA 1990 Annual Report*"), attached as **Exhibit E**.

12. Adult and juvenile fish killed from impingement at power plants are not just a direct loss of recreational and commercial fish species, but are a loss of fish species that support those

fisheries and other ecological functions. For example, a bay anchovy is not just food for a recreationally important species like striped bass, but it is food for other species, such as common terns, and it functions to convert nutrients from lower levels to upper levels of the food chain.

13. In addition to impingement, aquatic organisms can also become entrained.

Entrainment occurs when small aquatic organisms are drawn into and pass through the intake traveling screens with the cooling water. These organisms, including early life stages of fishes, are smaller and generally very delicate. As these tiny life forms move through a facility's cooling system, they are subjected to injury from contacting screens, pump mechanisms, and piping. In addition, they are exposed to significant and sudden changes in water temperature and pressure. The additive effects of these stressors result in the mortality of most entrained fish. In other words, most entrained fish die.

14. The early life stages of fish entrained at power plants serve many ecological functions. These organisms have almost an infinite number of interactions with biological and physical parameters within the complex food chain, or more appropriately, the complex food web. For example, organisms that can become entrained can serve as both food for other organisms and consumers of still other organisms. The interconnected nature of the food web makes quantifying the full extent of ecological function difficult, if not impossible. However, the mortality associated with entrainment at power plants alters food webs, disrupts nutrient conversions, and changes the value of habitats for organisms within ecosystems. See United States Environmental Protection Agency (USEPA) Proposed Rule, *National Pollutant Discharge Elimination System - Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities*, 67 Fed. Reg. 17122- 17225 April 9, 2002, attached as **Exhibit F**.

Impingement & Entrainment Impacts of Once-through Cooling at Indian Point

15. The impingement and entrainment impacts caused by IP2 and IP3 are well-documented. See Central Hudson Gas and Electric Corp., Consolidated Edison Company of New York, Inc., New York Power Authority, and Southern Energy New York, *Draft Environmental Impact Statement for State Pollutant Discharge Elimination System Permits for Bowline Point, Indian Point 2&3, and Roseton Steam Electric Generating Stations*, December 1999, (hereinafter "1999 DEIS"), Appendices VI-1-D-2 & VI-2-D, **attached to the Declaration of William G. Little as Exhibit K**; 2003 FEIS, pp. 2-3, **Exhibit L attached to the Declaration of William G. Little**). The millions of fish that are killed each year from operations at Indian Point represent a significant mortality and a stress on the River's fish community.

16. Several populations of Hudson River fishes have declined, including American shad, white perch, Atlantic tomcod, and rainbow smelt. The population of American shad in the Hudson River has declined since the early 1990s. Indices of young-of-year and older white perch have declined since the late 1970s. Adult Atlantic tomcod abundance over the last ten years has been lower than in previous years and continues to show high annual variability. Finally, rainbow smelt have been virtually absent from the fisheries surveys since 1995. See Waldman et al. 2006, pg. 145, **Exhibit C**.

17. Annual in-plant impingement sampling was conducted at IP2 and IP3 between 1976 and 1990, and the data demonstrate that impingement figures are significant. During that time, impingement ranged between 850,000 to almost 6.5 million fish per year, with an average of 1.18 million fish impinged per year over the last five years of sampling (1986-1990). See EA 1990 Annual Report, Table 4-3, pg. 4-6, **Exhibit E**. Since impingement sampling was conducted more than 10 years ago, the Department asked Entergy, as part of the SPDES permit review

process, for more recent estimates of impingement at IP2 and IP3. Consultants working for Entergy (ASA Analysis and Communication) developed an algorithm to adjust the 1986-1990 data to account for estimated changes in fish abundance since that time. This algorithm uses data from annual sampling of the Hudson River (Fall Juvenile Survey) and is based on the ratio of fish abundance when in-plant sampling was conducted (1986-1990) to more recent sampling (1997-2001). Using this algorithm, Entergy estimated that current baseline impingement at IP2 and IP3 is about 350,000 fish/year. See ASA Analysis and Communication, *Response to New York State Department of Environmental Conservation Request for Information on Indian Point Unit 2 and Unit 3, Items 3 & 4* (prepared for Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC) (2003) (hereinafter "ASA 2003 Response"), attached as **Exhibit G**. This estimate is one third the number estimated from in-plant sampling in the late 1980s. The decrease presumably is a reflection of declines in the numbers of juvenile and older fish in the waters near Indian Point.

18. I have reviewed Entergy's Environmental Report submitted with its license renewal application, and I note that it does not provide any estimate of the actual numbers of fish impinged at either IP2 or IP3. Nowhere in the six pages of analysis regarding impingement are the actual numbers of fish impinged provided. In my view, that is a major omission because it fails to acknowledge a significant and obvious environmental impact of once-through cooling. In addition, I found statements in the Entergy report that were misleading and self-serving.

Misleading - The report concludes on pages 4-19 that given several things, including the outcome of the draft SPDES permit proceeding, impingement impacts will *remain* SMALL. While I agree that provisions in the draft SPDES permit will provide for the eventual attainment of a SMALL impact from impingement (i.e., after the installation of closed-cycle cooling),

current impingement impacts are far from small. Even considering the survival of impinged fish resulting from the use of Ristroph-modified traveling screens, hundreds of thousands of fish die annually from impingement at IP2 and IP3. This impact is not small.

