IPRenewalCEmails

From: Deborah Brancato [DBrancato@riverkeeper.org]
Sent: Wednesday, March 18, 2009 8:51 PM
To: IndianPointEIS Resource
Subject: Riverkeeper, Inc.'s Comments on the Indian Point License Renewal DSEIS, Docket Nos. 50-247 and 50-286
Attachments: Riverkeeper's Comments on Indian Point License Renewal DSEIS.pdf; Exhibit A - Pisces Expert Report (March 2009).pdf; Exhibit B - Letter from NMFS to NRC, Re BA (Feb. 24, 2009).pdf; Exhibit C – Map of Intake Site of Proposed Rockland County Desalination Plant.pdf; Exhibit D – Google map showing proximity of IP to proposed desalination plant.pdf; Exhibit E – Letter from DEC to Riverkeeper re DEC lead agency status for desalination project.pdf

Dear Rulemaking, Directives and Editing Branch Chief:

Attached for submission, please find "Riverkeeper, Inc.'s Comments on the Indian Point License Renewal DSEIS" along with four (4) supporting Exhibits, each attached separately, in the above referenced matter. A courtesy hard copy of Riverkeeper's submission will follow in the mail.

Thank you for your consideration.

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MESSAGE	1402	3/18/2009 8:51:14 PM
Riverkeeper's Comments on Indian Point License Renewal DSEIS.pdf	546032	
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Exhibit C – Map of Intake Site of Proposed Rockland County Desalination Plant.pdf	4186092	
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RIVERKEEPER

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March 18, 2009

Chief, Rulemaking, Directives and Editing Branch
Division of Administrative Services
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Re: Riverkeeper, Inc.'s Comments on the U.S. Nuclear Regulatory Commission's Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 38, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3, Draft Report for Comment, Docket Nos. 50–247 and 50–286

Dear Rulemaking, Directives and Editing Branch Chief:

Riverkeeper, Inc. ("Riverkeeper") hereby respectfully submits the following comments on the U.S. Nuclear Regulatory Commission Staff's ("NRC Staff") Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 38, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3, Draft Report for Comment (also known as the Draft Supplemental Environmental Impact Statement, and hereinafter referred to as "DSEIS"). Notice of availability of and opportunity to comment on the DSEIS was published in the Federal Register on December 22, 2008.[1]

Introduction

Riverkeeper has been actively involved in the Indian Point relicensing proceeding due to the serious concerns relating to the continued operation of the facility, including the environmental damage caused by its antiquated once-through cooling system and leaking spent fuel pools, the vulnerability of the plant's spent fuel pools to terrorist attacks and serious accidents, and the failure of any long-term solution for permanent nuclear waste disposal. As the NRC Staff is well aware, Riverkeeper filed a successful petition to intervene in Indian Point's relicensing

[1] Nuclear Regulatory Commission, Indian Point Nuclear Generating Unit Nos. 2 and 3; Notice of Availability of the Draft Supplement 38 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants and Public Meeting for the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3, Docket Nos. 50–247 and 50–286, 73 Fed. Reg. 80,440 (2008).

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proceeding, and is currently litigating three contentions which have been admitted for an adjudicatory hearing.[2] On October 17, 2007, Riverkeeper submitted Scoping Comments to inform the NRC Staff's environmental review pursuant to NEPA in the license renewal proceeding.[3] Disappointingly, the NRC Staff has failed to meaningfully address any of the issues raised by Riverkeeper's comments.

An exhaustive review of the DSEIS reveals glaring deficiencies which wholly undermine the NRC Staff's initial conclusion that the environmental impacts of Indian Point's operation are not severe enough to preclude renewing its operating license.[4] Riverkeeper absolutely disagrees with this determination and submits that if the NRC Staff had performed the proper assessments as outlined in the following comments, then they would have reached the opposite conclusion. Riverkeeper urges the NRC Staff to fully consider and address the following comments prior to issuing the Final Supplemental Environmental Impact Statement for License Renewal of Indian Point ("FSEIS"), in order to come to a more accurate recommendation to the Commission.

DSEIS Section 1.0

1. Improper Reliance on Outdated GEIS

In Section 1.0 of the DSEIS, the NRC Staff explains its use of the 1996 License Renewal Generic Environmental Impact Statement, NUREG-1437 ("GEIS").[5] However, as Riverkeeper's Scoping Comments explained at length, such reliance is misplaced. The GEIS is inadequate if evidence exists of material changes affecting the baseline environment since the GEIS was written.[6] It has been 13 years since the GEIS was written. Since that time, various new circumstances have arisen that have materially changed the baseline environment, including heightened risks of terrorism, the failure of a permanent nuclear waste disposal solution, changes in population density, and progress in the viability of renewable energy technologies. Accordingly, the GEIS is no longer adequate to dispose of such issues, and they must be specifically assessed in the environmental review process for Indian Point. Unfortunately, as discussed in further detail where applicable in the comments herein, the NRC Staff has ignored such new information and continues to rely on the outdated GEIS. The NRC's refusal to consider such material changes violates the fundamental requirements of NEPA.

As explained in Riverkeeper's Scoping Comments, the NRC has failed to update the GEIS in a timely fashion as required by law.[7] The law requires the GEIS to be updated every 10 years.

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[2] Riverkeeper, Inc.'s Request for Hearing and Petition to Intervene in Indian Point License Renewal Proceeding, November 30, 2007 (hereinafter "Riverkeeper Petition for Hearing"); *See Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), LBP-08-13, 68 NRC __ (slip op. July 31, 2008) ("July 31, 2008 ASLB Order").

[3] Riverkeeper Comments on Environmental Scoping for the Indian Point License Renewal Proceeding, Docket Nos. 50-247, 50-286 (Oct. 12, 2007), *available at* http://www.riverkeeper.org/document.php/642/101207_Scoping_.pdf (hereinafter "Riverkeeper Scoping Comments).

[4] DSEIS, Main Report § 9.3, at 9-8.

[5] *Id.* § 1.2.1.

[6] Blanco v. Burton, Slip Copy, 2006 WL 2366046 (E.D. La.); League of Wilderness Defenders v. Marquis-Brong, 259 F.Supp.2d 1115 (U.S. Dist. Ct. Or. Apr. 2003).

[7] *See* Riverkeeper's Scoping Comments at 1-2; 10 C.F.R. Part 51, Subpart A, Appendix B.

The schedule explained in Riverkeeper's Scoping Comments projected a final GEIS by February 2009. That deadline has obviously passed, without any public notice or mention by the NRC of any pending review or update of the GEIS. Internal communications between DEC and NRC Staff indicates that NRC Staff have thus far failed to complete even a draft for public notice and comment by this coming summer. At this time, the required deadline for the GEIS review is three years overdue, and counting. It is ridiculous that the environmental review process for Indian Point's license renewal relies upon a document which has not been updated as legally required. Accordingly, the NRC Staff should not rely on the GEIS until the NRC has completed "10-year review" and determined whether or not the GEIS will be updated.

Moreover, as discussed in Riverkeeper's Scoping Comments, the mandates of the National Environmental Policy Act ("NEPA") require that federal agencies take a "hard look" at the environmental impacts of a proposed action.[8] This includes assessing "significant new circumstances or information relevant to the environmental concerns that bear on the proposed action or its impacts."[9]

2. Failure to Assess Deficient Emergency Planning Anywhere in the DSEIS

The deficiencies of the DSEIS comes starkly into focus when it comes to the issue of emergency planning. Indeed, the NRC Staff has classified emergency planning issues as outside the realm of license review, and no mention whatsoever of the serious concerns with Indian Point's emergency plan is made in the DSEIS.[10] This flies in the face of logic given the changes in population density and traffic pattern in the area surrounding the facility since the plant started operating. In particular, since Indian Point's initial licensing, the population around the facility has nearly doubled, resulting in significant traffic congestion that would prevent authorities from evacuating the residents living within the ten-mile Emergency Planning Zone ("EPZ") in the event of an accident or terrorist attack. Roads and bridges would not be able to handle the amount of traffic leaving the 10-mile radius and beyond in the event of an accident or attack.[11] Clearly the environmental impacts on public health will be far greater if the population within the 10-mile emergency planning zone cannot be evacuated in a timely manner.

According to an independent analysis of Indian Point's emergency plans commissioned by former New York Governor George Pataki in 2003 and authored by former FEMA director James Lee Witt found, the radiological emergency plan for Indian Point is badly flawed, unworkable and key components are unfixable. Witt found that ". . . the current radiological response system and capabilities are not adequate to . . . protect the people from an unacceptable dose of radiation in the event of a release from Indian Point . . . ."[12]

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[8] *See generally* 42 U.S.C. § 4332; Riverkeeper Scoping Comments at 2-4.
[9] 40 C.F.R. § 1502.9(c)(1)(ii); Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18036.
[10] Environmental Impact Statement Scoping Process, Summary Report, Indian Point Nuclear Generating Station Unit Nos. 2 and 3 Village of Buchanan, New York, December 2008 ("NRC Staff Scoping Summary Report"), at 260 (finding that "offsite emergency planning is not within the scope of the NRC's environmental review" since the NRC "monitors emergency planning under requirements of the current operating license.").
[11] *See* Riverkeeper Scoping Comments at 5 n.11.
[12] Review of Emergency Preparedness of Areas Adjacent to Indian Point and Millstone, p. viii, James Lee Witt Associates, 2003.

In 2003 KLD Associates conducted a traffic study for Entergy and determined that evacuation times for the Emergency Planning Zone around Indian Point doubled since 1994. The original estimate was 2.5 hours for people to proceed with evacuation, with a total of 5.5 hours for complete evacuation. KLD estimates increased mobilization time to four hours, while complete evacuation of the region in good weather conditions could take up to 9.5 hours and in snow conditions up to 12 hours.[13] Shadow evacuation would increase this time.

The NRC itself has recognized the concerns associated with the location of Indian Point and increased population density, even prior to the September 11th terrorist attacks.[14] Were Entergy applying for a license to build a new nuclear power plant where Indian Point is now located, it is unlikely they would be allowed to do so, based on its proximity to such a highly populated area.[15] In fact, in the evaluation factors for stationary power reactor site applications before January 1997 the regulations state that residences within the exclusion area shall normally be prohibited.[16] In exclusion areas with residents, the regulations recommend low population zones - the total number and density of which are such that there is a reasonable probability that appropriate protective measures could be taken in their behalf in the event of a serious accident.[17] The regulations state where very large cities are involved, the regulations find that a greater distance may be necessary because of total integrated population dose consideration.[18]

The regulations for reactors built after 1997 require that every site must have an exclusion area and a low population zone.[19] These regulations define low population zone as "the area immediately surrounding the exclusion area which contains residents, the total number and density of which are such that there is a reasonable probability that appropriate protective measures could be taken in their behalf in the event of a serious accident."[20] There are 300,000 people living within the ten-mile EPZ of Indian point and the only means of evacuation are primarily one and two lane roads. The regulations do not specify a permissible population density or total population within this zone because the situation may vary from case to case.[21] The regulations go on to say whether a specific number of people can, for example, be evacuated from a specific area, or instructed to take shelter, on a timely basis will depend on many factors such as location, number and size of highways, scope and extent of advance planning, and actual distribution of residents within the area.[22] As far as Indian Point is concerned, there is no low population zone, therefore if Entergy were applying to build a new nuclear power plant as opposed to a relicensing it would likely not be permitted.

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[13] Indian Point Energy Center Evacuation Time Estimate, Tbl. 1-1, p. 1-12, KLD Associates, Inc., 2003.
[14] 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, p. 5 (Robert Ryan, the NRC's Director of the Office of State programs, stating "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 . . . [Indian Point is] one of the most inappropriate sites in existence.")
[15] *See* 10 C.F.R. Pts. 100.3, 100.10(b), 100.11, & 100.21(h).
[16] 10 C.F.R. § 100.3.
[17] 10 C.F.R. § 100.10(b).
[18] *Id.*
[19] 10 C.F.R. § 100.21(h).
[20] 10 C.F.R. § 50.2.
[21] *Id.*
[22] *Id.*

Based on the foregoing, it is absurd to exclude emergency planning from review during the license renewal process. The NRC Staff must assess the changes to population density and traffic concerns during its environmental review process in the context of assessing the environmental impacts of an accident or attack on Indian Point that results in a radiological release.[23] Failing to do so leaves the DSEIS fundamentally flawed.

DSEIS Section 4.0

After "objectively" describing how Indian Point interacts with the environment in Section 2.0 of the DSEIS, Section 4.0 presents the NRC Staff's assessment of the environmental impacts of continued operation of the facility. This section of the NRC Staff's review is riddled with deficiencies, as follows: (1) improper analysis of the environmental impacts of Indian Point's once-through-cooling system, (2) improper analysis of the impacts to endangered or threatened species, (3) improper analysis of groundwater contamination caused by spent fuel pool leaks, (4) failure to consider the Rockland County Desalination Project, (5) failure to properly consider impacts to the communities utilizing Hudson River water as a supply source, and (6) improper conclusions regarding the cumulative environmental impacts of continued operation.

1. Improper Analysis of Environmental Impacts of Once-Through Cooling System

NRC regulations implementing NEPA classify the effects of entrainment, impingement, and heat shock on the protection and propagation of fish and shellfish as "Category 2" environmental issues which must be assessed in the site-specific SEIS. 10 C.F.R. Part 51, Appendix B to Subpart A. The DSEIS "must contain an analysis of those issues identified as Category 2" in Appendix B to subpart A. 10 C.F.R. 51.71(d). The DSEIS is NRC Staff's independent evaluation of such Category 2 issues. 10 C.F.R. § 51.70. Despite this mandate, as demonstrated below herein, NRC Staff has failed to adequately analyze the adverse impacts on aquatic resources by impingement, entrainment, and heat shock caused by Indian Point's once-through cooling system. As a result, the DSEIS violates NEPA and NRC implementing regulations at 10 C.F.R. §§ 51.70, 51.71.

Riverkeeper's comments regarding NRC Staff's analysis of Indian Point's once-through cooling system were prepared with the expert assistance of Drs. Peter Henderson and Richard Seaby of Pisces Conservation Ltd. ("Pisces"). Pisces' expert report in support of these comments – "Comments Relating to the Indian Point NRC draft EIS on the Cooling System" (herein the "Pisces Report") – is attached as Exhibit A.[24] In short, Pisces concludes that the NRC Staff's assessment of impingement and entrainment − undertaken on the representative important species ("RIS") of 17 fish species and the blue crab − is based on a scoring system that initially appears objective and quantitative. However, detailed examination of the method shows that it

[23] For details regarding how the NRC Staff incorrectly excluded terrorism and certain accidents from review, see comments on DSEIS Section 5.0 below.

[24] In 2007, Pisces prepared a report entitled "Entrainment, Impingement and Thermal Impacts at Indian Point Power Station" ("2007 Pisces Report"); a copy of the 2007 Pisces Report was provided to NRC Staff in November of 2007 as an attachment to Riverkeeper's Request for a Hearing and Petition to Intervene with respect to the license renewal proceeding for the Indian Point Nuclear Power Station (Attachment 4 to the Declaration of Peter Henderson).

makes assumptions about the statistical properties of populations, the impact of cooling water systems on invertebrates prey species, and the relative importance of local and larger-scale changes in population number, which are unjustified and arbitrary.

Although impingement and entrainment effects are considered together by NRC Staff − an approach that has merit − the impact of Indian Point's cooling system is assessed using a flawed scoring system that takes into account changes in species abundance (the trend) and strength of connection (connection), and which attempts to measure the relationship between abundance in the environment and Indian Point's direct fish mortality. This approach differs significantly from the New York State Department of Environmental Conservation ("NYSDEC") evaluation and overall conclusion regarding these impacts, which focuses on fish mortality rather than fish populations, and has determined that the cooling system results in significant adverse environmental impacts. The NRC Staff should defer to NYSDEC's evaluation pursuant to NRC precedent.

A particular problem with NRC Staff's assessment is the distinction between '*Large'* and '*Small'* population impacts, which is hard to support from an examination of the overall population trend data. The use of both river-wide and river segment 4 data (where Indian Point is located), and the use of population decline criteria that include a measure of the deviation from the mean of a normal distribution produce results that do not necessarily reflect the actual population trends, and have the potential to understate the importance of recent changes in abundance.

Another concern is the scoring method used to assess the strength of connection line of evidence to determine whether operation of the Indian Point cooling system has the potential to influence RIS populations near the facility or within the lower Hudson River; this is a poor measure of the impact of the power plant on the species. The strength of connection is a flawed measure because it is based on rank abundance. Furthermore, the lack of importance given to impacts on invertebrates makes low to moderate levels of impact for many species almost inevitable.

NRC Staff's comparison of species' proportional rank abundance in the power station kill with that living in the river results in potentially misleading conclusions. For example, the fish that contributes the highest proportion of the number of individuals killed by the power plant, and which is also the commonest in the river, only has a medium strength of connection. In Pisces' opinion, such a situation where a fish is killed in high numbers and is locally common would suggest a high degree of linkage. A number of the RIS species have a prey score for impingement and entrainment of 1, and thus are unlikely to score highly for the strength of connection. This feature of the scoring protocol is thus central to the final outcome. Another key underlying point to note about NRC Staff's analysis of impingement and entrainment is the reliance on data collected between 1981 and 1990. These data are old and may not reflect current conditions. In fact, many populations have shown marked changes since that period. This calls into question the reliability of the conclusions when applied to the future.

NRC staff also concludes that thermal impacts associated with the discharge are small to moderate, principally on the grounds that there is no evidence for the scale of the impact. The assertion that, because no appropriate evidence has been collected, there is therefore only a small to moderate impact, is not logical and contrary to NEPA. In addition, NRC staff state that they

cannot determine the effects of climate change, particularly in relation to thermal issues. We believe they should have, at the very least, concluded that they needed more data on thermal issues before reaching a conclusion.

a. NRC Staff's Flawed Assessment of Impingement and Entrainment

As noted above, impingement and entrainment effects are considered together by NRC Staff, which is an approach that has merit because the goal is to measure the well-being of all fish stages. However, the impact of Indian Point's cooling system is assessed using a faulty scoring system which attempts to measure the relationship between abundance in the environment and Indian Point's direct fish mortality.

NRC Staff's methodology has many problems, which are explained in detail in the Pisces Report. With respect to the trend (the so-called "Assessment of Population Trends−The First Line of Evidence"), the Pisces Report demonstrates that the NRC Staff's distinction between '*Large'* and '*Small'* impingement and entrainment impacts is hard to support.[25] Indeed, the weight of evidence ("WOE") scoring system to measure such impacts, which uses both river-wide and river segment 4 data (where Indian Point is located), and uses population decline criteria that include deviation from the mean of a normal distribution, produces results that do not necessarily reflect the actual population trends, and have the potential to understate the importance of recent changes in abundance.[26] For instance, examination of the river-wide abundance trends for white fish and weakfish indicates that both species have, since 1990, appreciably declined in abundance. Yet while the decline in white catfish is classified as 'Large', that in weakfish is 'Small'.[27] Such differences are more a reflection of the arbitrary nature of the statistical and quantitative approach taken, than a real difference in the state and health of the populations.