Self-serving - The final sentence in Section 4.3.6 concludes that additional mitigation measures are not warranted. This conclusion is in direct opposition to the conclusion of Department staff. When considering all the available data regarding impingement and entrainment, Department staff concluded that additional measures, namely closed-cycle cooling, were legally required to fulfill New York State water quality requirements and the requirements of the Clean Water Act.

19. The Hudson River estuary is a major spawning and nursery area for anadromous fishes, which migrate from marine waters to reproduce (spawn) in brackish and freshwater. Most of the anadromous fishes of the Hudson River estuary spawn eggs that float in the water column, and these eggs move passively both upstream and downstream with the tidal currents. A notable exception among the anadromous species in the estuary is the Atlantic tomcod, whose eggs are demersal and adhere to the bottom of the river where they are not subject to entrainment. However, larvae of all fish species are only capable of limited movement and drift with the currents for several weeks during early development. Thus, entrainment of fish eggs and larvae of these pelagic or free-floating organisms in power plant cooling systems is a major concern.

20. The number of fish entrained by the two Indian Point plants is astounding, with over 1.2 *billion* fish eggs and larvae entrained each year. *See* 1999 DEIS, Appendix VI-1-D-2, **Exhibit K attached to Declaration of William G. Little**; 2003 FEIS pp. 2-3, **Exhibit L attached to the Declaration of William G. Little**. This estimate was generated based on in-plant entrainment sampling conducted by the previous owners of IP2 and IP3 between 1981 and

1987, and only included estimates of entrainment for bay anchovy, striped bass, river herring (*Alosa spp.*), American shad, and white perch. More recently, Entergy's consultants created an algorithm to account for changes in fish populations since in-plant data were collected and estimated that over 1.3 billion fish eggs and larvae were entrained each year. See ASA 2003 Response, p. 16, **Exhibit G**. This estimate included all the species of the earlier estimate and an additional species, Atlantic tomcod.

21. Just as Entergy's Environmental Report does not provide any estimate of the numbers of fish impinged at either IP2 or IP3, it also does not provide any estimate of the actual numbers of fish entrained at both plants. Nowhere in the five plus pages of analysis regarding entrainment are the actual numbers of fish eggs and larvae entrained provided. In my opinion, that, too, is a major omission of a significant and obvious environmental impact of once-through cooling. In addition, I found statements in the Entergy report that were misleading and self-serving.

Misleading - The report concludes on pages 4-13 that given several things, including the outcome of the draft SPDES permit proceeding, entrainment impacts will *remain* SMALL. While I agree that provisions in the draft SPDES permit will provide for the eventual attainment of a SMALL impact from entrainment (i.e., after the installation of closed-cycle cooling), current entrainment impacts are in the billions and are far from small.

Self-serving - The final sentence in Section 4.2.6 of the Environmental Report concludes that additional mitigation measures are not warranted. This conclusion is in direct opposition to the conclusion of Department staff. When considering all the available data regarding impingement and entrainment, Department staff concluded that additional measures, namely closed-cycle cooling, were legally required to fulfill New York State water quality requirements

and the requirements of the Clean Water Act.

Impingement - Mitigative Measures Currently Used at Indian Point

22. IP2 and IP3 are equipped with a progressive screen design known as Ristroph modified traveling screens (Ristroph screens). Ristroph screens are designed to protect organisms from damage by holding them in water-filled buckets until they can be washed from the screens using a spray of water and returned to the receiving water. Ristroph screens provide a substantial benefit for reducing impacts from impingement. However, they have no benefit for reducing impacts from entrainment. In 1991, Ristroph screens with fish return systems were installed at Indian Point and survival of impinged fish was estimated to be about 70%. While 70% survival is consistent with other estimates of fish protective screens (See Jinks 2003, **Exhibit D**), this estimate is based on simulation studies conducted off site using a prototype Ristroph system and not the actual systems at use at IP2 or IP3. The actual benefit to fish impinged on the Ristroph screens currently in use at Indian Point has never been measured and could vary from this estimate.

23. While reductions in the mortality of impinged fish have been achieved at IP2 and IP3, few reductions in entrainment have been realized. In the past several years, Indian Point has taken refueling outages during March when only a small fraction of the total fish eggs and larvae are in the water column. In addition, IP2 and IP3 have reduced cooling water flow between October and early June when river water temperatures are relatively low. However, most of these flow reductions occur when relatively few fish eggs and larvae are in the water column. Consequently, all of these operational measures combined result in only a 30% reduction in entrainment.

Impingement - Potential Additional Mitigation Measures

24. Other than closed cycle cooling, few options are available to substantially reduce entrainment and impingement mortality at Indian Point. Those that have been developed have had varying degrees of success, but few could substantially reduce entrainment and impingement mortality beyond current conditions. For example, behavioral devices that deter fishes from entering the cooling water intake – such as angled screens, intakes with escape passageways, and sonic deterrent systems (none of which are used at Indian Point) – have been effective to varying degrees. However, these systems can only reduce impingement since they are only effective on fish with a well-developed ability to swim (juvenile and adult fish). In addition, angled screens and escape passageways would not likely reduce impingement mortality much beyond the Ristroph screens currently in use at IP2 and IP3, and sonic deterrent systems would provide limited additional benefit for reducing impingement since they are only effective on alewife and herring.

25. The only technology for substantially reducing entrainment at IP2 and IP3 is closed cycle cooling. Use of closed cycle cooling systems at IP2 and IP3 would result in substantial reductions in cooling water use compared to the current once-through cooling system because cooling water would be recirculated and waste heat would be dissipated using cooling towers. Reductions in entrainment and impingement would be substantial using closed cycle cooling. Entergy's consultants estimated that use of closed cycle cooling systems at IP2 and IP3 would reduce both impingement and entrainment by about 98%. See ASA 2003 Response, pp. 16-17, **Exhibit G.**

Endangered and Candidate Threatened Species Impacts at Indian Point

26. The Indian Point plants harm both a federally listed endangered species (shortnosed sturgeon) and a candidate threatened species (Atlantic sturgeon) by impinging them on the water intake screens or entraining them through the cooling water systems.

Shortnose Sturgeon

27. Shortnose sturgeon (*Acipenser brevirostrum*) have been impinged on the screens at IP2 and IP3. This species was listed by the federal government on the federal list of endangered species on March 11, 1967 (32 Fed. Reg. 4001) under the Endangered Species Preservation Act of 1966 (predecessor to the Endangered Species Act of 1973). The National Marine Fisheries Service (NMFS) has been concerned about the impingement of this endangered species at Hudson River power plants, including Indian Point, since 1995. *See National Marine Fisheries Service Endangered Species Act Section 7 Consultation Biological Opinion*, Nov. 29, 2000, p. 2., attached as **Exhibit H**.

28. Since in-plant impingement sampling has not been conducted in well over ten years, no accurate estimates exist of the numbers of shortnose sturgeon currently being impinged. However, twenty-eight shortnose sturgeon were collected in impingement samples between 1977 and 1990. Since impingement collections were only conducted during a small fraction of that period, the number of sturgeon that were actually impinged at IP2 and IP3 is likely much greater. Indeed, the NMFS estimated the number of shortnose sturgeon impinged at IP2 and IP3 to be 63 from 1972-1998.

29. In my opinion, the NRC's extension of Entergy's license would result in another 20 years of impingement of an endangered species and provide yet another source of mortality that

when combined with other sources of mortality could jeopardize the continued existence of that endangered species. While the number of shortnose sturgeon impinged may appear low compared to the millions of other fish (not federally listed) that were impinged at IP2 and IP3 during the same period, any mortality of a listed endangered species, either from impingement or other factors, is cause for concern. In addition, the life history of the shortnose sturgeon makes all mortality factors for that species particularly important. Shortnose sturgeon reproduce at a later age compared to other Hudson River fish species and they have a relatively low reproductive rate. They also do not reach maturity until they are between five to ten years old, and spawning can be delayed for as much as two years more for males and up to five years more for females. In any event, the numbers reported are based on very limited data, which means that the numbers are actually higher.

30. Moreover, any impingement of shortnose sturgeon at the two IP plants violates federal law. The Endangered Species Act (ESA) focuses on the taking activity, *e.g.*, the impingement, and not the result. Moreover, while the ESA provides the opportunity for a plant operator to obtain an incidental take permit, Entergy does not currently have such a permit, nor has it made application for one. *See* M.A. Culligan Letter to James A. Thomas, Enercon Services, Inc., Regarding Presence of Listed Species in the Vicinity of Entergy's Indian Point Power Plant (Jan. 23, 2007), attached as **Exhibit I**.

Atlantic Sturgeon

31. Additionally, the Atlantic sturgeon (*Acipenser oxyrinchus*) is also being considered for listing as a threatened species under the Endangered Species Act. *See* 71 Fed. Reg. 61022-61025 October 17, 2006. The Atlantic Sturgeon Status Review Team (SRT) recently concluded

that the New York Bight Distinct Population Segment (DPS) of Atlantic sturgeon should be considered threatened under the Endangered Species Act. See Atlantic Sturgeon Status Review Team, *Status Review of Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus)* (prepared for National Marine Fisheries Service, National Oceanic and Atmospheric Administration) (Feb. 23, 2007), attached as **Exhibit J**.

32. More specifically, the SRT considered impingement and entrainment as one of the many factors in its recommendation to list the New York Bight DPS. Atlantic sturgeon in the Hudson River, which includes the area around Indian Point, are included in this DPS, and if the recommendations of SRT are followed, the Atlantic sturgeon in the Hudson River would be afforded additional protection under the Endangered Species Act. Atlantic sturgeon have been impinged at IP2 and IP3, with 381 collected during in-plant impingement sampling between 1977 and 1990. When scaled to plant cooling water flows, the actual number of Atlantic sturgeon impinged during the same period would be greater.