Turning to the strength of connection (the so-called "Assessment of Strength of Connection−The Second Line of Evidence"), to determine whether operation of the Indian Point cooling system has the potential to influence RIS populations near the facility or within the lower Hudson River, the Pisces Report also unveils serious problems.[28] NRC Staff's describes how strength of connection is measured, as follows:

> Impingement and/or entrainment can also remove and reintroduce RIS prey into the aquatic system in a manner that alters food web dynamics and produces indirect effects that may result in decreased recruitment, changes in predator-prey relationships, changes in population feeding strategies, or movements of populations closer to or farther away from the cooling system intakes or discharges. Staff based the analysis of impingement on the concordance of two ranked proportions. The first proportion was the ratio of the number of YOY and yearling fish of each

[25] Pisces Report at 2-5.
[26] *Id.* at 4-5.
[27] *Id.* at 2 (citing to DSEIS' Table 4-4).
[28] *Id.* at 5-9.

> species impinged in relation to the sum of all fish impinged. The second proportion was the ratio of each species abundance in the river near IP2 and IP3 relative to the total abundance of all 18 RIS. A large rank for both proportions would mean that the proportion impinged for the given RIS and the proportion abundance in the river were both large. The ratio of these two ranks would then be close to 1, suggesting that the stationary sampler was sampling proportionately to the abundance in the river (a medium strength of connection).[29]

The first point to note is that the analysis is undertaken by comparing a species' proportional rank abundance in Indian Point's actual kill with that living in the river. Rather oddly, a fish that contributes the highest proportion to the number of individuals killed by the power plant, and which is also the commonest in the river, only has a medium strength of connection.[30] In Pisces' opinion, such a situation where a fish is killed in high numbers and is locally common would suggest a high linkage.[31] This is a point that needs reconsideration and critical appraisal. The effect is to reduce the assessment of the power plant's impact on abundant, commonly-caught fish.

The second point to note is that a species which is ranked less common in Indian Point's kill than in the river will be scored small to moderate.[32] The key point is that the power plant kill may actually reflect the abundance in the Hudson River, however the rank could decline if other species are killed in unusually high numbers.[33] Thus, each species is not being fairly assessed on its own merits.

To illustrate the weaknesses in NRC Staff's approach, Pisces points to Juvenile rainbow smelt, a species that has disappeared from fish surveys since the mid 1990s.[34] This species is assessed in the trends (the population line of evidence) as '*Large'*.[35] However, NRC Staff considers the impact of Indian Point on this species to be moderate because the strength of connection is assessed as '*Medium'*.[36] The strength of connection is only medium because both the impingement and entrainment prey scores are 1. The example demonstrates that an unsubstantiated and unproven assumption by NRC Staff, that invertebrate prey species are not affected by the cooling water system, leads in turn to the conclusion that the rainbow smelt, a species which has effectively disappeared from the data in recent years and has been assessed as potentially highly impacted by entrainment, is only given a moderate impact. The Atlantic tomcod makes another telling example.[37] The tomcod population shows long-term decline, thus the population line of evidence is large, however, NRC Staff assigns a low-to medium strength of connection and the final conclusion is an impact small to moderate.

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[29] DSEIS, Appendix H, at H-29.
[30] Pisces Report at 6.
[31] *Id.*
[32] *Id.*
[33] *Id.*
[34] *Id.* at 7-8.
[35] *Id.* at 7 (citing to DSEIS' Table 4-4).
[36] *Id.*
[37] *Id.* at 8.

The Pisces Report observes that before conclusions of this nature can be justified, the assertion that the cooling water system has no impact on invertebrate prey species needs to be demonstrated.[38] There is considerable evidence that large numbers of invertebrates are entrained and potentially killed by the cooling water system. There is therefore no reason to believe that invertebrate prey species are not adversely affected. This impact may extend beyond entrainment effects as the heated discharge water may also adversely affect them.

Another problem with NRC Staff impingement and entrainment assessment is the age of the data.[39] NRC Staff is relying on data collected between 1981 and 1990. These data are old, and may not reflect current conditions. Further, there are hints that the NRC staff did wonder if the data reflected present conditions. If impinged data were available for 2008 would we find that entrained and impinged fish had changed even more? The risks inherent with the use of old data are not addressed. In addition, it is worth noting that, although the impingement and entrainment data are over 17 years old, the population data that shows the decline in so many of these species is current. The differences in the population of fish between the 1990s and the present are great.

b. NRC Staff's Improper Analysis of Thermal Impacts

The NRC Staff conclude that thermal impacts associated with the discharge are small to moderate, principally on the grounds that there is no evidence for the scale of the impact:

> In the absence of specific studies, and in the absence of effects sufficient to make a determination of a LARGE impacts, the NRC staff concludes that thermal impacts from IP2 and IP# [sic] could thus range from SMALL to MODERATE depending on the extent and magnitude of the thermal plume, the sensitivity of various aquatic species and lifestages likely to encounter the thermal plume, and the probability of an encounter occurring that could result in lethal or sublethal effects.[40]

The assertion that, because no appropriate evidence has been collected, therefore there is only a small to moderate impact is not logical and contrary to NEPA.[41]

Linked to thermal impacts must be a consideration of climate change impacts. The following conclusion is reached in the DSEIS:

> Thus, the NRC staff has concluded that the cumulative effects of climate change cannot be determined.[42]

Therefore, NRC Staff is willing to conclude that thermal effects are small to moderate and can therefore be dismissed, but Staff cannot determine the effects of climate change. We believe that

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[38] *Id.*
[39] *Id.* at 9.
[40] DEIS, Main Report at 4-27.
[41] Pisces Report at 11.
[42] DSEIS, Appendix H, at H-60.

NRC Staff should have, at the very least, acknowledged that they needed more data on thermal issues before reaching a conclusion.[43]

c. NRC Staff has Failed to Defer to the New York Department of Environmental Conservation

The NRC Staff has failed to defer to, and coordinate with the responsible state agency in charge of protecting aquatic impacts under federal delegation and state law – the New York State Department of Environmental Conservation ("NYSDEC") − as required by NRC regulations and precedent. NRC regulations implementing NEPA require that the NRC cooperate "to the fullest extent possible" with State and local agencies to reduce duplication and inconsistencies.[44] Despite this mandate, however, NRC Staff has largely ignored NYSDEC's environmental review and permitting of Indian Point's cooling system under the federal Clean Water Act ("CWA"). NYSDEC's review and re-permitting of Indian Point's cooling system has been ongoing since 1992, and is currently in the final adjudicatory phase. Following the NRC's instructions in the *Seabrook* case, the NRC Staff must defer to NYSDEC's assessment of entrainment and impingement, and its permitting determinations.[45]

Indian Point is operating a once-through cooling system under an administratively extended State Pollutant Discharge Elimination System ("SPDES") permit issued by the NYSDEC for the period 1987-1992.[46] In July 31, 2008, the Atomic Safety and Licensing Board ("ASLB") ruled that Entergy can rely on this permit for purposes of satisfying 10 C.F.R. § 51.53(c)(3)(ii)(B); thus, it need not assess the impacts of impingement, entrainment, and heat shock in the Environmental Report.[47] Indian Point's 1987 SPDES permit has been administratively continued, however, pending issuance of a final SPDES permit currently subject to adjudication by the NYSDEC.

Beginning in 1992, the NYSDEC has required a specific environmental impact statement ("EIS") under the State's Environmental Quality Review Act[48] ("SEQRA") to consider Indian Point's entrainment, impingement, and thermal impacts, as well as mitigation alternatives. As a result, the prior owners of Indian Point and other Hudson River power plant generators prepared the 1999 Draft Environmental Impact Statement for permit renewal.[49] The final environmental impact statement ("SPDES FEIS") was prepared and released by the NYSDEC in 2003, after Hudson River advocates filed an action against the NYSDEC in New York State Supreme Court.[50]

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[43] Pisces Report at 11.
[44] 10 C.F.R. § 51.70 (c); 40 C.F.R. § 1506.2 (b) and (c).
[45] *See Public Service Co. of N.H.* (Seabrook Station, Units 1 and 2), *Seabrook*, CLI-78-1, 7 NRC at 26 (1978); *Entergy Nuclear Vt. Yankee* (Vermont Yankee Nuclear Power Station), CLI-07-16, 65 NRC 371, 389 (2007).
[46] NYSDEC, 1987, State Pollutant Discharge Elimination System ("SPDES") Discharge Permit NY-000-4472, Indian Point Generating Stations (NYSDEC, 1987 SPDES Permit.
[47] July 31, 2008 ASLB Order, *supra*.
[48] New York State Environmental Conservation Law, Article 17.
[49] 1999 Draft Environmental Impact Statement Concerning the Applications to Renew SPDES Permits for the Roseton 1 and 2, Bowline 1 and 2 and Indian Point 2 and 3 Electric Generating Stations (1999 DEIS).
[50] *See Matter of Brodsky v. Crotty, Sup. Ct., Albany County*, Keegan, J., Index No. 7136-02.

In the SPDES FEIS, the NYSDEC determined that Indian Point's dramatic intake and use of Hudson River water has significant adverse environmental impacts and must be mitigated.[51] Consequently, NYSDEC prepared a draft SPDES permit requiring closed cycle cooling at Indian Point.[52] In 2008, the NYSDEC advanced the SPDES proceeding to the evidentiary phase, at the time when it resolved various appeals by the parties to the proceeding. Notably, NYSDEC determined that there is no need to adjudicate whether Indian Point's cooling system results in adverse environmental impacts because this issue has already been established as a matter of law and fact, and required that a supplemental EIS be prepared during the adjudication.[53]

The DSEIS not only contradicts the key findings and conclusions on entrainment and impingement at Indian Point contained in the SPDES FEIS but completely ignores the 2008 NYSDEC Ruling.[54] Tellingly, the 2008 NYSDEC Ruling relied on the United Stated Court of Appeals for the Second Circuit, in its decisions referred to as *Riverkeeper I* (2004) and *Riverkeeper II* (2007).[55] As the 2008 NYSDEC Ruling stated, the Second Circuit "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 and emphasized that the EPA's focus on the number of organisms killed or injured by cooling water intake structures is eminently reasonable.[56] Thus, the NRC Staff's marked reliance on population trends is inconsistent with NYSDEC's and EPA's focus on the number of organisms killed or injured by the cooling system.

The DSEIS also includes, in its alternatives analysis (in Section 8.1.2), a Restoration Alternative that is unlawful based on the Second Circuit rulings in its *Riverkeeper I* and *Riverkeeper II* decisions. Pursuant to *Riverkeeper I* and *Riverkeeper II* "restoration" alternatives both at existing and new facilities are contrary to the CWA. Therefore, Section 8.1.2 should be stricken in its entirety. These failures and inconsistencies runs contrary to NRC's own precedent set forth in *Seabrook*, CLI-78-1, 7 NRC at 26, and *Entergy Nuclear Vt. Yankee*, 65 NRC at 387, indicating that NRC Staff must defer to the responsible permitting authority, here the NYSDEC.

NYSDEC's 2008 Ruling also requires that a supplemental EIS be prepared to examine the environmental impacts that were not already addressed in the SPDES FEIS for closed cycle cooling, the proposed interim measures, and any alternative technologies that Entergy may propose in order to minimize adverse environmental impact at Indian Point.[57] There is no

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[51] NYSDEC, 2003, Final Environmental Impact Statement Concerning the Applications to Renew SPDES Permits for the Roseton 1 and 2, Bowline 1 and 2 and Indian Point 2 and 3 Electric Generating Stations (hereinafter NYSDEC, 2003 FEIS).
[52] NYSDEC, 2003, Draft SPDES Permit for Entergy Nuclear Indian Point Units 2 & 3 (NYSDEC, 2003 Draft SPDES Permit).
[53] *See Matter of Entergy Nuclear Indian Point 2 and Entergy Nuclear Indian Point 3*, Interim Decision of the Assistant Commissioner (August 13, 2008), *at* http://www.dec.ny.gov/hearings/45956.html ("NYSDEC, 2008 Ruling"), at 14-18 & 36-41.
[54] NYSDEC, 2003 FEIS, at 58.
[55] NYSDEC, 2008 Ruling, at 17 (*citing to* Riverkeeper I, [358 F.3d 174] at 196; Riverkeeper II, [475 F.3d 83] at 125.
[56] *Id.* fn 12 *(*citing to "Riverkeeper II, at 125 (quoting Riverkeeper I, at 196).").
[57] *Id.* at 39.

indication whatsoever that NRC Staff will defer to, and/or coordinate with, the NYSDEC's supplemental EIS, as required by NRC regulations and precedent.[58]

Finally, NRC Staff has not recognized NYSDEC's statements and concerns with respects to Indian Point's thermal impacts. The DSEIS' lack of a thermal analysis (discussed in the previous section) is plainly at odds with the available data on Indian Point's thermal plume, which shows that the facility does not comply with New York water quality standards for thermal discharges. As noted in the scoping comments filed by the State of New York − later incorporated in New York State's Petition to Intervene with respect to aquatic impacts:

> The available data -- generated from the applicant and the other Hudson River power plant generators as part of the HRSA -- regarding the thermal discharge at Indian Point demonstrates that state water quality criteria are *not* being met.[59]

In addition, the 2007 Pisces Report on Entrainment, Impingement and Thermal Impacts, submitted to NRC Staff in November of 2007, clearly shows that temperature increases in the Hudson River caused by Indian Point's operation have had significant effects on aquatic life.

2. Improper Analysis of Impacts to Endangered or Threatened Species

a. Listed Species – Shortnose Sturgeon

The license renewal of the Indian Point nuclear facility is a federal action which "may affect a listed species or critical habitat."[60] In the DSEIS, the NRC Staff admits that the license renewal will require consultation under Section 7 of the Endangered Species Act of 1973 ("ESA").[61] Because the operation of the Indian Point nuclear facility has resulted in the taking of the endangered shortnose sturgeon without a permit,[62] and the continued operation will continue to affect the fish if the license is renewed and Indian Point operates without a closed-cycle cooling system, such renewal is a federal action which may affect a listed species.

The shortnose sturgeon was listed under the Endangered Species Preservation Act on March 11, 1967 and remained on the Endangered Species List when the ESA became law in 1973. Females live significantly longer than males; while females have reportedly reached 67 years, males usually will not live past 30.[63] This being the case, the sexes are nearly equal in number when young, but when the shortnose reaches 90 cm, females outnumber males by approximately four to one.[64] Also, because they are long living fish, in the mid-Atlantic region, the males will reach

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[58] 10 C.F.R. § 51.70 (c); 40 C.F.R. § 1506.2 (b) and (c); *Seabrook*, CLI-78-1, 7 NRC at 26 (1978); *Entergy Nuclear Vt. Yankee*, CLI-07-16, 65 NRC 371, 389 (2007).
[59] NYS, Scoping Comments, at 8 (emphasis in original text).
[60] 50 C.F.R. § 402.14(a) (2008).
[61] *See* 16 U.S.C. § 1536 (2006); *See also* DSEIS, Main Report § 4.6, at 4-49.
[62] *See id.* § 4.6, at 4-51 (reporting that 714 endangered shortnose sturgeon were impinged at Indian Point from 1975 to 1990).
[63] NOAA Fisheries Office of Protected Resources, Shortnose Sturgeon, http://www.nmfs.noaa.gov/pr/species/fish/shortnosesturgeon.htm (last visited March 13, 2009).
[64] *Id.*

reproductive maturity between four and seven years and the females at approximately eleven years.[65] Even still, while males may spawn every year, females will often go three years between spawning.[66] Because of this slow maturation process, *any* impacts on the shortnose sturgeon will have noticeable effects. It is, thus, critical that impacts on the shortnose species are kept to a minimum.

Riverkeeper recognizes that Section 7 consultation is based on astute principles designed to further the basic purpose of the ESA, which is to conserve endangered and threatened species and the ecosystems on which they depend.[67] Of particular relevance here are section 7 "philosophies" which encourage reliance on biology first, emphasize the ecosystem approach to species conservation, and stress the importance of the "best available scientific and commercial data."[68] These are commendable standards of practice, and NRC Staff should adhere to them during the relicensing process.

Although the NRC Staff admits that the continued operation of the Indian Point nuclear facility will impinge the shortnose sturgeon, the data relied upon in the DSEIS and the NRC Staff's Biological Assessment ("BA") appended thereto for assessing those impacts is incomplete at best.[69] The data provided by Entergy accounts only for shortnose sturgeon impinged at Indian Point Units 2 and 3 from 1975 through 1990.[70] Furthermore, there are several years during this period that have no reported data at all[71] and the data can be questioned due to the fact that over 90% of the recorded impingements occurred in only two years.[72] In a letter from Mary A. Colligan (National Marine Fisheries Service ("NMFS")) to David J. Wrona (NRC), NMFS echoed Riverkeeper's concerns about the lack of reporting data and the inconsistencies in those reports.[73] In Colligan's letter, NMFS instructed the NRC that there was insufficient information provided in the DSEIS and BA to start formal consultation.[74] Specifically, NMFS was concerned with the gaps in the reported impingements at the Indian Point nuclear facility.[75] More importantly, the impingement data provided in the DSEIS was from a period when the Indian Point nuclear facility did not use Ristroph screens to minimize fish impingement, which were installed in 1991.[76]

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[65] *Id.*
[66] *Id.*
[67] 16 U.S.C. § 1531(b).
[68] U.S. Fish and Wildlife Service and National Marine Fisheries Service, ESA § 7 Consultation Handbook, § 1.1, at 1-2, *available at* http://www.fws.gov/endangered/pdfs/Sec7/handbook/CH1-3.PDF.
[69] *See generally* DSEIS § 4.6; *see also id.* Appendix E, Biological Assessment of the Potential Effects on Federally Listed Endangered or Threatened Species from the Proposed Renewal of Indian Point Nuclear Generating Plant, Unit Nos. 2 and 3 ("BA"), at E-88 – E-100.
[70] *Id.*
[71] *Id.* (no reported impingements in 1980-1983, 1985, 1986, 1988-1990).
[72] *Id.* (out of 317 total impinged shortnose sturgeon, 176 were recorded in 1984 and 116 were recorded in 1987).
[73] Colligan (NMFS) to Wrona (NRC), RE: Biological Assessment for License Renewal of the Indian Point Nuclear Generating Unit Nos. 2 and 3 (Feb. 24, 2009), attached to Riverkeeper's Comments as Exhibit B.
[74] *Id.*
[75] *Id.*
[76] DSEIS, Appendix E, BA § 4.3.2, at E-96.