SPDES Permitting - Environmental Impact Statements

33. In June 1993, as a requirement of their outstanding SPDES permit renewal applications, and pursuant to the New York State Environmental Quality Review Act (SEQRA, ECL Article 8 and 6 NYCRR Part 617), the three Hudson River power generators (Roseton, Bowline, and Indian Point) submitted a Draft Environmental Impact Statement (DEIS). In response to this 1993 DEIS, Department Staff questioned the generators' data and conclusions, rejected the DEIS, and directed the generators to provide additional information in a revised DEIS. The Department later accepted a 1999 DEIS simply to move the permit process forward. However, the Department determined that the 1999 DEIS was not sufficient to stand alone.

34. To complete the record, the Department provided additional information regarding alternatives and an evaluation of impacts in the 2003 Final Environmental Impact Statement (FEIS). The FEIS consisted of the DEIS, comments received on the DEIS, and the Department's responses to those comments.

BTA is Required for Cooling Water Intake Structures

35. Section 316(b) of the Federal Clean Water Act and 6NYCRR section 704.5 of New York's water quality regulations require that cooling water intake structures associated with a thermal discharge "reflect the best technology available for minimizing adverse environmental impact." 33 U.S.C. § 1326(b).

36. In preparing the draft SPDES permit in 2003, Department staff determined that the present use of once-through cooling at both IP plants does not adequately minimize fish mortality in accordance with applicable federal and New York State regulations and laws. After evaluating the known available alternatives, Department Staff concluded that closed-cycle cooling represents the best technology available (BTA) for minimizing adverse environmental impacts from the cooling water intake structures at Indian Point. In November 2003, the Department issued a draft SPDES permit for IP2 and IP3 that included provisions for the eventual construction of closed-cycle cooling. The Department also provided that Entergy could propose a comparable alternative to closed-cycle cooling (Condition 28 c). (The draft permit is attached as Exhibit M to the Declaration of William G. Little.)

37. As described in more detail in the Declaration of William G. Little, the Department determined that prior to the construction of cooling towers, Entergy must perform a number of tasks. As further set forth in the Declaration of William G. Little, Entergy and several other

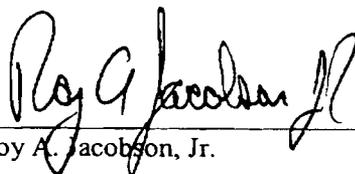
interested parties challenged provisions of the draft permit, which remains the subject of an ongoing adjudication process.

Conclusion

38. In the ongoing administrative proceeding, the Department concluded that the once-through cooling system at IP2 and IP3 produces significant adverse effects on the aquatic resources in the Hudson River. The Department staff has determined that additional measures are necessary to reduce the numbers of fish impinged and entrained at IP2 and IP3. After extensive evaluation and analysis of the known available alternatives, the Department staff concluded that closed-cycle cooling represents the best technology available (BTA) for minimizing adverse environmental impacts from the cooling water intake structures at Indian Point.

Pursuant to 28 U.S.C. section 1746, I declare under penalty of perjury that the foregoing is true and correct.

Dated: Albany, New York
November 29, 2007



Roy A. Jacobson, Jr.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
OFFICE OF THE SECRETARY

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

ENERGY NUCLEAR INDIAN POINT 2, LLC
ENERGY NUCLEAR INDIAN POINT 3, LLC
ENERGY NUCLEAR OPERATIONS, INC.

NRC Docket Nos.
50-247 & 50-286

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 & 3

ASLB No.
07-858-03-LR-BD01

Regarding the Renewal of Facility Operating Licenses
No. DPR-26 and No. DPR-64 for an Additional 20-year Period

DECLARATION OF DAVID W. DILKS

I, DAVID W. DILKS, declare under penalty of perjury that the following is true and correct:

1. I am the Vice President of LimnoTech (LTI), an environmental consulting firm that specializes in environmental science and engineering. My office is located in Ann Arbor, Michigan. I graduated from the University of Michigan with a Bachelor of Science Degree in Natural Resources in 1979, a Masters Degree in Public Health in 1981, and a Doctorate in Environmental Health Sciences in 1987. In 1980, I started employment with LTI as a Project Engineer. During my tenure at LTI, I have also held the following positions - Senior Project Engineer, Project Manager, and Associate Vice President. During my 27-plus years of employment at LTI, the focus of my activities has been on environmental assessment of surface waters. I have conducted studies on over 250 water bodies around the world. I have authored national guidance manuals for the U.S. Environmental Protection Agency ("EPA") on water quality and mixing zone assessment and have conducted approximately 50 training workshops

Attachment C

**Declaration of David W. Dilks, Ph.D. (November 28, 2007), submitted in support of the State of New York's
Notice of Intention to Participate and Petition to Intervene (November 30, 2007)**

designed to teach proper water quality modeling techniques to EPA and State staff. My curricula vitae is attached as **Exhibit A**.

2. I reviewed numerous documents to determine whether the substantial thermal discharges from the Indian Point Nuclear Generating Facility meet New York State regulatory requirements for those discharges. A list of the documents that I reviewed is attached as **Exhibit**

B.

3. Based on my review of the record documents, I can state the following opinions:

- All of the technical analyses conducted related to the thermal discharges from the two Indian Point nuclear power plants clearly indicate that the discharges do not meet New York State water quality criteria.

- The operator of the Indian Point Nuclear Generating Facility has failed to demonstrate that it meets the New York State water quality standard for thermal discharges because the analyses that the operator uses in its demonstration that the discharges “will assure the presence of a balanced and indigenous population of aquatic organisms” are laced with significant uncertainties, which relate to both the modeling conducted to estimate the temperature increases in the Hudson River and the biological assessment of the impacts of those temperature increases.

- The operator of Indian Point is using outmoded technology with its once-through cooling system, and closed-cycle cooling water intake structures would mitigate substantially the impacts from the thermal discharges at Indian Point.

Background of Indian Point’s Thermal Discharges

4. Entergy Nuclear Operations, Inc. (Entergy) currently operates two nuclear power plants – Indian Point 2 (IP2) and Indian Point 3 (IP3) – at the Indian Point Generating Facility, which is located along the Hudson River in Buchanan, New York.

5. IP2 and IP3 use “once-through condenser cooling” to eliminate waste heat from the generating process. In this once-through cooling process, water is drawn from the Hudson River into the plants by twelve large pumps; the drawn water is then passed through condensers, which condense the steam back into water for eventual discharge into the Hudson River.

6. IP2 and IP3 draw enormous amounts of water – 2.5 billion gallons each day. Nearly all of this water is eventually discharged into the Hudson River, but at a much higher temperature because it has been used to cool the plants' operations. Collectively, the maximum permitted thermal discharge for IP2 and IP3 is for trillions of BTUs of total heat per year. Based on my review of the EPA Permit Compliance System, these BTU limits are hundreds of times larger than most power facilities.

7. The discharge of this large amount of waste heat can have drastic physical and biological consequences. The heated water, when initially discharged, is poorly diluted and is contained in what is called a thermal plume. Because heated water is less dense (i.e., lighter) than cooler water, this discharge plume rises in the water column until it meets the water surface. At this point, the plume spreads out and is transported by natural river currents and tidal flows. Temperatures are generally much higher in the discharge plume than in the surrounding water. Furthermore, for large discharges such as IP2 and IP3, temperatures are noticeably raised outside of the discharge plume, because the quantity of heat released is greater than the capacity of the river to fully dilute it.

8. Increases in water temperatures have been shown to have numerous biological consequences. These consequences can be divided into the following categories:

- Lethal effects: High or low temperatures, which kill an organism within a finite time. Low temperature lethality can happen when plant operations shut down temporarily during cold water periods, exposing warm water acclimated fish to cold water.
- Controlling effects: Non-lethal temperatures which affect biological processes such as growth or reproduction.
- Directive effects: Changes in behavioral responses or migrations.

- Indirect effects: Changes in some other factor (e.g., oxygen), which in turn affect aquatic life.

9. The original NPDES Permit, issued by EPA on March 31, 1975, required the construction of closed-cycle cooling (i.e., cooling towers). This requirement was challenged by the former operator of Indian Point, and the parties subsequently entered into the Hudson River Settlement Agreement (HRSA). The HRSA was designed to study the effects of the generating facilities on the Hudson River. The final outcome of the HRSA studies has now demonstrated non-compliance with thermal criteria.

10. The New York State Department of Environmental Conservation (“NYSDEC” or “the Department”) is currently conducting an administrative proceeding for Entergy’s application to renew its Clean Water Act permit, known as a State Pollutant Discharge Elimination System (SPDES) permit in New York. In that administrative proceeding, the NYSDEC staff determined that current operations at IP2 and IP3 do not adequately minimize fish mortality in accordance with applicable federal and New York State regulations and laws. After evaluating the known available alternatives, NYSDEC staff concluded that closed-cycle cooling represents the best technology available (BTA) for minimizing adverse environmental impacts from the cooling water intake structures at Indian Point. As explained more fully in the Declaration of William G. Little, in November 2003, the Department issued a draft SPDES permit for IP2 and IP3 that included provisions for the eventual construction of closed-cycle cooling. The Department also provided that Entergy could provide a comparable alternative to closed-cycle cooling (Condition 28 c).

NEW YORK'S REGULATORY FRAMEWORK FOR THERMAL DISCHARGES

11. New York State has regulatory requirements for thermal discharges. First, it provides a narrative water quality standard for thermal discharges. Second it provides specific, numeric water quality criteria that are intended to ensure that discharges meet the water quality standard. These regulatory provisions are set out below.

New York's Water Quality Standard for Thermal Discharges

12. New York State has adopted a narrative water quality standard for thermal discharges, set forth in 6 N.Y.C.R.R. section 704.1(a):

(a) 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.

New York's Water Quality Criteria for Thermal Discharges

13. As provided in 6 N.Y.C.R.R. section 704.1(b), New York State has also adopted general and waterbody-specific numeric criteria to ensure that the water quality standards are met:

(b) The criteria contained in this Part shall apply to all thermal discharges and shall be complied with except as provided in this Part.

General Water Quality Criteria for Thermal Discharges

14. The criteria are comprised of both general and special criteria. Section 704.2(a) sets forth the general criteria governing thermal discharges:

(a) General criteria. The following criteria shall apply to all waters of the State receiving thermal discharges, except as provided in section 704.6 of this Part:

(1) The natural seasonal cycle shall be retained.

(2) Annual spring and fall temperature changes shall be gradual.

(3) Large day-to-day temperature fluctuations due to heat of artificial origin shall be avoided.