Moreover, the impingement data cited in the BA, which the NRC Staff included in order to comply with Section 7 of the ESA,[77] is self-conflicting and does not create a complete, accurate or current illustration of the status of impinged shortnose sturgeon at the Indian Point nuclear facility. Included in the BA are two impingement reports, one each from NMFS and Entergy.[78] The NRC Staff concluded that because Entergy's reports of impinged sturgeon were larger than those of NMFS, they would disregard the NMFS reports.[79] Although it is important for the BA to be a conservative analysis of the impacts to the sturgeon, the NRC Staff's only reasoning disregarding the NMFS reports was that they were significantly lower than the data supplied by Entergy.[80]

Entergy and the NRC Staff state that the implementation of the Ristroph screens, installed in 1991, may have resulted in reduced the impacts to shortnose sturgeon.[81] Despite these assurances from Entergy and the NRC Staff that these screens are mitigating the impingement of shortnose sturgeon, there is no data to support this conclusion. Because the NRC Staff fails to rely on any impingement monitoring after the screens were installed,[82] it cannot be assumed or concluded that these screens have had any mitigating effects. In order to properly assess the impacts of the Ristroph screens, the NRC Staff must rely on actual impingement data. The NRC Staff even admits that they cannot assess the extent to which the installation of the screens might reduce impacts to the sturgeon.[83]

The lack of complete and recent impingement data significantly limits the NRC Staff's ability to form a conclusion about the actual affects on the shortnose sturgeon. Indeed, the NRC Staff readily admits that it is unable to come to a definitive conclusion based on this incomplete data. Based on its review of the impingement data supplied by Entergy, the NRC Staff finds in the DSEIS that due to "the uncertainty of the current impingement losses of . . . sturgeon and because insufficient data exist to use the [weight of evidence] approach," the effects on endangered shortnose sturgeon due to license renewal could range from "SMALL to LARGE."[84] In fact, the NRC Staff explicitly admits that the supplied data was insufficient and current monitoring is needed to form a conclusion about the effects of impingement on the shortnose sturgeon.[85] However, instead of gathering data to support a rational and reasonable assessment of the affects to the shortnose sturgeon, the NRC Staff was content to leave their analysis as incomplete and uncertain. NMFS has also shown concern with this lack of recording data.[86] Riverkeeper agrees with NMFS that unless the NRC Staff gathers impingement data or studies

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[77] 50 C.F.R. § 402.14 (2008).
[78] DSEIS, Appendix E, BA § 4.3.2, at E-96, E-97.
[79] *Id.* at E-97.
[80] *Id.*
[81] *See id.* at E-98.
[82] *See* DSEIS, Main Report Table 4-11 Impingement Data for Shortnose and Atlantic Sturgeon at IP2 and IP3, 1975-1990 (data from Entergy 2007b), at 4-52.
[83] DSEIS, Appendix E, at E-99.
[84] DSEIS, Main Report § 4.6.1, at 4-52.
[85] DSEIS, Appendix E, BA § 4.3.2, at E--98 -- E-99 (concluding that the license renewal would likely affect the species, but without current monitoring data, it is impossible to gauge the extent of the impact).
[86] Colligan (NMFS) to Wrona (NRC), RE: Biological Assessment for License Renewal of the Indian Point Nuclear Generating Unit Nos. 2 and 3 (Feb. 24, 2009).

reflecting accurate estimates of impinged shortnose sturgeon, the impact assessment in the DSEIS is inadequate.[87]

The NRC Staff's inconclusive determination also rests in part on the lack of data regarding entrainment and heat shock. While the NRC Staff says that there is likely no entrainment of shortnose sturgeon occurring, this determination is based on a review of data dating back to the 1980s.[88] The NRC Staff admits that entrainment cannot be ruled out and that there is currently no monitoring program at Indian Point.[89] Similarly, in regards to potential heat shock, the NRC Staff admits that increased temperatures can have a "significant effect on the shortnose sturgeon," however, could not determine the extent to which the population would be affected because additional studies are required.[90]

The NRC Staff's ultimate "conclusion" that the range of impacts to shortnose sturgeon is "SMALL to LARGE"[91] lacks any definitiveness and is essentially meaningless, improperly flouting the requirements of NEPA.[92] While the lack of monitoring data and studies inhibits the ability to form specific conclusions, this does not excuse the NRC Staff from their obligation to accurately assess the impacts on endangered species affected by Indian Point. It is clear that the NRC Staff did not effectively or sufficiently analyze the impacts that license renewal would have on the shortnose sturgeon, and the NRC Staff cannot justify its inadequate conclusion simply by pointing to the unavailability of relevant data.

Pisces' expert report corroborates the deficiency of the NRC Staff's review.[93] Pisces points out that the data used by the NRC Staff to assess the number of shortnose and Atlantic sturgeon impinged at Indian Point is old, and that the lack of monitoring of impingement means that they do not know if current impingement rates are similar to those between the 1970s and 1990s. In addition, Pisces points out that the NRC Staff admit that they cannot assess the thermal impact on these species. The Pisces expert report concludes that, given these large uncertainties, the NRC Staff came to no conclusion on the impact of Indian Point on sturgeon, giving a range of small to large for the future impacts.[94]

The NRC Staff's analysis of the impacts to shortnose sturgeon is also wanting since it does not consider the impacts caused by IP1. If the license for Indian Point Units 2 and 3 is renewed, Entergy will use some of the systems from Indian Point Unit 1 in the continued operations of the facility.[95] Specifically, the intake structure for Unit 1 will be used to "[p]rovide support, shelter and protection for equipment credited for regulations associated with fire protection."[96] The

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[87] *Id.*
[88] DSEIS, Main Report § 4.6.1. at 4-51; DSEIS, Appendix E at E-96.
[89] DSEIS, Appendix E at E-96.
[90] DSEIS, Main Report § 4.6.1. at 4-51; DSEIS, Appendix E at E-99-100.
[91] DSEIS, Main Report § 4.6.1, at 4-52.
[92] *See* 42 U.S.C. § 4332; *Marsh v. Oregon Natural Resources Counsel*, 490 U.S. 360, 374 (1989).
[93] Pisces Report at 10.
[94] *See* Pisces Report at 10.
[95] *See generally,* NRC: Indian Point Nuclear Generating Unit Nos. 2 and 3 – License Renewal Application (Apr. 30, 2007), *available at* http://www.nrc.gov/reactors/operating/licensing/renewal/applications/indian-point.html#application ("Entergy LRA").
[96] Entergy LRA § 2.4.2, at 2.4-5.

License Renewal Application states that travelling screens have been installed at the Unit 1 intake structure[97], but neither the DSEIS nor the application analyze the impingement impacts on the shortnose sturgeon. Moreover, neither of these documents cites to any reports of past shortnose impingements at the Unit 1 intake structure. By failing to analyze the effects of the continued use of the Unit 1 Intake Structure, the NRC has ignored another point of impact on the shortnose sturgeon. If Entergy is going to use the intake structure from Unit 1 in the continued operation of Indian Point, the NRC staff must take into account past and future impingement from Unit 1 in order to accurately analyze the total impacts on the species.

The NRC Staff also fails to recognize that the Indian Point nuclear facility will require an incidental take permit in order to comply with the ESA.[98] The NRC admits that future operation of the facility will likely impinge shortnose sturgeon, and this future impingement is considered a "take" under the ESA.[99] Any reliance on the fact that shortnose sturgeon appear to be rebounding in the River, is unfounded, since the fact remains that impingement is still occurring.[100] *Every* impingement of shortnose sturgeon that occurs without an incidental take permit is a violation of the ESA. Because the taking of shortnose sturgeon would be incidental to the operation of the plant, the ESA requires that the facility obtains a permit to regulate and minimize the impact on the species. Riverkeeper's concerns about future takings were echoed in a letter from Mary Colligan, Assistant Regional Administrator for Protected Resources for NMFS Northeast Region, to James Thomas at Enercon Services, a company assisting Entergy in its preparation of its Environmental Report (ER).[101] In this letter, Colligan stated that NMFS is aware that Indian Point has impinged shortnose sturgeon and that such impingement is a take under the ESA.[102] Colligan also wrote that since Indian Point has operated without a permit, such takes were violations of the ESA.[103] The DSEIS failed to note that any future impingements of shortnose sturgeon at the Indian Point nuclear facility without a permit will also be violations of the ESA. In the absence of recent data showing that impingement is not occurring, the NRC Staff and NMFS must assume that the shortnose sturgeon are continuing to be impacted by impingement, and comply with the law accordingly.

Moreover, the DSEIS is inadequate due to a complete lack of assessment of the potential effects on federally listed species caused by groundwater contamination at Indian Point. As discussed in more detail below, the IP1 and IP2 spent fuel pools are have leaked extensive amounts of highly toxic radionuclides, including strontium-90 and tritium, into the groundwater around the plant. The NRC Staff at no point in the DSEIS assesses the effects of this toxic contamination on the Hudson River's federally listed shortnose sturgeon. Riverkeeper is highly concerned about the

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[97] *Id.* § 2.3.3.19, at 2.3-157.
[98] *See* 15 U.S.C. § 1539(a)(1)(B) (2006); *see also* 50 C.F.R. § 402.14(i) (2008) (NMFS may also include an incidental take statement in a biological opinion after formal consultation, but there is no reference to this option either).
[99] *See* 15 U.S.C. § 1532(19) (2006).
[100] *See* DSEIS, Main Report § 2.2.5.5, at 2-77 to 2-78; DSEIS, Appendix E, at E-95. In fact, the NRC Staff admits that increased population of shortnose sturgeon will likely result in increased impingement. *Id.* at E-97.
[101] *See* Entergy, Inc., License Renewal Application, Appendix E: Applicant's Environmental Report, Operating License Renewal Stage, Indian Point Energy Center (ER), Attachment A, Colligan (NMFS) to Thomas (Enercon) (Mar. 19, 2007), *available at* http://www.nrc.gov/reactors/operating/licensing/renewal/applications/indian-point/ipec-er-attachment-a2.pdf.
[102] *See id.*
[103] *See id.*

lack of analysis here, particularly because of the known dangers of exposure to radioactive substances such as strontium-90 and tritium. Strontium-90 imitates calcium by concentrating in fish bones and shells of clams and blue crab. Clams are a major part of the diet of sturgeon found in the Hudson River. Riverkeeper is therefore concerned that Hudson sturgeon are being exposed to elevated levels of this dangerous substance. Without reference to additional studies done to scrutinize the effects of such contamination on listed species and humans, the NRC Staff's DSEIS is woefully incomplete.

b. Candidate Species – Atlantic Sturgeon

The Atlantic sturgeon is currently a candidate species under the ESA, and is thus being considered for listing as threatened or endangered. As such, it does not currently receive any substantive federal protections. However, if the decision is made to list the Atlantic sturgeon the NRC may have to reinitiate Section 7 consultation with NMFS to assess the effects of relicensing on this species. The chances of re-initiation are particular strong because the listing decision will likely be released well before a final decision is made regarding the relicensing of Indian Point.

Riverkeeper is concerned with the NRC Staff's assessment of impacts on the Atlantic sturgeon. Similar to the data on shortnose sturgeon impingement, entrainment, and heat shock, the DSEIS relies on insufficient records to assess the impacts on the Atlantic sturgeon. Although the data for the impingement of Atlantic sturgeon is more complete than that for the shortnose sturgeon, there is no record of impinged fish after 1987.[104] The NRC Staff does not give a reason for why the monitoring of impingement was halted over 20 years ago and also fails to make its current impact assessments on best estimates or currently available data. Riverkeeper is also concerned that the reporting of impinged Atlantic sturgeon reflects the impingement of over 4,000 fish from 1976 to 1987.[105] If the Atlantic sturgeon is indeed listed under the Endangered Species Act, the NRC will be required to engage in the ESA Section 7 consultation process, in order to address the "taking" of Atlantic sturgeon by Indian Point's operation, and to consider mitigation measures necessary to minimize impingement and entrainment losses. The DSEIS lacks the current data that is necessary to assess potential impacts to the species and recommend mitigation strategies that could lessen the harm of those impacts. As a result, the NRC Staff has failed to provide sufficient factual support for its conclusion regarding the impacts of relicensing Indian Point to the Atlantic sturgeon.

3. Improper Analysis of Groundwater Contamination Caused by Spent Fuel Pool Leaking

Sections 4.3, 4.5, and 4.7 of the DSEIS contain the NRC Staff's evaluation of the environmental impacts of spent fuel pool leaking at Indian Point.[106] The NRC Staff discusses the status of the leaking and its investigation findings earlier in the DSEIS, in section 2.2.7, but reserves

[104] DSEIS, Main Report § 4.6.1, at 4-52.
[105] *Id.*
[106] *Id.* §§ 4.3, 4.5, 4.7.

judgment on the environmental impacts of the leaking until section 4.0.[107] These brief portions of the DSEIS, taken together totaling a paltry 4 pages at best, constitutes the NRC Staff's entire evaluation of the extensive spent fuel pool leaking that has been ongoing at the Indian Point facility for years. A review of the NRC Staff's collective assessment in the DSEIS of the spent fuel pool leaks reveals an utter failure to address any of the concerns raised in Riverkeeper's Scoping Comments or by the contention filed by Riverkeeper on this issue.

Riverkeeper's Scoping Comments urged the NRC Staff to comprehensively assess the environmental impacts of the IP1 and IP2 spent fuel pool leaks.[108] Riverkeeper explained the gross inadequacy of Entergy's Environmental Report ("ER") and, thus, urged the NRC Staff not to rely upon it to prepare its draft supplemental environmental impact statement.[109] Riverkeeper highlighted the importance of fully evaluating the ever-accumulating contamination caused by the leaks on the Hudson River ecosystem, including on fish, shellfish, and river sediments.[110] Riverkeeper's Scoping Comments also suggested assessing the feasibility of requiring Entergy to move more fuel to dry casks as a reasonable mitigation measure.[111] Riverkeeper's subsequently filed contention on spent fuel pool leaks further elaborated on the deficiencies of Entergy's analysis and the need for a thorough review of the environmental impacts resulting from the leaks.[112]

Yet, despite the reasoned and entirely valid requests articulated in Riverkeeper's Scoping Comments, the NRC Staff essentially grafted Entergy's assessment of the leaks into the DSEIS as their own.[113] This deficient analysis completely fails to comply with NEPA.

Firstly, the NRC Staff ignores the fact that Entergy has failed to definitively demonstrate that the leaking has even ceased. In fact, there is no discussion at all of whether the leaking is still active, and instead, the NRC Staff apparently accepts Entergy's current monitoring and other "remedial" activities, such as the draining of the IP1 pool, as enough.[114] Despite these actions, there is still no indication that Entergy will ever be able to definitively determine whether the IP2 pool continues to leak. Even though IP1 is no longer a possible source of leakage, IP2 still is. While Entergy identified and addressed some sources of the leakage from IP2, no one disputes that Entergy has been unable to inspect 40% of the IP2 pool liner due to the high density of the spent fuel storage racks and the minimal clearance between the bottom of the racks and the floor of the pool.[115] Indeed, Entergy has explicitly acknowledged that active leaks cannot be ruled out.[116] Moreover, as Riverkeeper has pointed out to the NRC Staff several times already, sample results

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[107] *Id.* § 2.2.7, at 2-107 to 2-108. The NRC Staff references its findings relating to the significance of the spent fuel pool leaking sporadically throughout the DSEIS, but these four sections seem to represent the NRC Staff's primary analysis of this issue.
[108] Riverkeeper Scoping Comments at 12-15.
[109] *Id.*
[110] *Id.*
[111] *Id.*
[112] Riverkeeper Petition for Hearing at 74-86.
[113] DSEIS, Main report §§ 2.2.7, 4.3, 4.5, 4.7.
[114] *Id.* § 2.2.7, at 2-107 to 2-108, § 4.3, § 4.5, § 4.7.
[115] *See* Riverkeeper Scoping Comments at 13; Riverkeeper Petition for Hearing at 74, 80-81.
[116] *See* Groundwater Investigation Executive Summary (Indian Point Energy Center, Buchanan, N.Y., Jan. 2008), at 3, *available at* http://jic.semo.state.ny.us/Resources/ExecutiveSummary%20GW%20final.pdf.

clearly demonstrate that the contamination is the result of recent leaking, and not "historical" releases.[117]

Yet, Entergy has not provided any information on the feasibility of examining the remainder of the pool liner, or explained any other steps it will take to find any and all sources of leaks from IP2. In fact, Entergy has made no commitment whatsoever for augmented inspection of the spent fuel pool liners during the period of extended operation, and instead is relying on the one-time inspection of the accessible portion of the liner and groundwater testing.[118] The NRC Staff has expressed concern in its recent Safety Evaluation Report about the lack of a system at IP2 to monitor, detect and quantify potential leakage through the spent fuel pool liner, and stated that it is uncertain that the leakage problems have been permanently corrected.[119] Yet, despite these concerns, the DSEIS is devoid of discussion on the questionable status of the leaking.[120] Riverkeeper does not understand how the NRC Staff can accurately assess the environmental impacts of ongoing leaking during the 20-year extended licensing term without addressing the root of the problem.

Secondly, the NRC Staff's analysis is deficient since it relies solely on the finding that radiological doses to humans from consumption of aquatic foods, the only current exposure pathway, is within regulatory limits.[121] The NRC Staff maintains that the spent fuel pool leaks, "while new information, are within the NRC's radiation safety standards . . . and are not considered to have a significant impact on plant workers, the public, or the environment.[122] However, the NRC Staff is continuing to improperly hide behind section 4.6 of GEIS, which analyzes radiological impacts based only on dosage limits.[123] However, the GEIS only addresses radiological impacts to man from *routine operations and releases*, and does not contemplate unplanned, unmonitored releases from leaking plant systems into the environment. As such, mere calculation of dose limits is not sufficient for assessing the "significance" of the impacts of the spent fuel pool leaks.[124]

Rather, NEPA requires a broader evaluation of environmental impacts beyond mere public health concerns.[125] The CEQ regulation defining "significantly," requires consideration of the context of the action and intensity or severity of the impacts.[126] Accordingly, in order to accurately evaluate the significance of the spent fuel pool leaking, the NRC Staff's must fully assess the impacts to the natural environment of the Hudson River. However, by relying on

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[117] *See* Riverkeeper Scoping Comments at 13-14; Riverkeeper Petition for Hearing at 74, 81-82.
[118] U.S. Nuclear Regulatory Commission, Safety Evaluation Report With Open Items Related to the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3, Docket Nos. 50-247 and 50-286 (January 2009), at 3-123 ("SER").
[119] SER at 3-123.
[120] DSEIS, Main Report § 2.2.7, at 2-107 to 2-108, § 4.3, § 4.5, § 4.7.
[121] DSEIS, Main Report § 2.2.7, at 2-107 to 2-108; § 4.3, § 4.5, § 4.7. In addition to incorrectly relying on dose limits as a sole measurement of the impacts from the leaks, the NRC Staff's assessment of dose limits itself is fundamentally flawed since it does not take into consideration a proposed desalination plant right that is likely to result in a direct drinking water pathway. *See infra* for in-depth discussion.
[122] DSEIS, Main Report §§ 4.3, 4.5, 4.7.
[123] *Id.* §§ 2.2.7, 4.3, 4.5, 4.7.
[124] 10 C.F.R. § 51.53(c)(3)(iv); *See* 40 C.F.R. § 1508.27.
[125] *See Marsh v. Oregon Natural Resources Counsel*, 490 U.S. 360, 374 (1989).
[126] *See* 40 C.F.R. § 1508.27 (requiring analysis of ten different factors).

human dose standards, the NRC Staff completely foregoes *any* analysis of the impacts of the contamination to the Hudson River ecosystem.[127] In particular, the DSEIS fails to determine if toxic radionuclides such as strontium-90 or cesium-137 are bioaccumulating in the environment; there is no analysis of the contamination to Hudson River fish or shellfish despite sampling showing elevated levels of such radionuclides in fish;[128] there is no assessment of the effects of the contamination to the nearby ecologically critical area of Haverstraw Bay;[129] and there is no assessment of the potential effects of the leaking on the Hudson River's federally listed endangered species, such as the short-nosed sturgeon.[130]

There is also no evaluation of the cumulative long-term effects of the contaminated groundwater plumes. The NRC Staff cites Entergy's removal of spent fuel from the IP1 pool as evidence that impacts from the contamination would be minimized.[131] However, the extensive leaking from the Unit 1 pool, which contained strontium-90, one of the most toxic radionuclides, is still in the groundwater and will continue to slowly leach into the Hudson River.[132] Simply because this source of the leaking has now stopped does not change the fact that there has been no assessment of the environmental impacts of this contamination. Moreover, current and future accidental radioactive releases from the plant will only add to the existing plumes. For example, a recent underground pipe leak at the facility resulted in over 100,000 gallons of tritiated water being released directly into the plant's discharge canal, and the Hudson River.[133] The NRC Staff must sufficiently evaluate the cumulative environmental impacts of the contamination that has occurred. Likewise, any claims that the leaking has ceased from the pools altogether, which is dubious as explained above, similarly does not change the fact that there has been no analysis of the environmental impacts of the contamination to date.