(4) Development or growth of nuisance organisms shall not occur in contravention of water quality standards.

(5) Discharges which would lower receiving water temperature shall not cause a violation of water quality standards and section 704.3 of this Part.

(6) For the protection of the aquatic biota from severe temperature changes, routine shut down of an entire thermal discharge at any site shall not be scheduled during the period from December through March.

Special Water Quality Criteria for Thermal Discharges - Estuaries

15. In addition, New York State has adopted special criteria for six different types of waterbodies: non-trout waters, trout waters, lakes, coastal waters, and estuaries or portions of estuaries, and enclosed bays. The special criteria for estuaries apply to the Hudson River where the Indian Point plants are located. Those special criteria are set forth in 6 N.Y.C.R.R. section 704.2(5), which provides the following:

(5) Estuaries or portions of estuaries.

(i) The water temperature at the surface of an estuary shall not be raised to more than 90 degrees Fahrenheit at any point.

(ii) At least 50 percent of the cross sectional area and/or volume of the flow of the estuary including a minimum of one-third of the surface as measured from water edge to water edge at any stage of tide, shall not be raised more than four Fahrenheit degrees over the temperature that existed before the addition of heat of artificial origin or a maximum of 83 degrees Fahrenheit whichever is less.

(iii) From July through September, if the water temperature at the surface of an estuary before the addition of heat of artificial origin is more than 83 degrees Fahrenheit an increase in temperature not to exceed 1.5 Fahrenheit degrees at any point of the estuarine passageway as delineated above, may be permitted.

(iv) At least 50 percent of the cross sectional area and/or volume of the flow of the estuary including a minimum of one-third of the surface as measured from water edge to water edge at any stage of tide, shall not be lowered more than four Fahrenheit degrees from the temperature that existed immediately prior to such lowering.

VIOLATION OF THE WATER QUALITY CRITERIA FOR THERMAL DISCHARGES

16. As demonstrated below, based on my review of the record documents in the SPDES renewal proceeding and the Environmental Report submitted by Entergy in the Nuclear Regulatory Commission (NRC) license renewal proceeding, I conclude that the thermal discharges from IP2 and IP3 do not meet the special water quality criteria for estuaries in 6 N.Y.C.R.R. sections 704.2(5)(ii), (iii), and (iv).

17. The Environmental Report that Entergy filed with its license renewal application to the NRC does not adequately, or even accurately, address the impacts from the thermal discharges from IP2 and IP3. Entergy relies on the 1999 DEIS that it submitted in the NYS Clean Water Act (SPDES) permit proceeding. In the DEIS, Entergy claimed that “[t]he surface orientation of the plume allows a zone of passage in the lower portions of the water column, the preferred habitat for many of the indigenous species.” DEIS, p. VI-29. As discussed in detail below, this claim focuses only on the plume itself and does not adequately consider the temperature impacts on bottom waters that occur outside of the plume.

18. The modeling conducted for the environmental review attendant to the SPDES permit renewal – i.e., the 1999 DEIS, which was cited by the DEC in the 2003 Final Environmental Impact Statement (FEIS) – clearly indicates that the discharge violates these thermal criteria under certain river flow conditions. This is true both for Indian Point discharges alone, and when considered along with all thermal discharges in the region.

19. Specifically, operation of the Indian Point facilities alone is predicted to violate 6 N.Y.C.R.R. section 704.2(5)(ii). Where the criteria require that a minimum of one-third of the surface shall not be raised more than four Fahrenheit degrees, model results indicate that 100%

of the surface width will be raised by more than four degrees (i.e., 0% of the surface width will not be raised) during certain tidal conditions.

20. When operation of the Indian Point plant is considered in conjunction with other thermal discharges, the extent of criteria violation increases substantially. In this multiple discharger case, the “cross-sectional area” component of the criteria is also violated (6 N.Y.C.R.R. § 704.2(5)(iv)), and the number of months that the “surface” component of the criteria is violated increases as well (6 N.Y.C.R.R. § 704.2(5)(iii)).

Significant Uncertainties and Flaws with Indian Point’s Thermal Modeling

21. I have also concluded that while the water quality criteria are being violated by the Indian Point thermal discharges, either alone or in conjunction with other thermal discharges, the applicant’s modeling contains many uncertainties and flaws. This means that the extent of the thermal impacts from Indian Point could be much greater than predicted in the DEIS.

22. The DEIS conclusions were largely based on a thermal modeling analysis, linking three different temperature models: CORMIX, FFTM, and a temperature balance model. My review of the thermal modeling analysis indicates the following:

- The DEIS overstates the degree of accuracy contained in the model predictions.
- Many underlying assumptions of the CORMIX model are violated.
- CORMIX model results were not calibrated to Indian Point data.
- The linkage between the CORMIX and FFTM models is very simplistic.
- DEIS overstates the degree of protectiveness contained in the model predictions.
- Better models and data are currently available to assess temperature impacts.

These points are addressed more fully below.