Section 4.5 of the DSEIS ostensibly analyzes the environmental impacts of operation on "Groundwater Use and *Quality*."[134] It is ludicrous to think that the NRC Staff could come to a conclusion on the *quality* of groundwater by only looking at public health impacts. And yet, the end conclusion in the DSEIS explicitly states that leaks do not have a significant impact on "plant workers, the public, *or the environment*,"[135] despite absolutely no inquiry into how the leaks are affecting the natural ecosystems surrounding Indian Point.

Furthermore, by only looking at whether public health doses were within regulatory standards, the NRC Staff has failed to accurately assess the degree of the contamination caused by the spent fuel pool leaks. There is no dispute that there are at least two extensive groundwater plumes

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[127] *See* Riverkeeper Scoping Comments at 12, 14-15; Riverkeeper Petition for Hearing at 75, 84-86.
[128] *See* Riverkeeper Scoping Comments at 14; Riverkeeper Petition for Hearing at 75, 84-86.
[129] *See* Riverkeeper Scoping Comments at 14-15; Riverkeeper Petition for Hearing at 75, 84-86.
[130] *See also discussion infra*.
[131] DSEIS, Main Report § 4.3, at 4-36.
[132] In the months leading up to the completion of draining of the IP1 pool, Entergy reported it was leaking around 70 gallons per day, contributing thousands and thousands of additional gallons of polluted water into the groundwater and eventually the Hudson River. It is not clear that this additional leakage was factored into Entergy's conclusions in its Environmental Report or subsequent Investigation Report, and accordingly, it is not clear that the NRC Staff considered this either. It is, thus, apparent, that the NRC Staff has utterly failed to analyze the leaks that have occurred from IP1.
[133] *See* Annie Correal, *Indian Pt. Broken Pipe Spurs Safety Worries*, THE NEW YORK TIMES (Feb. 27, 2009).
[134] DSEIS, Main Report § 4.5 (emphasis added).
[135] *Id.* §§ 4.3, 4.5, 4.7 (emphasis added).

underlying the Indian Point site.[136] GZA GeoEnvironmental, the hydrogeological engineering firm hired by Entergy to examine the Indian Point site, had identified radionuclide contaminated plumes at depths ranging from 80 feet (below Indian Point 2) to 160 feet (near the Hudson River bank) for tritium, and from 120 feet (below Indian Point 1) to 150 feet (near the Hudson River bank) for strontium-90.[137] The geology under the Indian Point site is characterized by fractured bedrock, in particular Inwood Marble.[138] Strontium is chemically similar to calcium and prone to substitution for calcium in carbonate minerals such as marble.

A review of recent sampling results shows that the level of contamination is well in excess of EPA drinking water levels.[139] The DSEIS emphasizes the NRC Staff's investigation finding that there is currently no drinking water exposure pathway to humans.[140] As discussed at length below, this is flawed since a proposed desalination plant right across the river from Indian Point is likely to result in drinking water pathway. In any event, EPA maximum contaminant levels are a recognized, highly-conservative benchmark for comparison purposes, to assess the degree of contamination.[141] As Riverkeeper consistently points out, the NRC Staff routinely uses this method of measurement to analyze spent fuel pool leaks. Using drinking water standards is a perfect way to assess the "significance" of the leaking under NEPA, and the fact that the water at Indian Point is not used for drinking water right now is of no moment.[142] Instead, by relying solely on radiation dose calculations, the NRC Staff has failed to acknowledge the severity of the contamination.

With such glaring gaps in the NRC Staff's analysis, how can the NRC Staff possibly come to an accurate conclusion as to the "significance" of the spent fuel pool leaking? If they had taken into account that which NEPA requires, the NRC Staff should have found that the leaking is indeed "significant." The NRC Staff's opposite conclusion is entirely unwarranted, unfounded, and wrong.[143] Likewise, the NRC Staff's conclusion that "additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted" is based on a wholly incomplete analysis.[144] Thus, the NRC Staff should consider appropriate mitigation measures in light of the concerns raised herein, including, but not limited to, requiring Entergy to move more spent fuel to dry casks.[145]

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[136] *See* Riverkeeper Petition for Hearing at 82 (referencing E-mail from James Noggle, NRC, to Timothy Rice and Larry Rosenmann of the NYS DEC (Nov. 6, 2006); Groundwater Investigation Executive Summary (Indian Point Energy Center, Buchanan, N.Y., Jan. 2008), at 2-4, *available at* http://jic.semo.state.ny.us/Resources/ExecutiveSummary%20GW%20final.pdf.

[137] *See* January 7, 2008 GZA GeoEnvironmental Inc., *Hydrogeologic Site Investigation Report*, Figure 9.1 - Unit 2 Tritium Plume, Cross Section A - A', *available at* NRC ADAMS Accession No. ML0800320055; *id.* at Figure 9.2 - Unit 1 Strontium Plume, Cross Section B - B', *available at* NRC ADAMS Accession No. ML0800320056.

[138] January 7, 2008 GZA GeoEnvironmental Inc., *Hydrogeologic Site Investigation Report* at 50. The GZA report is available at NRC ADAMS Accession No. ML080320540.

[139] *See* Riverkeeper Petition for Hearing at 82-84.

[140] DSEIS, Main Report § 2.2.7, at 1-108.

[141] *See* Riverkeeper Petition for Hearing at 82-84.

[142] *See* 40 C.F.R. § 1508.27; 10 C.F.R. § 51.53(c)(3)(iv).

[143] DSEIS, Main Report § 4.3, 4.5, 4.7.

[144] *Id.* § 4.3, at 4-35.

[145] Riverkeeper Scoping Comments at 15.

The NRC Staff has the ultimate responsibility for performing the required NEPA evaluation in relicensing proceedings.[146] Since Entergy's ER was wholly deficient in regards to analyzing the impacts of the spent fuel pool leaking, it is incumbent upon the NRC Staff to pick up the slack. As such, the NRC Staff must take into account the foregoing concerns, perform the necessary analyses and assessments as indicated, and incorporate their findings into the FSEIS.[147]

4. Failure to Consider the Rockland County Desalination Project

The NRC Staff's assessment of the spent fuel pool leaks in Section 4.0 of the DSEIS is premised upon the assumption that "no drinking water exposure pathway exists"[148] and that the "only noteworthy dose pathway resulting from contaminated ground water migration to the river is through the consumption of fish and invertebrates from the Hudson River."[149] However, the facts concerning United Water New York's proposed desalination plant in Rockland County, indicate a highly foreseeable outcome to the contrary, and, as such, must be considered and incorporated into the review process in all relevant contexts and document sections.

This desalination project, which will withdraw Hudson River water, to be sited across the river and slightly downstream from Indian Point,[150] and deliver 7.5 million gallons per day of drinking water, is currently undergoing review by the NYSDEC,[151] as well as other agencies, concerning various permit applications and SEQRA. United Water New York has stated that this project is in development pursuant to the Public Service Commission Order of December 2006 ("PSC Order"), which approved a merger and rate plan, and provided for an increase in the drinking water supply to Rockland County residents.[152] According to United Water New York, as required by the PSC Order, the scheduled in-service, operational completion date for the project is 2015.[153] Plans for a pilot plant, which has been designed to evaluate water treatment methodologies for the permanent plant, are now also in the application and permitting process

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[146] *See Exelon Generation Co., LLC* (Early Site Permit for Clinton ESP Site), ASLBP No. 04-821-01-ESP, 2005 N.R.C. LEXIS 61, *5-6 (2005); 42 U.S.C. § 4332.

[147] The NRC Staff has consistently refuted the necessity of assessing the environmental impacts of the spent fuel pool leaks in the manner Riverkeeper describes, including the need to consider leaks from IP1, the effects on the Hudson River ecosystem, or the need to use any other standards aside from NRC dose limits. However, Riverkeeper's contention relating to the leaks has been admitted for a hearing, and is currently being litigated. In light of the fact that these issues are in dispute, the NRC Staff should err on the side of caution in the preparation of its FSEIS and address the concerns presented herein.

[148] *See e.g.*, DSEIS, Main Report § 2.2.7 at 2-107.

[149] *Id.*

[150] The Intake Site consists of a one-acre portion of one tax parcel in the Town of Haverstraw, 21.09-2-1, located at 710 Beach Road. As shown in Figure 2-2, annexed hereto as Exhibit C, the Intake Site is on the south side of Beach Road on a point of land that extends into the Hudson River. The Intake Site is bounded to the north by the road and to the east by the Hudson River; *see also* Google Map showing rough proximity of Indian Point to proposed desalination plant, annexed hereto as Exhibit D.

[151] *See, e.g.*, Letter from William C. Janeway (DEC Regional Director) to Rebecca Troutman (Riverkeeper), March 9, 2009, annexed to Riverkeeper's comments as Exhibit E (Confirming DEC's lead agency status for the desalination plant project).

[152] Commission Order in Case No. 06-W-0131, Issued and Effective December 14, 2006 by the New York State Department of Public Service.

[153] Haverstraw Water Supply Project, Draft Environmental Impact Statement, September 26, 2008, at S-1. Please note that this document is currently in revision pursuant to direction from the DEC. Available at http://hudsondesal.com/home.cfm, and last viewed on March 11, 2009.

with DEC. Moreover, a Draft Environmental Impact Statement ("Desalination DEIS") on the project has already been submitted by United Water New York.[154]

Pursuant to NEPA, the NRC Staff is required to assess the impacts associated with the desalination plant in the DSEIS: An environmental impact statement must include discussion of any indirect effects of the proposed project and their significance.[155] "Indirect effects" are defined as those

> which are caused by the action and are later in time or farther removed in distance, but are still *reasonably foreseeable*. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in these regulations are synonymous.[156]

Thus, an EIS must consider impacts which are "reasonably foreseeable."[157] There is no doubt that effects on Rockland County's drinking water supply due to radioactive contamination from Indian Point are "reasonably foreseeable." Due to the fact that the Hudson River flows south from IP towards the planned, closely situated intake site of the desalination plant, it is more than "reasonably foreseeable" that any current water-borne contamination, as well as potential additional contamination due to continued deterioration of plant systems, accident or terrorist event, will impact the water supply provided via the desalination plant, and in turn public health. Similarly, Entergy's own environmental documents admit that the topography of Indian Point is such that "surface drainage is toward the Hudson River."[158]

Neither Entergy nor the NRC Staff dispute that the leaking spent fuel pools have resulted in the leaching into the Hudson River of two extensive plumes of radionuclide-laden contamination.[159] Monitoring well samples at Indian Point show that the levels of contamination in the groundwater are well above EPA drinking water limits.[160] In addition to the ongoing spent fuel pool leaking, other future accidental discharges from the plant will also contribute contamination

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[154] Available at http://hudsondesal.com/home.cfm, and last viewed on March 11, 2009.
[155] 40 C.F.R. § 1502.16.
[156] 40 C.F.R. § 1508.8(b)
[157] *See* C.E.Q., Memorandum, 40 Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 12086, 18031 (March 23, 1982) ("The EIS must identify all the indirect effects that are known, and make a good faith effort to explain the effects that are not known but are 'reasonably foreseeable.' . . . The agency has the responsibility to make an informed judgment, and to estimate future impacts on that basis, especially if trends are ascertainable. . . .The agency cannot ignore these uncertain, but probable, effects of its decisions." *See also, Swain v. Brinegar*, 542 F.2d 364, 7th Cir. 1976 ("An EIS need not review all possible environmental effects of a project. It is sufficient if it considers only those which are 'reasonably foreseeable.'"; *Carolina Environmental Study Group v. U.S.*, 510 F.2d 796, 798 DC Cir. 1975 ("Section 102(2)(C)(i) of NEPA requires a 'detailed statement' on 'the environmental impact of the proposed action.' That language requires description of reasonably foreseeable effects. A 'rule of reason' is used to ascertain those effects anticipated.").
[158] Entergy ER at 2-18.
[159] *See* Groundwater Investigation Executive Summary (Indian Point Energy Center, Buchanan, N.Y., Jan. 2008), at 2, *available at* http://jic.semo.state.ny.us/Resources/ExecutiveSummary%20GW%20final.pdf.
[160] *See* Riverkeeper Petition for Hearing at 82-83.

to the Hudson River. For example, a recent underground pipe leak at the facility resulted in over 100,000 gallons of tritiated water being released directly into the waterway.[161]

Moreover, and ominously, the Desalination DEIS *specifically considers* the presence of Indian Point and the impacts of its contaminants to the water quality:

> Due to the presence of the Indian Point nuclear power plant on the eastern shore of the Hudson River in Buchanan, NY, some have expressed concern regarding the possible radiological contamination of groundwater as well as the Hudson River close to the plant. A summary of the radiological results from United Water's sampling program is provided below. Table 2-4 summarizes the analyses performed for radionuclides in water samples collected at several locations in the Hudson River in 2007 and 2008.[162]

The Desalination DEIS states that preliminary testing showed that the water withdrawn in the vicinity of the intended site contains detectable levels of the radionuclides radium, uranium, strontium-90, and tritium.[163]

The proposed desalination plant is not merely speculative at this point given the fact that it is in the planning, environmental review, and permitting stages. It is, thus, "reasonably foreseeable," as contemplated by the regulations implementing NEPA, that impacts to drinking water quality will result due to the radiological contamination from Indian Point. The presence of an environmental impact statement for the Rockland County Desalination Project renders the foreseeability of these impacts irrefutable. Indeed, the NRC Staff does not have to rely on prognostication to consider the impacts of IP on the proposed desalination plant because there is currently ample available information for the agency to rely on. Thus, NRC Staff is required to assess the effects of Indian Point on the Rockland County desalination project.

Yet, despite the foreseeable nature of this project, the DSEIS is completely devoid of assessment of the impacts of the license renewal on drinking water quality as it relates to the use of the Hudson River as a source of drinking water via the proposed desalination plant. The NRC Staff's current analysis of radiological impacts is premised upon a hypothetical "maximally exposed individual" which does not include consumption of drinking water via the desalination plant as an exposure pathway.[164] While the NRC Staff cites to past radiological sampling data to demonstrate no detectable radiological effects on drinking water,[165] there is no mention whatsoever of what kinds of radiological effects on drinking water supply will result from having a facility in close proximity and downstream from Indian Point, withdrawing water for human consumption. Moreover, the NRC Staff's evaluation of the groundwater contamination from

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[161] *See* Annie Correal, *Indian Pt. Broken Pipe Spurs Safety Worries*, THE NEW YORK TIMES (Feb. 27, 2009).
[162] Haverstraw Water Supply Project, Draft Environmental Impact Statement, September 26, 2008, at 2 – 9. Please note that this document is currently in revision pursuant to direction from the DEC.
[163] *Id.*
[164] *See* DSEIS, Main Report §§ 2.2.7, 4.3.
[165] *See id.* § 2.2.7 at 2-104, 2-105.

spent fuel pool leaks hinges on its finding that the only exposure pathway is through consumption of aquatic organisms.[166]

Thus, the DSEIS is substantially incomplete, and must be corrected prior to the conclusion of the environmental review process. The NRC Staff must comprehensively review and consider the impacts of radiological releases from the Indian Point facility, both through normal operations and from unplanned discharges, on drinking water quality in light of the Rockland County Desalination Project.

5. Failure to Properly Consider Impacts to the Communities Utilizing Hudson River Water as a Water Supply Source

Additionally, although the DSEIS acknowledges that "the Hudson River was and is used as a source of potable water,"[167] the NRC Staff fails to properly identify and evaluate potential adverse impacts to the communities which draw Hudson River water for their water needs. The DSEIS asserts that it includes "drinking water" in its evaluation of "airborne pathway," but omits this critical issue in the reference to "waterborne pathway."[168] Further, in the subsequent discussion of data from the "2006 REMP Results," the DSEIS simply refers to results of the "monthly drinking water samples" without identifying which sources (presumably those with potential airborne exposure only) were examined.[169]

Communities which use the Hudson River for their water supply needs, and are therefore vulnerable to waterborne exposure to contaminants, include, but are not limited to, the City of Poughkeepsie, the Town and Village of Rhinebeck, and New York City, which operates the emergency Chelsea pump station at New Hamburg. Due to the fact that the Hudson River is a tidal estuary (the water flows up and downstream), and dispersion and diffusion of contaminants occurs with their release into the waterway,[170] radionuclides can be transported upriver as well as downriver. Accordingly, the potential adverse impacts caused by the operation of Indian Point, under normal operation, with leaks, other accident or disaster, pertaining to the current use of the Hudson river as a source of water, must be fully assessed.

6. Improper Conclusions Regarding Cumulative Environmental Impacts of Operation

a. Cumulative Impacts on Aquatic Resources

In assessing the current and likely future stressors that contribute to cumulative impacts of aquatic resources of the Hudson River, the NRC Staff concedes that the continued operation of IP2 and IP3 has the potential to adversely affect a variety of RIS species due to the once-through

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[166] *See id.* § 2.2.7 at 1-108.
[167] *Id.* § 2.2.5.2, at 2-40.
[168] *Id.* §2.2.7 at 2-104.
[169] *Id.* §2.2.7 at 2-105.
[170] *See e.g.,* Ho, D.T., P. Schlosser, & T. Caplow, Determination of longitudinal dispersion coefficient and net advection in the tidal Hudson River with a large-scale, high resolution SF6 tracer release experiment, Environ. Sci. Technol., 36, 3234-3241, 2002.; Ferdi L. Hellweger, Alan F. Blumberg, Peter Schlosser, David T. Ho, Theodore Caplow, Upmanu Lall, & Honghai Li, *Transport in the Hudson Estuary: A Modeling Study of Estuarine Circulation and Tidal Trapping,* Estuaries Vol. 27, No.3 pp.527-538 (June 2004).

cooling system.[171] (Interestingly, the staff's examination of cumulative impacts to water and sediment quality of the Hudson River does not even mention the radioactive contamination caused by spent fuel pool leaks at Indian Point[172]). When all the various factors, including the operation of Indian Point, were considered, the NRC Staff found that the overall effects on aquatic resources was "large."[173] In Pisces' expert opinion, "the Indian Point power plant must take its share of the responsibility and undertake to do as little damage a possible to an already stressed system."[174]

b. Cumulative Radiological Impacts

The NRC Staff concludes in Section 4.8.2 of the DSEIS that the cumulative radiological impacts are "SMALL."[175] However, in light of the issues raised above regarding the NRC Staff's flawed assessment of spent fuel pool leaks, and the failure to consider the Rockland County Desalination Project or other drinking water supplies, this conclusion is dubious. A more thorough analysis that fully addresses the above-referenced concerns must be completed before the NRC Staff can come to an accurate conclusion as to cumulative radiological impacts of continued operation of IP2 and IP3.

DSEIS Section 5.0

Improper Analysis of Severe Accident Mitigation Alternatives

The assessment of Severe Accident Mitigation Alternatives ("SAMAs") in Section 5.2 of the DSEIS is wholly deficient because the NRC Staff incorrectly relied upon the assessment of SAMAs in Entergy's ER.[176] Specifically, the NRC Staff found that Entergy's methodology and analyses were completely sound.[177] Unfortunately, the NRC Staff has ignored several fundamental flaws in the methods employed by Entergy, which, if considered, would greatly change the outcome of the SAMA analysis.

1. Failure to Consider the Risk of Intentional Acts of Sabotage

The NRC Staff's SAMA assessment is utterly flawed because it fails to consider the risks posed by terrorist attacks on Indian Point. Riverkeeper recognizes that the NRC refuses to consider the environmental impacts of intentional attacks in a licensing proceeding. In the instant proceeding, the NRC Staff has explicitly said that the "issue of security and risk from malevolent acts at nuclear power plants is beyond the scope of license renewal . . . the Commission's long-standing position is that NEPA does not require inquiry into the consequences of a hypothetical terrorist attack."[178] It is Riverkeeper's unwavering position that this refusal is simply unreasonable.

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[171] DSEIS, Main Report § 4.8.1, at 4-56.
[172] *Id.* § 4.8.1, at 4-57.
[173] *Id.* § 4.8.1, at 4-58; Pisces Report at 10.
[174] Pisces Report at 10.
[175] DSEIS, Main Report § 4.8.3, at 4-60.
[176] *Id.* § 5.2.
[177] *Id.* § 5.2, at 5-6 to 5-10.
[178] NRC Staff Scoping Summary Report at 279-80.

Numerous reports indicate that nuclear power plants remain likely targets of terrorist attacks. The 9/11 Commission Report revealed that the mastermind of the 9/11 attacks had originally planned to hijack additional aircrafts to crash into targets, including nuclear power plants, but wrongly believed the plants were heavily defended.[179] This report indicates that the terrorists were considering attacking a specific nuclear facility in New York which one of the pilots had seen during a familiarization flight near New York.[180] This was likely Indian Point, especially given the fact that more than 17 million people live within 50 miles of the facility.[181] In the years since the 9/11 attacks, the federal government, including the NRC, has repeatedly recognized that there is a credible threat of intentional attacks on nuclear power plants.[182] Notably, existing nuclear power plants in the United States were built between the 1950s and the 1980s and were not intended to be able to withstand the impact of aircraft crashes or explosive forces.[183] Thus, given the current landscape, it is, essential that the risks of intentional attacks be considered during the relicensing process.

The U.S. Court of Appeals for the Ninth Circuit has specifically found that the NRC's consistent refusal to consider the risks of terrorism is unreasonable,[184] although, misguidedly, the NRC has explicitly chosen to limit the applicability of that judicial opinion.[185] The U.S. Environmental Protection Agency also specifically requested the NRC Staff to address the impacts of intentional attacks in the Indian Point license renewal EIS, to no avail.[186]

The Commission's rationale for precluding this important issue from review during the relicensing process is very weak. For example, the Commission has concluded that the benefits of considering the environmental impacts of attacks during a license renewal term would be marginal because those impacts are addressed in the current license term.[187] This reasoning is not supportable since the level of defense required under NRC's Atomic Energy Act-based

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[179] Nat'l Comm'n on Terrorist Attacks Upon the U.S., *The 9/11 Commission Report* (2004), at 154 ("9/11 Commission Report").
[180] *Id.* at 245.
[181] *See* Edwin Lyman, *Chernobyl on the Hudson? The Health & Economic Impacts of a Terrorist Attack at the Indian Point Nuclear Power Plant*, at 23 (2004), *available at*, http://www.riverkeeper.org/document.php/651/11302007_EL_Lym.pdf.
[182] *See, e.g.*,; *Wide-Ranging New Terror Alerts*, CBS News.com (May 26, 2002), *available at*, http://cbsnews.com/stories/2002/05/24/attack/main510054.shtml (discussing heightened alert of the U.S.'s nuclear power plants as a result of information gained by the intelligence community); *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 (discussing FBI warning to nuclear plant operators to remain vigilant about suspicious activity that could signal a potential terrorist attack); General Accounting Office, *Nuclear Regulatory Commission: Oversight of Security at Commercial Nuclear Power Plants Needs to be Strengthened*, GAO-03-752 (2003) (noting that U.S. nuclear power plants are possible terrorist target, and criticizing the NRC's oversight of plant security); *FBI's 4th Warning*, CBS News.com (July 2, 2004) (discussing FBI warning of recent intelligence showing Al-Qaeda interest in attacking nuclear plants).
[183] *In re All Nuclear Power Reactor Licensees*, DD-02-04 (Nov. 1, 2002), *available at* http://www.nrc.gov/reading-rm/doc-collections/petitions-2-206/directors-decision/2002/ml022890031.pdf; *NRC: Nuclear Power Plants Not Protected Against Air Crashes*, Associated Press (Mar. 28, 2002).
[184] *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir 2006).
[185] *Amergen Energy Co., L.L.C.* (Oyster Creek Nuclear Generating Station), CLI-07-08, 65 N.R.C. 124 (2007).
[186] Letter from Grace Musumeci, U.S. EPA, to Chief, NRC Rules and Directives Branch (Oct. 10, 2007) (ADAMS Accession No. ML07290360).
[187] *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-26, 56 N.R.C. 358, 365 (2002).

security regulations is lighter than the fundamental design changes that may warrant consideration under NEPA if they are cost-effective.[188] Moreover, this reasoning is inconsistent with NEPA, which imposes mandatory obligations on the NRC in considering proposals for re-licensing of nuclear plants.[189]

The Commission also rationalizes its decision to preclude risk assessment of terrorist attacks by arguing that it had already assessed the impacts of intentional attacks in the 1996 GEIS.[190] The GEIS contains the conclusion that:

> Although the threat of sabotage events cannot be accurately quantified, the commission believes that acts of sabotage are not reasonably expected. Nonetheless, if such events were to occur, the commission would expect that resultant core damage and radiological releases would be no worse than those expected from internally initiated events.[191]

In the DSEIS, the NRC Staff relies upon the conclusions in the GEIS to rationalize its exclusion of risks associated with terrorism.[192] Unfortunately, the conclusions in the GEIS been outdated by the significant change in the Commission's analysis of the potential for intentional attacks

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[188] Gordon Thompson, Risk-Related Impacts from Continued Operation of the Indian Point Nuclear Power Plants (Nov. 28, 2007), at §§ 7, 9, *available at*, http://www.riverkeeper.org/document.php/652/11302007_GT_Tho.pdf ("Thompson Report").

[189] The NRC recognized as much in a 2001 decision denying a petition for rulemaking by the Nuclear Energy Institute ("NEI") that would have eliminated the requirement to consider SAMAs, *Nuclear Energy Institute; Denial of Petition for Rulemaking,* 66 Fed. Reg. 10,834 (February 20, 2001). In response to a comment that "the costs of performing the SAMA reviews required by Part 51 are not justified when compared to the small potential safety benefits that result from the reviews," the Commission stated: "The NRC believes that it should continue to consider SAMAs for individual license renewal applications to continue to meet its responsibilities under NEPA. *That statute requires NRC to analyze the environmental impacts of its actions and consider those impacts in its decisionmaking.* In doing so, Section 102(2)(C) of NEPA implicitly requires agencies to consider measures to mitigate those impacts when preparing an impact statement. *See Robertson v. Methow Valley Citizens Council,* 490 U.S. 332 (1989). *NRC's obligation to consider mitigation exists whether mitigation is ultimately found to be cost-beneficial and whether or not mitigation ultimately will be implemented by the licensee.*" 66 Fed. Reg. at 10,836 (emphasis added). The Commission also provided a detailed rebuttal to NEI's argument that license renewal was a mere "continuation" of the current operating term and therefore should not trigger NEPA obligations: ". . . [T]o the extent that license renewal involves a continuation of impacts already experienced at the site under the current operating license, the arguments made by the petitioner would appear to call for the elimination of almost the entire environmental review of impacts from operation during the license renewal term, a position clearly at odds with the Commission's approach to the matter and also, as discussed below, inconsistent with the case law related to relicensing." 66 Fed. Reg. at 10,836-37. The Commission found that that none of the cases under NEPA excusing agencies from considering certain environmental impacts supported petitioner's argument that the NRC can ignore the impacts of its actions in the context of a license renewal. *Id.* The Commission cited to a case which squarely addressed the issue and concluded that there is a need to consider environmental impacts in the context of a relicensing. *Id.* (citing *Confederated Tribes and Bands of the Yakima Indian Nation v. Federal Energy Regulatory Commission,* 746 F.2d 466 (9th Cir. 1984). Thus, the Commission's position in *Duke Energy* is inconsistent with both NEPA and the Commission's previous interpretation of NEPA.

[190] *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-26, 56 N.R.C. 358, 365 n.24 (2002).

[191] GEIS at 5-18.

[192] DSEIS, Main Report § 5.1.2, at 5-3.

that has occurred since September 11, 2001.[193] It also totally overlooks the fact that mitigation measures to avoid conventional accidents may be different than those designed to avoid effects of intentional attack. The findings in the GEIS also do not take into account the fact that radiological consequences of a spent fuel pool fire are significantly different from the consequences of a core damage accident,[194] and that mitigation measures for a spent fuel pool fire would be quite different from mitigation measures for a severe core-damage accident.[195]

Moreover, in a recent denial of a petition for rulemaking, which sought reconsideration and revocation of the Category 1 designation of spent fuel pool fires, the Commission explained that it considered the probability of a successful terrorist attack to be low because licensees have implemented mitigative measures believed to lower the likelihood that fuel will ignite if the pool is attacked:

> As previously described, the NRC has required, and nuclear power plant licensees have implemented, various security and mitigation measures that, along with the robust nature of SFPs, make the probability of a successful terrorist attack (i.e., one that causes an SFP zirconium fire, which results in the release of a large amount of radioactive material into the environment) very low. As such, a successful terrorist attack is within the category of remote and speculative matters for NEPA considerations; it is not 'reasonably foreseeable.' Thus, on this basis, the NRC finds that the environmental impacts of renewing a nuclear power plant license, in regard to a terrorist attack on a SFP, are not significant.[196]

In fact, in July 2007, the NRC amended IP3's operating license to require the licensee to address large fires and explosions including those caused by planes.[197]

However, such mitigation measures contemplated by the NRC to acceptably reduce the likelihood of a successful attack on a spent fuel pool were never considered in the GEIS or in any other subsequent NEPA document.[198] This starkly demonstrates that the GEIS does not validly deal with impacts related to terrorism, and the need to assess such impacts comprehensively under NEPA as part of the license renewal process is apparent.

Despite the foregoing, the NRC Staff refused to consider the risk of intentional attacks in its SAMA assessment in the DSEIS. Accordingly, the NRC Staff's SAMA analysis is patently deficient. The Indian Point reactors and spent fuel pools are vulnerable to a range of attack scenarios for which conventional probabilistic risk assessment ("PRA") techniques can be

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[193] *See San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir 2006) ("We find it difficult to reconcile the Commission's conclusion that, as a matter of law, the possibility of a terrorist attack is 'remote and speculative,' with its stated efforts to undertake a 'top to bottom' security review against this same threat.").
[194] Thompson Report at 9 n.9
[195] *Id.* at 52.
[196] Denial of Petition for Rulemaking, 73 Fed. Reg. at 46,211 (2008).
[197] Indian Point Unit 3 Operating License, DPR-64, Condition AC, Mitigation Strategy License Condition (July 11, 2007), ML052720273, at 8.
[198] Denial of Petition for Rulemaking, 73 Fed. Reg. at 46,211 (2008).

adapted by postulating an initiating event (malicious act) and then examining the outcomes of that event.[199] This has not been done.

Moreover, in the first step of Entergy's analysis (which the NRC accepts as sound), i.e., establishing the baseline of severe accidents, Entergy, and the NRC Staff in turn, did not consider the contribution to severe accident costs made by such intentional attacks at Indian Point.[200] The present value of cost risks for an attack at an Indian Point Reactor and its pool exceeds half a billion dollars, warranting significant expenditures on SAMAs.[201] The present value of cost risks for an attack on a reactor alone are also significant -- $62 million to $73 million.[202] Relevant SAMAs with a value of this magnitude have not been considered. Additionally, Entergy's original assessment, which the NRC Staff claims is sound, fails to address National Infrastructure Protection Plan principles for increasing the inherent robustness of infrastructure facilities against attack, which could significantly reduce the radiological and regulatory risk-related impacts of continued operation of the IP2 and IP3 plants.[203]

Based on the foregoing it is clear safety risks due to intentional attacks and accident mitigation alternatives have not been adequately addressed in the DSEIS.[204] The NRC Staff must factor such risks into its SAMA analysis prior to the end of the environmental review process.

2. Failure to Consider the Risk of Spent Fuel Pool Fires

The SAMA analysis in the DSEIS does not adequately take into account the risk of spent fuel pool fires. Riverkeeper is aware that the NRC classifies the environmental impacts of pool accidents and related SAMAs as "Category 1" issues that are not subject to consideration in individual license renewal proceedings absent a waiver or change in the regulations.[205] However "new and significant" information about the risk of spent fuel pool fires warrants comprehensive review in the instant relicensing proceeding.

While initially, it was assumed that stored spent fuel generally did not pose significant risks, with the introduction of high-density, closed-form storage racks into spent fuel pools beginning in the 1970s, this understanding is no longer valid.[206] The closed-form configuration of the high density racks can create a major problem if water is lost from a spent fuel pool, including disastrous pool fires.[207] In fact, studies conducted after the issuance of the 1996 License Renewal GEIS contradict previous studies that had asserted that complete drainage of spent fuel pools was the most severe case and that aged fuel would not burn.[208] These later studies establish that if the water level in a fuel storage pool dropped to the point where the tops of the

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[199] Thompson Report at 42-45.
[200] DSEIS, Main Report § 5.2; Entergy's ER at § 4.21.
[201] *See* Thompson Report at 45-46, Table 7-7, Section 9.
[202] *Id.* at 49.
[203] *See id.* at 58-59.
[204] *See generally id.* §§ 7, 9.
[205] *Florida Power and Light*, 54 N.R.C. at 12.
[206] Thompson Report at 18-27.
[207] *Id.*
[208] *See* Waste Confidence Rule, 55 Fed. Reg. 38,474, 38,481 (Sept. 18, 1990).

fuel assemblies are uncovered, the fuel would burn regardless of its age, and resulting fires can be catastrophic.[209]

In light of this "new information," the States of Massachusetts and California recently petitioned the NRC for a rulemaking seeking reconsideration and revocation of the Category 1 designation of spent fuel pool fires.[210] The Commission issued a decision in early 2008, finding that the petitioning states had not presented "new and significant" information so as to warrant supplementation of the GEIS.[211] However, in its decision, the Commission made no attempt to defend the continuing technical validity of the studies cited in the GEIS, and in fact confirmed the conclusions of NUREG-1738 that partial drainage of a spent fuel pool is a more serious condition than complete drainage, that aged fuel can burn, and that spent fuel fires will propagate.[212]

Further the Commission discussed various mitigation measures that have been implemented by nuclear power plant licensees, asserting that such measures rendered the environmental impacts of high-density pool storage of spent fuel insignificant.[213] For example, in response to the evidence that partial draindown is a more severe situation than total draindown, the Commission discussed the fact that

> all nuclear plant SFPs have been assessed to identify additional existing cooling capability and to provide new supplemental cooling capability which could be used during such rare events. This supplemental cooling capability specifically addresses the cooling needs during partial draindown events, and would reduce the probability of a zirconium fire during those extreme events.[214]

The Commission also described other mitigation measures that have been imposed on all nuclear power plant licensees, including an "internal strategy" which implements a spent fuel pool "makeup system that can supply the required amount of makeup water and SFP spray to remove decay heat," and an "external strategy" in which an independently powered, portable SFP coolant makeup would be used to mitigate a range of scenarios that could reduce pool water levels.[215] The Commission further described "leakage control strategies" that would be considered in cases where SFP water levels can not be maintained, as well as development of timelines for dispersed and non-dispersed spent fuel storage.[216] The Commission cited to license amendments incorporating such strategies into plant licensing bases of all operating nuclear power plants in the United States.[217] Indeed, Indian Point's operating license has specifically

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[209] NUREG-1738, *Final Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants* (January 2001); 2006 NAS Study at 53-54.
[210] *See Massachusetts Attorney General; Receipt of Petition for Rulemaking*, 71 Fed. Reg. 64,169 (Nov. 1, 2006); *State of California; Receipt of Petition for Rulemaking*, 72 Fed. Reg. 27,068 (May 14, 2007).
[211] Denial of Petition for Rulemaking, 73 Fed. Reg 46,204 (2008).
[212] *Id.* at 46,208-10.
[213] *Id.* at 46,209-10.
[214] *Id.*
[215] *Id.* at 46,209.
[216] *Id.*
[217] *Id.*

been amended to incorporate such mitigation measures.[218] As discussed above, the Commission further emphasized that mitigative measures have reduced the risk of spent fuel pool fire from intentional attacks.

The Commission's discussion of spent fuel pool fires and mitigative measures is wholly contrary to their end conclusion that such fires are still a Category 1 issue. The NRC's three criteria for inclusion of an environmental impact in Category 1 are (a) the environmental impacts associated with the issue apply to all plants/plants having a specific site characteristic; (b) a single significance level has been assigned to the impacts, *and* (c) mitigation of adverse impacts associated with the issue has been considered in the analysis and it has been determined that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation.[219]

With the Denial of Petition for Rulemaking, the Commission rendered it *impossible* for the issue of spent fuel storage to fit into the last criterion of Table B-1. As is clear from the above discussion, the Commission relied heavily on mitigative measures, which notably have been imposed at Indian Point, for its conclusion that the environmental impacts of spent fuel storage are insignificant.[220] Contrary to the criterion (c) above, not a single one of those mitigation measures was considered in the GEIS. In fact, the Denial of Petition for Rulemaking is apparently the first NEPA document in which they have been identified.[221] There are no previous NEPA documents evaluating the effectiveness of any license amendments imposed to reduce the risk of pool fires, nor any NEPA documents assessing cooling capability that were allegedly assessed for all operating spent fuel pools.[222]

Accordingly, the NRC has effectively removed spent fuel pool impacts from the realm of Category 1, and, accordingly, such impacts must be considered in the instant proceeding.