The DEIS Overstates the Degree of Accuracy Contained in the Model Predictions

23. The CORMIX model, as applied for this purpose, is not nearly as accurate as purported in the 1999 DEIS. Appendix VI-3-A of the DEIS states:

One of the distinguishing features of CORMIX is its use of an expert system to help the user develop the discharge/ambient description, check the data for consistency, and tailor the solution technique to the specific combination of ambient and discharge conditions. The specific mathematical model formulations embedded in CORMIX are derived from previously developed and tested stand-alone models. This combination of proven mathematical formulations with expert system supervisory control provides a high level of confidence that the model has been properly used and the results may be relied upon.

The CORMIX model is potentially very accurate in certain highly idealized situations. To the extent that real world conditions differ from these idealized conditions, CORMIX results may be accurate or may be completely inaccurate. To state, as the 1999 DEIS does, that CORMIX results may be relied upon due to a “combination of proven mathematical formulations with expert system supervisory control” grossly underestimates the capability for CORMIX to provide extremely wrong answers. For example, CORMIX results at times predicted a plume width wider than the width of the river itself (p. 6-7 and 6-8 of Appendix VI-3-A of the DEIS.)

Many Underlying Assumptions of the CORMIX Model Are Violated

24. Certain aspects of the CORMIX model are very reliable, others are not. The accuracy of CORMIX results is highly contingent on adhering to the assumptions of the model framework. In this regard, many underlying assumptions of the CORMIX model are violated for the Hudson River application. Two primary assumptions that are violated for the Hudson River application are (1) steady state conditions, and (2) constant channel geometry.

25. CORMIX assumes steady state conditions, i.e., all environmental conditions remain constant in time over the course of a simulation. This assumption, however, is clearly

inapplicable in a tidal system such as the Hudson, where currents are constantly changing in both magnitude and direction. The DEIS also implies that violating the steady state assumption results in predictions that are more conservative than the real world; this is not necessarily the case. The DEIS is correct that using a steady state model to approximate tidally varying conditions may overstate the peak temperature impact, for the individual snapshot in time that a given simulation represents. However, the application of CORMIX in the DEIS evaluated only a limited number of snapshots, and may actually underestimate the real extent of the plume.

26. The CORMIX model also assumes constant channel geometry (i.e., widths and depths) in the receiving water. This assumption, too, is clearly violated in the Hudson River. In fact, spatial variation in river depth caused errors in CORMIX predictions and required the modelers to add “patches” to the software (including entering known false geometry inputs) in order to achieve reasonable results.

CORMIX Model Results Were Not Calibrated to Indian Point Data

27. The draft DEIS shows some limited comparison of CORMIX model predictions to observed data from 1975 and 1976. These comparisons of predictions to observed data are provided only in the vicinity of the Roseton and Bowline Point facilities. The DEIS stated that “Data suited for testing the model at Indian Point were not available.” The potential for high uncertainty in CORMIX outputs near Indian Point, coupled with a lack of model calibration, calls the accuracy of the model predictions into question.

The Linkage Between the CORMIX and FFTM Models Is Very Simplistic

28. The “temperature balance model” used to merge the results of CORMIX and FFTM models is very simplistic and is based on assumptions that are violated for this application.

Specifically, the model assumes that any lateral section of the Hudson River consists of two parts: (1) an impacted section, defined as where the water temperature is four degrees higher than background, and (2) a less impacted section, where the water temperature is less than four degrees higher than background. Calculation of the size of the impacted section is conducted by assuming all of the water inside the impacted section is exactly four degrees higher than background, while all water in the less impacted section is at a uniform temperature. This situation – i.e., two adjacent bodies of water to be at two uniform temperatures, with no other spatial variability – will not occur in the real world. In the absence of any model calibration to demonstrate the degree of error introduced by these simplifying assumptions, the accuracy of the results must be called into question.

The DEIS Overstates the Degree of Protectiveness Contained in the Model Predictions

29. The DEIS (p. VI-26) states that the characterization of the extent of the plume exceeding 4°F represents “nearly absolute upper bound estimates.” The DEIS included the following arguments to support this conclusion:

- “tidal and river flow conditions modeled represent extreme conditions”; and
- modeling assumed steady state conditions, while in reality plume configuration shifts dynamically with changes in tidal flows.”

The environmental conditions used to assess temperature impacts, however, are not nearly as extreme as the DEIS implies.

30. The DEIS (p. 5-2) states “[t]aken together, these analyses indicate that June, July, August, and September of 1981 reasonably represent typical conditions in the Hudson River for summer months.” Furthermore, each of these months examined had higher than average river temperatures. The use of warmer than average ambient background temperatures will actually

underestimate the extent of the plume exceeding 4°F, as the size of the incremental temperature impacts will increase as the difference between background and discharge temperature increases. True “nearly absolute upper bound estimates” of plume extent would use cooler than normal ambient temperature. Warmer than normal ambient water temperatures would be appropriately used to assess maximum temperatures in the river, rather than maximum incremental (i.e. increase over background) impacts. In this regard, comments on the DEIS, which were incorporated in the FEIS, indicated that temperatures in the river may have increased since the time of the DEIS analysis. If this is true, the expected maximum temperatures in the river (although not the extent of the 4°F plume) may be greater than predicted in the DEIS. As stated above, the use of steady state conditions in the model does not necessarily provide upper bound predictions for plume extent, counter to the supporting argument in the DEIS.