Moreover, any reliance upon 10 C.F.R. §§ 51.95(c) and 10 C.F.R. § 51.23 is misplaced based on the foregoing. Section 51.95(c) provides that at the license renewal stage, the supplemental EIS for an individual plant "need not discuss . . . any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b).[223] Section 51.23(a) explains that the Commission's generic determination that spent fuel can be safely stored for at least 30 years beyond the licensed life for operation,[224] and section 51.23(b) explains that because of this generic finding of no significant impact, then "within the scope of the generic determination in paragraph (a) of this section, no discussion of

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[218] Letter from John P. Boska, NRC, to Michael A. Balduzzi, Entergy (July 11, 2007), ML071920023; *see also* Indian Point Unit 3 Operating License, DPR-64, Condition AC, Mitigation Strategy License Condition (July 11, 2007), ML052720273.
[219] 10 C.F.R. Part 51, Subpart A, Appendix B, Table B-1, note 2; *see also* Denial of Petition for Rulemaking, 73 Fed. Reg. at 46,206.
[220] *See* Denial of Petition for Rulemaking, 73 Fed. Reg. 46,204.
[221] *Id.* at 46,209-10.
[222] *Id.* at 46,209-10.
[223] 10 C.F.R. § 51.95(c).
[224] *See* further discussion below about why this generic determination is no longer supportable, necessitating comprehensive review of spent fuel storage impacts generally during the instant relicensing proceeding.

any environmental impact of spent fuel storage" is required in a license renewal proceeding.[225] However, the mitigative measures the Commission now relies upon to determine that spent fuel storage poses no significant impacts, are clearly not "*within the scope of the generic determination in paragraph (a)*" of section 51.23, and therefore neither 10 C.F.R. § 51.95(c) or 10 C.F.R. § 51.23(a) applies.

Accordingly, the NRC Staff has no lawful basis to refuse to consider the environmental impacts of high-density pool storage of spent fuel in the Indian Point relicensing proceeding. However, despite all of the foregoing, the NRC Staff did not consider the risk of spent fuel pool fire in its SAMA assessment in the DSEIS. As such, the NRC Staff's SAMA is patently deficient.

Specifically, in the first step of Entergy's analysis (which the NRC accepts as sound), i.e., establishing the baseline of severe accidents, Entergy, and the NRC Staff in turn, did not consider the contribution to severe accident costs by a fire in either of the spent fuel pools at IP2 or IP3.[226] No SAMAs that would avoid or mitigate such costs have been identified.[227] If the costs of pool fires were considered, the value of SAMAs would be significant. Even using unrealistically low probability estimates in NUREG-1353, *Regulatory Analysis for the Resolution of Generic Issue 82, Beyond Design Basis Accidents in Spent Fuel Pools* (1982), the offsite cost risk of a pool fire is substantially higher than the offsite cost risk of an Early High release from a core-damage accident.[228] The present value of cost risk for a conventional pool accident at Indian Point (i.e., an accident not caused by intentional attack), using the unrealistically low probability assumptions in NUREG-1353, is $27.7 million, a significant sum.[229] If more realistic assumptions about the likelihood of a pool fire were used, the cost would be considerably higher.[230] Moreover, the present value of costs risks ("PVCR") for a spent fuel pool fire would increase substantially (i.e., from $27.7 million to $38.7 million) if the discount rate were changed from 7% to 3%, a more appropriate rate for an analysis of the benefits of measures to prevent or mitigate radiological accidents that Entergy used to test the sensitivity of its SAMA analysis.[231] If the discount rate were dropped to zero, a rate that is justified in light of the catastrophic nature of the consequences involved, the PVCR for a spent fuel pool fire would be even higher -- $51.5 million.[232]

Based on the foregoing it is clear safety risks due to spent fuel fires and accident mitigation alternatives have not been adequately addressed in the DSEIS. The NRC Staff must factor such risks into its SAMA analysis prior to the end of the environmental review process.

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[225] *See* 10 C.F.R. § 51.23.
[226] DSEIS, Main Report § 5.2; Entergy's ER at § 4.21.
[227] DSEIS, Main Report § 5.2
[228] Thompson Report at 28
[229] *Id.* at 49 and Table 7-7.
[230] *Id.* at 51.
[231] *Id.* at 51-52.
[232] *Id.* at 52.

3. Failure to Consider the Risk of Reactor Containment Bypass

The SAMA analysis in the DSEIS does not adequately take into account the risk of reactor containment bypass.[233] The SAMA analysis in the DSEIS seriously underestimates the potential for containment bypass during a core-damage accident. In light of current knowledge about severe reactor accidents, it is prudent to assume that (1) any high/dry accident sequence, (i.e., those in which the secondary side dries out due to unavailability of feedwater and the reactor coolant system ("RCS") pressure remains high while primary coolant (i.e., water) is lost and the core is uncovered), would involve induced failure of steam generator tubes, and (2) that one or more of the secondary side safety valves downstream of the affected steam generator(s) would remain open after tube failure.[234] Taking these prudent assumptions into account, the conditional probabilities of atmospheric release categories in the event of core damage increase significantly: the conditional probability of an Early High release rises from 3.6% to 51.8% for the IP2 reactor, and from 8.2% to 54.1% for IP3.[235] Correspondingly, the present value of cost risk associated with atmospheric releases increases by a factor of 5.42 for IP2 and a factor of 3.18 for IP3.[236]

However, in the first step of Entergy's analysis (which the NRC accepts as sound), i.e., establishing the baseline of severe accidents, Entergy, and the NRC Staff in turn, did not properly consider the contribution to severe accident costs made by severe accidents involving such reactor containment bypass via induced failure of steam generator tubes.[237] Because it does not account for the above-mentioned assumptions, Entergy's estimates of conditional probabilities of atmospheric release categories are incorrectly low.[238] Correspondingly, the value Entergy assigned to the cost risk associated with atmospheric releases is mistakenly low.[239] As a result, Entergy underestimated the potential value of relevant SAMAs by approximately $47.3 million for IP2 and $23.4 million for IP3.[240] If the economic benefit of averted containment bypass accidents were appropriately considered, a number of SAMAs rejected by Entergy as too costly would be cost-effective.[241]

Since induced accidents involving reactor containment bypass via induced failure of steam generator tubes have not been accounted for, the SAMA analysis in the DSEIS is flawed. The NRC Staff must factor the foregoing into its SAMA analysis prior to the end of the environmental review process.

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[233] DSEIS, Main Report § 5.2.
[234] *See* Thompson Report at 14-18, 50.
[235] *See id.*
[236] *See id.*
[237] DSEIS, Main Report § 5.2; Entergy's ER at § 4.21; *See* Thompson Report at 14-18, 50.
[238] *See* Thompson Report at 14-18, 50.
[239] *See id*.
[240] *See id.*
[241] *See id.*

4. Inadequate Consequence Analysis

Lastly, the SAMA analysis is flawed because the NRC Staff accepts Entergy's inadequate consequences analysis.[242] Entergy grossly miscalculated radiological consequences of severe accidents in performing its SAMA analyses for three reasons,[243] none of which the NRC Staff has taken into consideration in the DSEIS.

First, Entergy significantly underestimated off-site costs resulting from a severe accident at Indian Point by using a source term that resulted in unusually low mean off-site accident consequences in comparison to results obtained with source terms vetted by independent experts and recommended for use by the NRC.[244] The source term Entergy used to estimate consequences of the most severe accidents with early containment failure was based on radionuclide release fractions generated by the MAAP code, which are smaller for key radionuclides than the release fractions specified in NRC guidance such as NUREG-1465, *Accident Source Terms for Light-Water Nuclear Power Plants* (1995) and the NRC's recent reevaluation for high-burnup fuel, ERI/NRC 02-202, *Accident Source Terms for Light-Water Nuclear Power Plants: High Burnup and MOX Fuels* (2002).[245] The source term used by Entergy results in lower consequences than would be obtained from NUREG-1465 release fractions and release durations.[246] It has been previously observed that MAAP generates lower release fractions than those derived and used by NRC studies, such as NUREG-1150.[247] Since Entergy's use of the MAAP code yielded lower consequences than use of the NRC's source term, Entergy should be required to repeat its SAMA analysis using source terms that are based on publicly available analysis. However, a review of the NRC Staff's assessment of Entergy's SAMA analysis reveals that they have no qualms with Entergy's source term based on the MAAP code.[248]

Second, Entergy significantly underestimated off-site costs resulting from a severe accident at Indian Point because it failed to adequately consider the uncertainties in its consequence calculations resulting from meteorological variations by only using mean values for population dose and offsite economic cost estimates.[249] Entergy's uncertainty analysis for its estimate of the internal events core damage frequency ("CDF") uses an inconsistent approach and omits

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[242] Riverkeeper's Contention EC-2, filed in the relicensing proceeding, but rejected by the Atomic Safety and Licensing Board raised this issue, which was supported by two expert reports: Edwin S. Lyman Expert Report, *A Critique of the Radiological Consequence Assessment Conducted in Support of the Indian Point Severe Accident Mitigation Alternative Analysis* (Nov. 2007) ("Lyman, IP SAMA Analysis Report"); Edwin S. Lyman Expert Report, *Chernobyl on the Hudson? The Health and Economic Consequences of a Terrorist Attack at the Indian Point Nuclear Plant* (Sept. 2004), *available at* http://www.riverkeeper.org/document.php/651/11302007_EL_Lym.pdf ("Lyman, Chernobyl on the Hudson"). *See* Riverkeeper Petition for Hearing at 68-74.

[243] *See* Entergy's ER § 4.21.

[244] *See* Riverkeeper Petition for Hearing at 68-70.

[245] *See* Riverkeeper Petition for Hearing at 68-70; Lyman, IP SAMA Analysis Report.

[246] *See* Riverkeeper Petition for Hearing at 68-70; Lyman, IP SAMA Analysis Report.

[247] *See* Riverkeeper Petition for Hearing at 69; J. Lehner et al., *Benefit Cost Analysis of Enhancing Combustible Gas Control Availability at Ice Condenser and Mark III Containment Plants*, at 17 (Final Letter Report, Brookhaven National Laboratory, Dec. 23, 2002) (ADAMS Accession Number ML031700011).

[248] *See* DSEIS, Exhibit G.

[249] *See* Riverkeeper Petition for Hearing at 70-71; Lyman, IP SAMA Analysis Report.

consideration of the uncertainties associated with other aspects of its risk calculation, including uncertainties associated with meteorological variations, which are found to be greater than the CDF uncertainties.[250] It is unreasonable to ignore such variations in the SAMA analysis.[251] However, the NRC Staff once again did not identify this as a deficiency with Entergy's SAMA analysis. In fact, the NRC Staff specifically found that the "approach taken for collecting and applying meteorological data in the SAMA analysis is reasonable."[252] Moreover, the NRC Staff stated that it "based its assessment of offsite risk on the CDF's and offsite doses reported by Entergy."[253] Accordingly, the NRC Staff has not addressed this defect in the SAMA analysis.

Third, Entergy significantly underestimated off-site costs resulting from a severe accident at Indian Point by inappropriately using $2,000/person-rem dose conversion factor.[254] The $2,000/person-rem conversion factor is intended to represent the cost associated with the harm caused by radiation exposure with respect to the causation of "stochastic health effects, i.e., fatal cancers, nonfatal cancers, and hereditary effects.[255] The use of this conversion factor in Entergy's SAMA analysis leads to a serious underestimation of the population-dose/health related costs of a severe accident at Indian Point.[256] This is because it (i) does not take into account the significant loss of life associated with early fatalities from acute radiation exposure that could result from some of the severe accident scenarios included in Entergy's risk analysis, i.e. deterministic effects and (ii) it underestimates the total cost of latent cancer fatalities that would result from a given population dose because it fails to take into account the fact that some members of the public exposed to radiation after a severe accident will receive doses above the threshold level for application of a dose- and dose-rate reduction effectiveness factor ("DDREF").[257] Thus, the single cost conversion factor used is not appropriate when some members of an exposed population receive doses for which a DDREF would not be applied.[258] Yet, the NRC Staff had no problem with Entergy's dose conversion factor. The NRC Staff explicitly accepts Entergy's use of the $2000/person-rem factor.[259] As such, the NRC Staff has failed to address this defect in the SAMA analysis.

The above-discussed deficiencies in the SAMA consequence analysis significantly undervalues the off-site costs of severe accidents.[260] Entergy's erroneously low cost estimate has, therefore, led it to underestimate the benefits of SAMAs that would mitigate or avoid the environmental impacts of severe accidents.[261] The NRC Staff's adoption of Entergy's methodology and

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[250] *See* Riverkeeper Petition for Hearing at 70-71; Lyman, IP SAMA Analysis Report at 4.
[251] *See* Riverkeeper Petition for Hearing at 70-71; Lyman, IP SAMA Analysis Report.
[252] DSEIS, Exhibit G, at G-18.
[253] DSEIS, Main Report § 5.2.2. at 5-6.
[254] *See* Riverkeeper Petition for Hearing at 68-74; Lyman, IP SAMA Analysis Report.
[255] *See* Riverkeeper Petition for Hearing at 71-74; Lyman, IP SAMA Analysis Report at 5; NUREG-1530, *Reassessment of NRC's Dollar Per Person-Rem Conversion Factor Policy* (1995).
[256] *See* Riverkeeper Petition for Hearing at 73; Lyman, IP SAMA Analysis Report at 6, 10.
[257] *See* Riverkeeper Petition for Hearing at 71-74; Lyman, IP SAMA Analysis Report at 5. The DDREF is a factor that reflects the reduced potency of radiation to cause cancer at low doses or low dose rates. *See* Riverkeeper Petition for Hearing at 72, n.110.
[258] *See* Riverkeeper Petition for Hearing at 71-74; Lyman, IP SAMA Analysis Report at 5.
[259] DSEIS, Exhibit G, at G-28, G-29.
[260] *See* Riverkeeper Petition for Hearing at 68-74; Lyman, IP SAMA Analysis; Lyman, Chernobyl on the Hudson.
[261] *See* Riverkeeper Petition for Hearing at 68-74; Lyman, IP SAMA Analysis; Lyman, Chernobyl on the Hudson.

analysis fails to address these concerns. Based on the foregoing concerns, the NRC Staff must address these flaws in the SAMA analysis prior to the conclusion of the NEPA review process.

DSEIS Section 6.0

Inadequate Analysis of Impacts of On-Site Storage of Spent Fuel

Riverkeeper's Scoping Comments explained the need for the NRC Staff to consider "new and significant" information regarding the environmental impacts of spent fuel storage, rather than relying on the outdated GEIS. Riverkeeper cited to increased security concerns due to terrorism and the failure of a long-term disposal solution as material changes affecting the baseline environment since the GEIS was written.[262] Riverkeeper, thus, urged the NRC Staff to assess the future environmental impacts of spent fuel storage in light of these material changes in the Indian Point License Renewal NEPA review process.

However, despite the serious environmental concerns associated with long-term onsite storage of spent nuclear fuel at Indian Point, the NRC Staff has chosen to avoid its responsibilities under NEPA and hide behind the wholly inadequate assessment in the GEIS which has not been updated since 1996, over 13 years ago. Specifically, the NRC Staff states in the DSEIS that it has not identified any new and significant information relating to the finding in the GEIS that "the increase in the volume of spent fuel from an additional 20 years of operation can be safely accommodated on site with small environmental effects through dry or pool storage at all plants" if a permanent disposal solution is not available.[263] This finding is completely unjustified.

The finding of small environmental effects from spent fuel storage in the GEIS, upon which the NRC Staff relies, stems from the NRC's generic "waste confidence" determination that spent fuel can be safely stored onsite for at least 30 years beyond a plant's operating life, including license renewal.[264] The NRC Staff explicitly cites to this rule, which was codified at 10 C.F.R. § 51.23(a), to evade any meaningful site-specific environmental analysis of decades of spent fuel storage at Indian Point in the DSEIS.[265]

However, given "new and significant" circumstances described herein, the NRC's generic finding of no significant impact can not be relied upon. The NRC's reasonable assurance of safe interim storage, first instituted over a quarter of a century ago and never supported by an environmental assessment or environmental impact statement under NEPA,[266] simply does not hold up given current knowledge and circumstances. Moreover, the NRC recently published a proposed update to its "Waste Confidence Decision" which, if finalized would extend the finding

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[262] *See* Riverkeeper Scoping Comments at 1, 7-12.
[263] DSEIS, Main Report § 6.1 at 6-6 to 6-7.
[264] *Id.* § 6.1 at 6-2, 6-6 to 6-7; GEIS § 6.4.6.3; NRC Staff Scoping Summary Report at 222.
[265] NRC Staff Scoping Summary Report at 222; *see* 10 C.F.R. § 51.23(b) (precluding review of spent fuel storage environmental impacts in any NRC proceeding due to the generic finding of no significant impact).
[266] Final Waste Confidence Decision, 49 Fed. Reg. 34658 ("[T]he Commission finds that NEPA does not require an EIS to support the [temporary storage] finding"); *see also* 40 C.F.R. § 1508.9 (explaining that environmental assessments under NEPA should provide sufficient evidence and analysis for determining whether to prepare an EIS or a FONSI).

of no significant impact an additional 30 years.[267] A concomitant proposed rule change would omit any reference to how long spent fuel can safely be stored in "temporary" on- or off-site facilities, and simply state that such waste can be so temporarily stored without significant impact "until a disposal facility can reasonably be expected to be available."[268] If these changes are implemented, the NRC's generic finding of no significant impact will essentially be extended to some indefinable point in the future. In any event, foregoing any analysis of impacts of decades of spent nuclear waste storage because of the NRC's "waste confidence" is improper.

The NRC's "confidence" in extended safe temporary storage at reactor sites is largely the result of the NRC's expectation that a long-term repository will become available eventually.[269] However, the viability of Yucca Mountain as a long-term disposal site is becoming more tenuous by the day[270] and there is no other foreseeable long-term repository on the horizon. The NRC essentially admits this in rationalizing its proposed update to the Waste Confidence Decision.[271] Moreover, if Yucca ever does become available, it will take decades to transfer the spent fuel from Indian Point, and it will not accommodate any of the waste generated by Indian Point during the extended licensing term.[272] As such, spent fuel will continue to be stored on-site at Indian Point for the foreseeable distant future.

Yet, the NRC Staff refuses to consider the impacts of this "temporary" storage at Indian Point, pointing to the generic finding of no significant impact, despite the fact that it is completely dated and fails to consider current circumstances. Most blatantly, the NRC's generic assurance of benign spent fuel pool storage is completely undermined by the evidence of leaks at Indian Point.[273] The IP1 pool began leaking as early as the 1990s, and the leaks from IP2 were discovered in 2005.[274] With spent fuel pool degradation already an issue at Indian Point, it is patently absurd to rely on the generic no impact finding to project the long-term integrity of the pools for decades into the future. Given the site-specific situation at Indian Point, a comprehensive environmental impact review of the storage in the pools is necessary during the

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[267] Waste Confidence Decision Update, 73 Fed. Reg. 59,551, 59551, 59563-59569 (Oct. 9, 2008) ("WCD Update").
[268] Proposed Rule on the Consideration of Environmental Impacts of Temporary Storage of Spent Fuel After Cessation of Reactor Operation, 73 Fed. Reg. 59,547, 59551 (Oct. 9, 2008) ("Proposed Rule Change").
[269] Proposed Rule Change, 73 Fed. Reg. at 59549 (referring the WCD Update rationale) (explaining that the original 30 year timeframe for safe interim spent fuel storage was related to the NRC's expectation of when sufficient repository capacity would be available).
[270] *See* Riverkeeper Scoping Comments at 7-9; *see, e.g.*, Remarks of Chairman Klein, Feb. 25, 2008, Waste Management Symposium (explicitly stating that NRC and DOE have "inadequate funds to meet their statutory obligations" relating to Yucca); Lisa Mascaro, *Yucca Funding: Another $100 Million Cut*, Las Vegas Sun (Feb. 27, 2009), *available at*, http://www.lasvegassun.com/news/2009/feb/23/yucca-funding-another-100-million-cut/ (Obama vowing that Yucca will never open as a nuclear waste repository).
[271] Proposed Rule Change, 73 Fed. Reg. at 59549 (explaining how the Commission no longer finds the 30-year timeframe useful since an unknown amount of time will be needed to bring about the necessary societal and political acceptance for a repository site).
[272] Riverkeeper Scoping Comments at 7-9.
[273] *See Liquid Radioactive Release Lessons Learned Task Force Final Report*, U.S. Nuclear Regulatory Commission, at 5-6 (September 1, 2006), *available at* http://www.riverkeeper.org/document.php/539/NRC_Lessons_Lea.pdf (hereinafter "Radioactive Release Task Force Report").
[274] *See* Entergy's Environmental Report, at 5-4; Groundwater Investigation Executive Summary (Indian Point Energy Center, Buchanan, N.Y., Jan. 2008), *available at* http://jic.semo.state.ny.us/Resources/ExecutiveSummary%20GW%20final.pdf.

relicensing process. Addressing the leaks as the NRC Staff did in the DSEIS is clearly inadequate.[275]

The NRC's unbridled confidence in the safety of dry cask storage is also questionable. As Riverkeeper's Scoping Comments discussed, it is not clear what environmental impacts will result if dry casks remain loaded with spent fuel beyond their design life.[276] In light of the fact that these casks will remain on the banks of the Hudson River indefinitely into the future, the NRC Staff must perform a site specific assessment of impacts of such long-term storage.

The NRC's generic finding of no significant impact also flies in the face of new information about the risks of accidents from natural forces at Indian Point. Numerous reports and studies show that fuel storage pools are potentially susceptible to fire and radiological release from natural phenomena.[277] As mentioned above, the environmental impacts of a fire in a spent fuel pool may be severe, extending over a geographic area larger than a state's legal boundaries and continuing for decades.[278] Despite such ominous potential consequences, the NRC Staff completely ignores the vulnerability of stored spent fuel at Indian Point to natural phenomenon, such as earthquakes. This is unwise given recent new information about the likelihood of earthquakes near Indian Point.

Seismologists at Columbia University's Lamont-Doherty Earth Observatory published a study in August 2008 on earthquakes in the greater New York City Area.[279] The study indicated that the Indian Point nuclear power plant sits on a previously unidentified intersection of two *active* seismic zones.[280] Indeed, several recent earthquakes in New Jersey right near the Ramapo fault, which runs directly underneath Indian Point, starkly demonstrate the active nature of the seismic areas around the facility.[281] The Columbia study further found that historic activity of earthquakes of a magnitude more than 5 has been higher in southeastern New York than in many other areas of the central and eastern United States, and that the fault lengths and stresses suggest

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[275] See discussion above regarding inadequate discussion of leaks.
[276] *See* Riverkeeper Scoping Comments at 9-10.
[277] *See, e.g.*, NUREG-1738, Final Technical Study of 1 Spent Fuel Pool Accident Risk and Decommissioning Nuclear Power Plants (NRC: January 2001); National Academy of Sciences Committee on the Safety and Security of Commercial Spent Nuclear Fuel Storage, Safety and Security of Commercial Spent Nuclear Fuel Storage (The National Academies Press: 2006); Gordon Thompson, Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants (May 25, 2006); Jan Beyea, Report to the Massachusetts Attorney General on the Potential Consequences of a Spent-fuel Pool Fire at the Pilgrim or Vermont Yankee Nuclear Plant (May 25, 2006).
[278] *See generally*, Gordon Thompson, Risk-Related Impacts from Continued Operation of the Indian Point Nuclear Power Plants (Nov. 28, 2007), at 18-27, *available at*, http://www.riverkeeper.org/document.php/652/11302007_GT_Tho.pdf ("Thompson Report").
[279] *See* Lynn R. Sykes, John G. Armbruster, Won-Young Kim, & Leonardo Seeber, *Observations and Tectonic Setting of Historic and Instrumentally Located Earthquakes in the Greater New York City-Philadelphia Area*, Bulletin of the Seismological Society of America, Vol. 98, No. 4, pp. 1696-1719 (August 2008) ("2008 Columbia Earthquake Study").
[280] *Id.*
[281] *See, e.g.*, Lawrence Ragonese, *Morris County Shows Signs of Stress: Four Quakes*, The Star-Ledger (Feb. 18, 2009), *available at*, http://www.nj.com/news/index.ssf/2009/02/morris_county_shows_sign_of_st.html.

magnitude 6 or 7 quakes (which would be 10 and 100 times bigger than magnitude 5, respectively) are "quite possible.[282]

However, despite the availability of such new seismological information, the NRC has never allowed old information, upon which nuclear plants' original licenses were based, to be contested in considering extensions of licenses.[283] There is no certainty whatsoever that the dry casks or spent fuel pools at Indian Point are designed so as to be able to withstand such natural occurrences in light of the new seismic information. Given the recent revelation about the specific seismology surrounding the Indian Point facility, reliance by the NRC Staff on a generic determination of environmental safety for potentially long-term on-site storage of spent fuel is totally inappropriate. The NRC Staff must assess the reasonably foreseeable impacts of continued storage of spent fuel at Indian Point in light of new information about potential accidents from natural forces.

The NRC Staff also relies upon the Commission's generic safety determination to further justify its refusal to consider the risks to spent fuel storage from intentional acts of sabotage.[284] However, the likelihood and seriousness of such risks necessitates a thorough review of the impacts of long-term storage of spent fuel at Indian Point. As discussed at length above, future terrorist attacks at Indian Point remain reasonably foreseeable, and such risks must be fully assessed in the relicensing proceeding.

Spent fuel pools are particularly at risk for intentional attacks and would pose significant environmental consequences should such attacks occur. A 2006 study by the National Academy of Sciences on security risks posed by the storage of spent fuel at nuclear plant sites ("2006 NAS Study") confirmed that attacks by civilian aircrafts remain a plausible threat.[285] The study found that attacks on spent fuel pools are attractive targets since they are less protected structurally than reactor cores and typically contain much greater inventories of medium and long-lived radionuclides than reactor cores.[286] The NAS study concluded that storage pools are susceptible to fire and radiological release from intentional attacks.[287] The environmental impacts of a fire in a spent fuel pool may be severe, extending over a geographic area larger than a state's legal boundaries and continuing for decades.[288] Moreover, as discussed above, new studies demonstrate the severe risks of spent fuel pool fires which were not known at the time the NRC issued its "waste confidence" findings.

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[282] 2008 Columbia Study; *see also* Robert Roy Britt, *Large Earthquakes Could Strike New York City* (Aug. 21, 2008), *available at* http://www.livescience.com/environment/080821-new-york-earthquakes.html.
[283] 2008 Columbia Earthquake Study at 1717.
[284] *See* DSEIS, Main Report § 6.1; WCD Update, 73 Fed. Reg 59,551. The NRC's overall general exclusion of issues relating to terrorism in license renewal proceedings is unwarranted, as discussed above.
[285] Nat'l Acad. of Sciences., *Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report*, at 30 (2006) ("2006 NAS Study").
[286] 2006 NAS Study at 36.
[287] *Id.* at 49, 57; *see also* German Reactor Safety Org., *Protection of German Nuclear Power Plants Against the Background of the Terrorist Attacks in the U.S. on Sept. 11, 2001* (Nov. 27, 2002) (finding that large jetliners crashing into nuclear facilities under different scenarios could cause uncontrollable situations and the release of radiation). Although the NRC considers impacts of spent fuel pool fires outside the scope of license renewal review, as discussed at length above, this conclusion is no longer valid.
[288] *See generally*, Thompson Report, *supra.*

Moreover, the 2006 NAS Study also concluded that the "potential vulnerabilities of spent fuel pools to terrorist attacks are plant-design specific. Therefore, specific vulnerabilities can be understood only by examining the characteristics of spent fuel storage at each plant."[289] At Indian Point, numerous factors demonstrate the susceptibility of the spent fuel pools to attack, including the fact that the pools are not within containment, but are housed in non-reinforced cinderblock industrial buildings. The fact that the pools are densely packed adds to the risk of catastrophic fire in the event of an attack.[290] Given the foregoing, it is essential that the NRC Staff perform a site-specific assessment of long-term spent fuel pool storage.

The dry casks storing spent fuel at Indian Point also present security concerns. Importantly, the dry casks were designed to ensure safe storage of spent fuel, and not to resist terrorist attacks.[291] The regulations for such storage systems are designed to ensure passive heat removal and radiation shielding during normal operations, off-normal events, and accidents.[292] The 2006 NAS Study found breach of a dry cask from a terrorist attack could potentially result in releases of radioactive material from the spent fuel environment, with offsite radiological consequences.[293] Moreover, while the regulations require that dry storage facilities be located within a protected area of the plant site, the protection requirements for such installations are lower than for reactors or spent fuel pools.[294] In addition to the foregoing, at Indian Point in particular, the dry casks in the Independent Spent Fuel Storage Installation ("ISFSI") are stored on an outdoor concrete pad, lined up in rows that are easily visible from the air and the Hudson River.

Thus, as currently configured, this ISFSI is potentially vulnerable to sabotage. Given that Entergy intends to continue constructing dry casks in this manner and the fact that the spent fuel generated at Indian Point will remain stored that way for the foreseeable distant future, the NRC Staff must assess the risks associated with intentional attacks on the ISFSI. As Riverkeeper's Scoping Comments called for, the NRC Staff should consider the mitigation measures recommended by the 2006 NAS Study to reduce the risk of impacts from intentional attacks, including: additional surveillance to detect and/or thwart attacks, creating earthen berms to protect casks from aircraft strikes, placing visual barriers around storage pads to prevent targeting of individual casks, re-spacing the casks to reduce likelihood of cask-to-cask interactions in the event of aircraft attack, and implementing design changes to newly manufactured casks to improve cask resistance to attack.[295]

Based on the foregoing, a comprehensive site-specific analysis of indefinite on-site spent fuel storage at Indian Point is necessary prior to the end of the NRC Staff's environmental review process. In light of extensive "new and significant" information, the NRC Staff can not rely upon an outdated, baseless generic finding of no significant impact to avoid its obligations under NEPA.

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[289] 2006 NAS Study.
[290] *See* Thompson Report, *supra,* at 18-27.
[291] *See* 2006 NAS Study; 10 C.F.R. Pt. 71.
[292] *See* 2006 NAS Study; 10 C.F.R. Pt. 72.
[293] *See* 2006 NAS Study.
[294] *Id.*
[295] Riverkeeper Scoping Comments at 11-12; 2006 NAS Study.

DSEIS Section 8.0

1. Irrelevance of the NRC Staff's Assessment of Alternatives to the Existing IP2 and IP3 Cooling-Water System

As indicated above, the NRC Staff must defer to NYSDEC's determinations in the SPDES proceeding. This includes NYSDEC's assessment of alternatives to once-through cooling at Indian Point. As such, the NRC Staff's assessment in the DSEIS of alternatives to the existing IP2 and IP3 cooling-water system is totally meaningless. The NYSDEC's 2008 Ruling requires that a supplemental EIS be prepared to examine the environmental impacts that were not already addressed in the SPDES FEIS for closed cycle cooling, the proposed interim measures, and any alternative technologies that Entergy may propose in order to minimize adverse environmental impact at Indian Point.[296] The NRC Staff must defer to the future determinations of NYSDEC relating to cooling-water system alternatives. Problematically, there is no indication whatsoever in the DSEIS that NRC Staff will defer to, and/or coordinate with, the NYSDEC's supplemental EIS, as required by NRC regulations and precedent.[297]

Moreover the DSEIS also includes a Restoration Alternative in Section 8.1.2 that is unlawful, as the Second Circuit ruled, in its *Riverkeeper I* and *Riverkeeper II* decisions. Pursuant to *Riverkeeper I* and *Riverkeeper II* "restoration" alternatives both at existing and new facilities are contrary to the CWA. Therefore, Section 8.1.2 should be stricken in its entirety.

2. Deficiencies in Assessment of Alternate Energy Sources

As Riverkeeper's Scoping Comments discussed, the NRC Staff is obligated fully consider the use of alternative energy sources in its analysis of alternatives for Indian Point. NEPA,[298] CEQ regulations,[299] NRC regulations,[300] and Appendix to Part 51 mandate that the full and complete environmental impacts of license renewal of IP2 and/or license renewal of IP3, be compared to the projected impacts of all reasonable alternatives. As delineated in CEQ regulations, the obligations include rigorously exploring and objectively evaluating all reasonable alternatives, devoting substantial treatment to each alternative, and including alternatives not within the jurisdiction of the lead agency.[301] Moreover, the scope of the NRC Staff's review encompasses the requirements to which the license renewal applicant is held in its Environmental Report, which includes the requirement to consider "new and significant information."[302]

A review of Sections 8.2 and 8.3 of the DSEIS reveals that the NRC Staff has utterly failed to meet this requirement.

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[296] NYSDEC, 2008 Ruling at 39.
[297] 10 C.F.R. § 51.70 (c); 40 C.F.R. § 1506.2 (b) and (c); *Seabrook*, CLI-78-1, 7 NRC at 26 (1978); *Entergy Nuclear Vt. Yankee*, CLI-07-16, 65 NRC 371, 389 (2007).
[298] NEPA, 42 U.S.C. § 4321 et seq.
[299] 40 C.F.R. § 1502.1.
[300] 10 C.F.R. §§ 51.45, 51.71, 51.95.
[301] 40 C.F.R. 1502.14(a) – (f).
[302] 10 C.F.R. § 51.71(a); 10 C.F.R. § 51.53(c)(3)(iv); 10 C.F.R. Part 51, Subpart A, Appendix B; *see also* 40 C.F.R. § 1502.9(c)(1)(I) (requiring a supplemental EIS if there are "significant new circumstances or information relevant to environmental concerns and bearing on the proposed actions or its impacts."

a. Reliance on Outdated Energy Information Administration Reports

The DSEIS fails to address significant new information in reliance on outdated energy production and consumption forecasts. The Energy Information Administration of the Department of Energy ("EIA") issues annual reports and frequent updates on energy production, consumption, and prices, the Annual Energy Outlook and associated supplements and updates. The DSEIS states that "the NRC staff uses the EIA's analysis to help select reasonable alternatives to license renewal."[303] The DSEIS, released and dated December 2008, cites and references "Annual Energy Outlook 2007 with Projections to 2030,"[304] "Assumptions to the Annual Energy Outlook 2006 with Projections to 2030,"[305] and "Assumptions to the Annual Energy Outlook 2007, Electricity Market Module."[306] However, the data and information contained in these annual reports have been superseded by the "Annual Energy Outlook 2009 Early Release Overview" ("2009 EIA Report").[307]

The 2009 EIA Report provides substantially changed data and information from that considered and referenced in the DSEIS concerning all of the alternative energy sources. For instance, the DSEIS relied on data from 2007 projecting coal-fired electric generation to rise to 32% of all generated capacity.[308] By contrast, the 2009 EIA Report adjusts the coal-fired electric generation projection to 24%, no significant increase from 2007, and projects reduced outlook and investment in new coal-fired generating capacity.[309] In line with this projection, the 2009 EIA Report projects much lower coal consumption by 2030 than projected even one year ago. Specifically, the 2009 EIA Report projects: (1) an even greater use of renewable energy than even one year ago, growing at 3.3% annually through 2030; (2) the largest source of growth in the electric power sector to be biomass and wind energy sources; and (3) renewable energy generation growth to 14.1% by 2030, even without a renewal of federal subsidies. Most significantly, the 2009 EIA Report projects that non-hydropower renewable power meets 33% of the total generation growth between 2007 and 2030.[310]

The DSEIS contains many assumptions about alternative energy sources derived directly from outdated data from EIA reports dating from 2006 and 2007. At a minimum, the DSEIS must select and evaluate any alternative energy source or combination of sources in light of the new and substantially different data and projections from the 2009 EIA Report. The failure of the NRC to amend the data relied upon for the analysis of alternative energy sources would violate the requirements of NEPA. Because NEPA requires an EIS in order to inform the agency of the environmental consequences of its actions, it is critical that the NRC Staff revisit their conclusions in light of the most recent data.

[303] DSEIS, Main Report § 8.3, at 8-33.
[304] DOE/EIA-0383(2007).
[305] DOE-EIA-0554(2006).
[306] DOE-EIA-0554(2007).
[307] DOE/EIA-0383(2009) (released December 2008, full report available March 13, 2009).
[308] DSEIS, Main Report § 8.3, at 8-32.
[309] 2009 EIA Report, Table 1.
[310] AEO2009 Early Release Summary Presentation.

b. Coal-Fired Generation Alternative

The DSEIS devotes a majority of consideration of alternative energy sources to a single alternative that presents the arguably least feasible and least environmentally sound alternative to relicensing. This analysis sets up a "straw man" scenario that skews objective comparisons to the proposed relicensing.

The DSEIS devotes the bulk of analysis of alternative energy sources to an off-site supercritical coal-fired generation source[311] despite the fact that no New York-based utility has pending application for new coal generation in Zones H, I, J, and K.[312] In contrast, the DSEIS gives short shrift to analysis of other alternatives, in particular, renewable energy sources and conservation. This analysis and seeming preference to prove the unsuitability of a single coal-fired source comes at the expense of considering a more effective portfolio of alternative energy sources. Moreover, the analysis of the supercritical coal-fired generation source in the DSEIS fails to satisfy the requirements of NEPA.

The NRC Staff opened its analysis of this alternative by assuming that a new source would have to generate 2200 MW(e) to replace the power produced by Indian Point Units 2 and 3.[313] At the outset, this analysis ignores the fact that energy alternatives must also be considered separately.[314] The NRC Staff failed to consider the effects of this alternative in place of only one of the units at the Indian point facility. It also failed to include evidence of other, non-coal sources of power generation and conservation when completing its analysis.[315] In order to remedy these flaws, the NRC Staff must consider all of the energy alternatives in light of the fact that the license renewal is for two power generating units and with respect to other existing sources and conservation efforts. An analysis of the alternatives must occur for both units together and for each unit separately in order to comply with NEPA.[316]

c. Natural Gas-Fired Generation Alternative

In its analysis of natural gas-fired combined-cycle generation as an alternative to the license renewal for Indian Point Units 2 and 3, the DSEIS notes that this alternative source operates at "markedly higher thermal efficiencies" and requires less water for condensing cooling, thus requiring smaller cooling towers than the existing facility.[317] However, in its conclusion about the effects of alternative sources, the NRC Staff concludes that the license renewal would have similar impacts to alternatives.[318] Even though the analysis of the natural gas-fired alternative

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[311] DSEIS, Main Report § 8.3.1, at 8-33 to 8-46.
[312] *See* State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement, Docket Nos. 50-247-LR and 50-286-LR (filed February 27, 2008) at 31.
[313] DSEIS, Main Report § 8.3.1, at 8-34.
[314] Riverkeeper's Scoping Comments discussed at length the need to assess reasonable alternatives to IP2 and IP3 separately. Riverkeeper Scoping Comments at 15-17 (citing NUREG-1437 vol. 1 §§ 1.2, 1.4, 1.8 (requiring a plant, not plants, specific review and a full analysis of alternatives at *individual* license renewal reviews.)).
[315] *See* State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement, Docket Nos. 50-247-LR and 50-286-LR (filed February 27, 2008) at 31.
[316] *See* Riverkeeper Scoping Comments at 15-17.
[317] DSEIS, Main Report § 8.3.2, at 8-46.
[318] *Id.* § 8.4, at 8-78.

acknowledged significant environmental benefits, the NRC Staff ignored these factors when making a conclusion based on all of the energy alternatives. The NRC Staff cannot ignore their analysis of a natural gas-fired generation alternative when making a general conclusion on the impacts of alternatives subject to the decision not to renew the licenses for Indian Point Units 2 and 3.