Better Models and Data Are Currently Available to Assess Temperature Impacts

31. Many of the limitations inherent to the DEIS modeling were driven by computational and data limitations that existed at the time of the analysis. Three-dimensional far field models now exist that would minimize many of the limitations of the models that were discussed above. Remote sensing provides the capability to collect large amounts of surface temperature data, and could be used to determine validity of the existing models or any other models applied in the future.

ASSESSMENT OF CLEAN WATER ACT SECTION 316(a) REQUIREMENTS

32. Given that the Indian Point thermal discharges exceed the 6 N.Y.C.R.R. Part 704 thermal criteria, it is next necessary to determine whether the Indian Point discharge meets the thermal discharge requirements of Section 316(a) of the Clean Water Act. Section 316(a)

provides that:

With respect to any point source otherwise subject to the provisions of section 301 or section 306 of this Act, whenever the owner or operator of any such source, after opportunity for public hearing, can demonstrate to the satisfaction of the Administrator (or, if appropriate, the State) that any effluent limitation proposed for the control of the thermal component of any discharge from such source will require effluent limitations more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made, the Administrator (or, if appropriate, the State) may impose an effluent limitation under such sections on such plant, with respect to the thermal component of such discharge (taking into account the interaction of such thermal component with other pollutants), that will assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on that body of water.

33 U.S.C. § 1326. To this end, it is therefore necessary to determine whether the Indian Point thermal discharges provide for the protection and propagation of a balanced, indigenous population of fish and shellfish in and on the Hudson River.

33. The biological community within the Hudson River system is very complex given the size of the river, its complex hydrologic conditions created by the tidal fluctuations, and the anthropogenic impacts. The response of higher level trophic communities in a system as large as the Hudson River requires careful and thorough data collection and analysis, particularly for such dynamic mechanisms as thermal impacts.

34. Based on my critical review of the biological analysis, I can point out specific weaknesses or oversights in the analysis that was used to support the applicant's original assessment:

- Thermal effects on benthos and benthic species are not adequately considered.
- Background temperatures in the river may be underestimated.
- Use of the 30 minute TL95 is not as protective as stated.
- Indirect temperature affects are not fully considered.

These points are addressed more fully below.

Thermal Effects on Benthos and Benthic Species Are Not Adequately Considered

35. The DEIS (VI-21) states that thermal exposure of benthic infauna and bottom-oriented macroinvertebrates and fish is limited “at most” to the immediate vicinity of the discharges. This justification only considers the initial plume, and does not consider the heating that will occur in deeper water as the plume is diluted into the river. The far-field modeling conducted as part of the DEIS indicates that, under certain conditions, the entire cross-section of the Hudson River in the vicinity of Indian Point will be subject to temperature increases of more than four degrees above background. If the heated plume does contact the bottom for a significantly larger area than defined in the DEIS, the thermal impacts of the plume on benthic species would need to be examined before a conclusion regarding the biological impact of the discharge could be made.

Background Temperatures in the River May Be Underestimated

36. Many biological impacts of temperature increases depend on the absolute temperature of the water, rather than the incremental change caused by the discharge. The DEIS considered background river temperature data from 1951 to 1992. The reports that I reviewed, however, suggest that background temperature conditions within the Hudson River have increased in recent years, both on an average basis and in terms of critical periods. The biological impact demonstration focused on impacts during average historical water temperatures. Biological impacts of the discharge will be greater than estimated when more recent background temperature data, including those for critical periods, are considered.

Use of the 30 Minute TL95 Is Not as Protective as Stated

37. The 316(a) report equates “the time required for the plume to surface” with “exposure time to elevated temperatures.” Because the time required for the plume to surface is on the order of seconds to minutes, the analysis concludes that the use of thermal tolerance tests evaluating 30 minute exposures will be protective. This is not necessarily true, because water temperatures are substantially elevated in areas outside of the initial plume. Drifting organisms will therefore be exposed to elevated temperatures long after the plume surfaces, for exposure durations longer than 30 minutes. This means that the use of 30 minute duration thermal tolerance tests is not overprotective, as stated, but may be under protective.

Indirect Temperature Effects Are Not Fully Considered

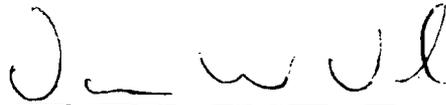
38. The biological assessment focused on direct mortality impacts and did not consider many potentially important impacts of increased temperature. Disease and parasites do not appear to be described within the 1999 DEIS, although several factors of thermal discharges, including (1) winter aggregations of species, (2) enhanced growth, survival and reproduction of parasites and pathogens, and (3) increased stress among fishes during extreme thermal seasons, can lead to increased incidences of parasites and disease. Diseases are described in the Hudson River mollusk populations as driven by anthropogenic causes. It would be valuable to understand the cumulative effects of the thermal plumes on the aquatic parasites or disease and how these conditions may affect the biological community.

39. In conclusion, the thermal discharges from the once-through cooling system at Indian Point are significant and adversely affect the fish and aquatic resources of the Hudson River. The discharges have not and do not currently meet New York State’s water quality criteria.

Entergy has also not demonstrated that it complies with New York's water quality standard. The problem here stems from the once-through cooling water intake system that Entergy continues to use.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Dated: Ann Arbor, Michigan
November 28, 2007



DAVID W. DILKS