Although the DSEIS addresses the fact that Indian Point Units 2 and 3 could be replaced by natural gas-fired combined-cycle generation at the Indian Point site or other locations, the analysis does not go far enough to show the development of natural gas generation in New York. The DSEIS ignores current construction of natural gas-fired facilities and other new sources that have been planned or permitted.[319] Because of this lack of consideration of the existence of and increased reliance on natural gas-fired power generation, the DSEIS is inadequate. In order to fulfill the requirements of NEPA, the NRC Staff should readdress the natural gas-fired generation alternative in order to reflect current information and trends. Currently, without this analysis, the DSEIS is incomplete.

d. Combination of Alternatives

The DSEIS suggests two options in which combinations of energy sources are used.[320] Unfortunately, these two combination alternatives are artificially narrow and arbitrary and fail to take into account additional combinations of alternatives in violation of NEPA. The NRC Staff's shoddy combination assessment in the DSEIS stems from the assumption in the GEIS that the only way to replace a large generating unit like a nuclear power plant is with another similarly large generating unit.[321] This assumption is not valid today, as utilities are meeting demand requirements with a broad combination of conservation, innovative modifications to existing plants, and renewable energy, without considering the construction of new fossil-fuel burning facilities.[322] As Riverkeeper's Scoping Comments explained, a recent study clearly demonstrates that the approximately 2000 MWe generated by Indian Point is replaceable and that if Indian Point were to close, a replacement strategy focusing on conservation, energy efficiency, renewable energy sources, and improving transmission infrastructure, would be technically feasible and achievable with no major disruptions.[323] Another study by the Nuclear Research Institute and the Institute for Energy and Environmental Research found that a reliable U.S. electricity sector is achievable without nuclear power through a combination of conservation and

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[319] *See* State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement, Docket Nos. 50-247-LR and 50-286-LR (filed February 27, 2008) at 32.
[320] DSEIS, Main Report § 8.3.5.
[321] GEIS § 8.1 ("NRC has determined that a reasonable set of alternatives should be limited to analysis of single, discrete electric generation sources"); DSEIS, Main Report § 8.3.5 (relying on NRC's recommendation in the GEIS that consideration of alternatives should "be limited to single, discrete generating options"). Riverkeeper's Scoping Comments further explained that this statement in the GEIS does not comply with NEPA's mandate to assess all reasonable alternatives to the proposed action, nor with NRC regulations mandating that *all* reasonable alternatives be identified and considered. *See* Riverkeeper's Scoping Comments at 19-20.
[322] *See* Michael Grunwald, *America's Untapped Energy Resource: Boosting Efficiency*, Time (Dec. 31, 2008), *available at* http://www.time.com/time/magazine/article/0,9171,1869224,00.html; EPRI, *Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. (2010 – 2030)* (published Jan. 14, 2009); *see also* Riverkeeper Scoping Comments at 15-21.
[323] *See* Riverkeeper Scoping Comments at 18-19 (citing NAS, *Alternatives to the Indian Point Energy Center for Meeting New York's Electrical Power Needs*, June 2006, Chapters 1-5).

alternative sustainable energy sources.[324] Thus, given the feasibility of developing and implementing energy portfolios that include renewable energy sources, conservation, and energy efficiency measures, the NRC Staff should have considered a broader range of alternatives in the DSEIS. The NRC Staff's continued reliance on the GEIS ignores the significant progress made on energy issues and, in turn, ignores NEPA's mandate to fully consider "new and significant" information in the supplemental EIS.

In particular, the combination assessment completely ignores the known potential of renewable energy sources. The NRC Staff's combination alternatives reflect the NRC's arbitrary belief that there are too many obstacles to implementing sufficient wind power or other renewable energy sources such that these sources could not provide anything more than 200 to 400 MW to replace either or both IP units.[325] Such beliefs are utterly misguided.[326] The NRC Staff also discounts and eliminates any contribution from hydropower or geothermal energy.[327] By limiting the consideration of energy sources in this manner, the NRC Staff's combination assessment it deficient.

The NRC Staff's combination alternatives also largely ignores the benefits of energy conservation and efficiency. The NRC Staff has failed to consider New York State's lofty plans and steps taken for reducing the state's electricity usage and increasing energy efficiency.[328] Recent information demonstrates the increasing financial, technical, and political viability of energy conservation.[329] However, by incorrectly assuming that energy conservation would only result in a savings of 800 MW, the NRC Staff arbitrarily fails to consider energy conservation as a full replacement for one or both of the units.[330]

Based on the foregoing, the NRC Staff's consideration of renewable energy sources and energy conservation and efficiency is severely wanting. Since the DSEIS does not adequately analyze the availability and environmental impacts of alternatives, the NRC Staff's assessment of the no-action alternative in section 8.2 of the DSEIS is flawed.[331] Indeed, the no-action alternative assessment does not consider and analyze much new information about various measures that would be taken if the no-action alternative were chosen, compared to the detriments that would

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[324] *See* Riverkeeper Scoping Comments at 19 (citing IERR, "Carbon Free and Nuclear Free – A Roadmap for U.S. Energy Policy" (Oct. 2007)).
[325] DSEIS, Main Report § 8.3.5 at 8-65 to 8-66.
[326] *See generally See* State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement, Docket Nos. 50-247-LR and 50-286-LR (filed February 27, 2008) at 27-28 (citing Report by Synapse Energy Economics, Inc. demonstrating the viability of wind energy and other renewable resources).
[327] *See* DSEIS, Main Report § 8.3.4 at 8-61, 8-62, § 8.3.5, at 8-65, 8-66.
[328] *See* New York State, Public Service Commission, Energy Efficiency Portfolio Standard, http://www.dps.state.ny.us/Phase2_Case_07-M-0548.htm (last visited March 16, 2009); Energy Efficiency Fact Sheet, http://www.ny.gov/governor/press/factsheet_0107092.html; *see generally* State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement, Docket Nos. 50-247-LR and 50-286-LR (filed February 27, 2008) at 23-29; Riverkeeper Scoping Comments at 20.
[329] *See generally* State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement, Docket Nos. 50-247-LR and 50-286-LR (filed February 27, 2008) at 24-25.
[330] DSEIS, Main Report § 8.2, 8.3.5.
[331] 10 C.F.R. § 51.71; 10 C.F.R. Part 51, Subpart A, Appendix A, Section 4; 40 C.F.R. § 1502.14(a).

be caused by relicensing of IP2 and IP3.[332] In contrast, the State of New York, with expert support, has laid out examples of combination alternatives using more realistic estimations, which demonstrate that the no-action alternative, i.e., not relicensing IP2 or IP3, is preferable.[333] Such combinations would use mostly renewable energy sources coupled with energy efficiency measures and are readily achievable under existing and identified New York State programs.[334]

Lastly, Riverkeeper's Scoping Comments explained the necessity under NEPA to compare Indian Point's cumulative detrimental contribution to climate change and environmental degradation to safe and clean renewable energy sources.[335] The NRC Staff has not performed such an analysis in the DSEIS.

Overall, the NRC Staff's assessment of energy alternatives to Indian Point in the DSEIS is deficient, and must be fixed prior to the conclusion of the environmental review process under NEPA.

DSEIS Section 9.0

Based on the foregoing, the NRC Staff has demonstrably not performed sufficient analysis to support its preliminary recommendation "that the adverse environmental impacts of license renewal for IP2 and IP3 are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable."[336] In order to comply with the mandates of NEPA, the NRC Staff must consider and address the foregoing comments before issuing the FSEIS.

Thank you for your consideration.

[332] *See generally* State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement, Docket Nos. 50-247-LR and 50-286-LR (filed February 27, 2008) at 22-29.
[333] *See id.* at 33-34.
[334] *See id.*
[335] *See* Riverkeeper Scoping Comments at 20-21.
[336] DSEIS, Main Report § 9.3, at 9-8.

Sincerely,

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Comments relating to the Indian Point NRC draft EIS on the Cooling System

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1 Summary

This report comments on the US NRC '*Generic Environmental Impact Statement for License Renewal of Nuclear Plants Supplement 38: Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3: Draft Report for Comment*' issued December 2008 (NUREG – 1437), Environmental Impacts of Cooling System. We are only concerned here with aquatic issues, and the impact of the plant's cooling system on fish and crustaceans in particular. The main impacts we look at in this document are entrainment, impingement and the effect of the thermal plume.

The assessment of impact undertaken on the representative important species (RIS) of (17 common fish species and the blue crab) is based on a scoring system that appears completely objective and quantitative. However, detailed examination of the method shows that it makes assumptions about the statistical properties of populations, the impact of cooling water systems on invertebrates prey species, and the relative importance of local and larger-scale changes in population number, that have not been justified and may be arbitrary.

A particular problem concerns the scoring method used to assess the strength of connection; this is a poor measure of the impact of the power plant on the species. The strength of connection is a flawed measure because it is based on rank abundance, furthermore, the lack of importance given to impacts on invertebrates makes low to moderate levels of impact for many species almost inevitable.

Another concern is that the distinction between '*Large'* and '*Small'* population impacts is hard to support from an examination of the overall population trend data.

The use of both river-wide and river segment 4 data (where Indian Point is located), and the use of population decline criteria that include a measure of the deviation from the mean of a normal distribution produce results that do not necessarily reflect the actual population trends, and have the potential to understate the importance of recent changes in abundance.

The comparison of species' proportional rank abundance in the power station kill with that living in the river results in potentially misleading conclusions. For example, the fish that contributes the highest proportion of the number of individuals killed by the power plant, and which is also the commonest in the river, only has a medium strength of connection. In our opinion, such a situation where a fish is killed in high numbers and is locally common would suggest a high degree of linkage.

A number of the RIS species have a prey score for impingement and entrainment of 1, and thus are unlikely to score highly for the strength of connection. This feature of the scoring protocol is thus central to the final outcome.

A key underlying point to note about the analysis of impingement and entrainment is the reliance on data collected between 1981 and 1990. These data are old and may not reflect current conditions.

NRC staff concludes that thermal impacts associated with the discharge are small to moderate, principally on the grounds that there is no evidence for the scale of the impact. The assertion that, because no appropriate evidence has been collected, there is therefore only a small to moderate impact, is not logical.

NRC staff state that they cannot determine the effects of climate change, particularly in relation to thermal issues. We believe they should have, at the very least, concluded that they needed more data on thermal issues before reaching a conclusion.

Although the NRC does not come to a definite conclusion about the effect of Indian Point on the sturgeon, they are concerned that they continuing operation will have adverse effects.

The cumulative effects of all the impacts on the River Hudson are assessed as large. The power plant, along with other users, must take their share of the responsibility and undertake to do as little damage a possible to an already stressed system.

2 Introduction

This report comments upon the US NRC '*Generic Environmental Impact Statement for License Renewal of Nuclear Plants Supplement 38: Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3: Draft Report for Comment*' issued December 2008. We will refer to this document below as NUREG-1437. We are only concerned here with aquatic issues, and the impact of the plant's cooling system on fish and crustaceans in particular.[1]

Fish and other species can be impacted in several ways by the operation of the power plant. They can be impinged (caught on the power station screens) as the power station withdraws water from the Hudson, entrained (smaller organisms pass thought the power station undergoing several stressors), or can be effected by the thermal plume produced by the cooling water.

The NRC method of assessing the above impact had several steps.

- Identifying the species to be examined,
- Examining what evidence there was of changes in populations and how useful it was.
- Assigning species to *Small*, *Moderate* or *Large* depending on their potential to be effected.
- Assigning a connection of *Low, Medium* or *High*, depending on whether the species was impinged or entrained in different numbers than they were present in the river.
- Combined the potential to be effected with the connection score to assess the impact of Indian Point.

3 Impingement and Entrainment: The scoring system

Impingement and entrainment effects are considered together by the NRC. This is an approach that has merit because the goal is the well-being of the populations as a whole, and not particular age classes.

The possible impact of the power plant is assessed using a scoring system that takes into account changes in species abundance (the trend) and strength of connection (connection), and which attempts to measure the relationship between abundance in the environment and in the power station catch. The analysis is restricted to the 18 RIS species (common fish species and the blue crab). The choice of these species is historic and was designed to represent the overall aquatic resource. They have all been studied over many years. The NRC staff note, as have many others before, that there have been notable declining

[1] NUREG-1437, Vol. 1, sections 2.2.5 Aquatic Resources, 4.1 Cooling System, 4.6 Threatened or Endangered Species, 4.8 Cumulative Impacts, 4.9 Summary of Impacts of Operations during the Renewal Term; 8.1 Alternatives to the Existing IP2 and IP3 Cooling-Water System.

trends in many RIS fish (see Population Line of Evidence column in Table shown in Figure 1). In this respect NRC staff agree with our previous analyses.[2]

Table 4-4. Impingement and Entrainment Impact Summary for Hudson River RIS

Species	Population Line of Evidence	Strength of Connection Line of Evidence	Impacts of IP2 and IP3 Cooling System on Aquatic Resources
Alewife	Large	Low to Medium	Small to Moderate
Bay Anchovy	Moderate	Low to Medium	Small to Moderate
American Shad	Large	Low to Medium	Small to Moderate
Bluefish	Large	High	Large
Hogchoker	Large	Medium to High	Moderate to Large
Atlantic Menhaden	Moderate to Large	Unknown[(a)]	Unknown[(b)]
Blueback Herring	Large	Low to Medium	Small to Moderate
Rainbow Smelt	Large	Medium	Moderate
Shortnose Sturgeon	Unknown	Unknown[(a)]	Unknown[(b)]
Spottail Shiner	Large	Low to Medium	Small to Moderate
Atlantic Sturgeon	Large	Unknown[(a)]	Unknown[(b)]
Striped Bass	Small	High	Small
Atlantic Tomcod	Large	Low to Medium	Small to Moderate
White Catfish	Large	Low to Medium	Small to Moderate
White Perch	Large	Medium to High	Moderate to Large
Weakfish	Small	Medium to High	Small
Gizzard Shad	Unknown	Unknown[(a)]	Unknown[(b)]
Blue Crab	Small	Unknown[(a)]	Unknown[(b)]

[(a)]Strength of connection could not be established using WOE, therefore strength of connection could range from LOW to HIGH.
[(b)]Conclusion of impact could not be established using WOE, therefore impacts could range from SMALL to LARGE.

Figure 1: A copy of Table 4-4 from NUREG-1437, Vol. 1.

The serious decline in abundance of many species is reflected in the number of '*Large*' classifications in column 2 of the table in Figure 1. We choose two species from Table 4-4, white catfish and weakfish, to illustrate the nature of these declines. These two species also serve to demonstrate that the distinction made in Table 4-4 between '*Large'* and '*Small'* impacts is hard to support from an examination of the overall population trend data.

3.1 White Catfish

The Year Class Reports for the Hudson River Estuary Monitoring Program shows that, river-wide, juvenile white catfish have been in a steep decline in abundance since 1990 (Figure 2).

[2] See "Status of Fish Populations and the Ecology of the Hudson River" and "Entrainment, Impingement and Thermal Impacts at Indian Point Power Station." Copies of these reports were are provided as Attachments 3 and 4, respectively, to the declaration of Dr. Peter Henderson, in support of Riverkeeper's request for a hearing and petition to intervene with respect to the license renewal proceeding for the Indian Point Nuclear Power Station (November 2007).

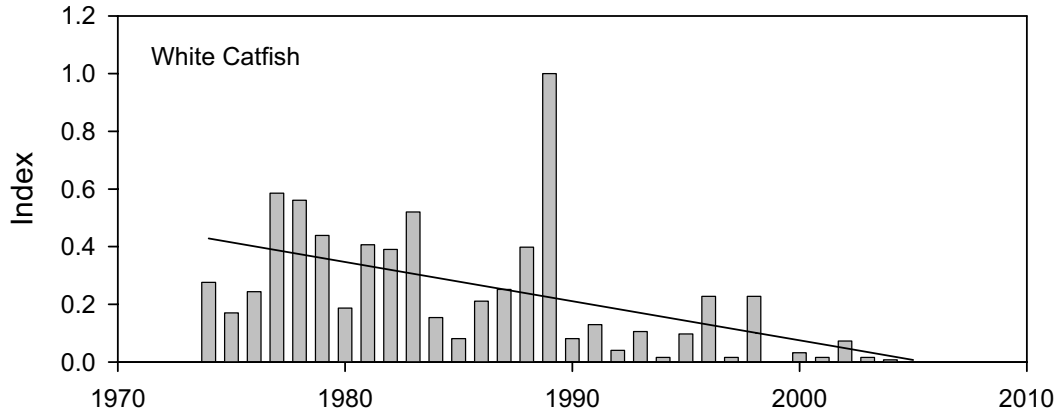

Figure 2: The standardised juvenile index for white catfish in the Hudson, showing a decreasing trend though time.
The trend is significant (a = -0.0136, b = 27.216, F = 14.0414, p = 0.0008) (Seaby and Henderson, 2007)

It is therefore unsurprising that in Table 4-4 (see Figure 1) the population line of evidence is for a 'Large' potential adverse impact. The trend shown in Figure 2, which is statistically significant, certainly seems to correspond with the definition of Large given on page H-33, NUREG-1437, Vol 2:

> *"A LARGE potential for an adverse impact to an RIS population was determined if population trends had slopes that were significantly different from zero (i.e., detectable slope) and had greater than 40 percent of annual abundance outside the defined level of noise (i.e., support for potential impact). This response was considered clearly noticeable, and an adverse environmental impact was likely."*

The fact that 40% of the observations lie outside the standardised mean abundance level observed over the first 5 years of the long-term study is also significant. To quote from page H-36, NUREG-1437, Vol. 2:

> *"Thus, observations outside the boundaries of ±1 standard deviation from the mean of the first 5 years were considered outside of the natural variability (noise). If greater than 40 percent of the standardised observations were outside this defined level of noise, then a potential for adverse impact was considered supported."*

There are two important points to note about this definition. First, it is based on the normal distribution. The abundance of natural populations is never normally distributed. This brings into question the validity of the method.

Second, the approach is based on events in the first 5 years of the time series. If during this period the population showed unusually great variability, it would make it much harder, if not impossible, to score for a Large potential impact.

3.2 Weakfish

Like white catfish, weakfish have also shown river-wide a steep decline in abundance since 1990 (Figure 3). However, unlike white catfish, for this species Table 4-4 classifies the population line of evidence as 'Small'.

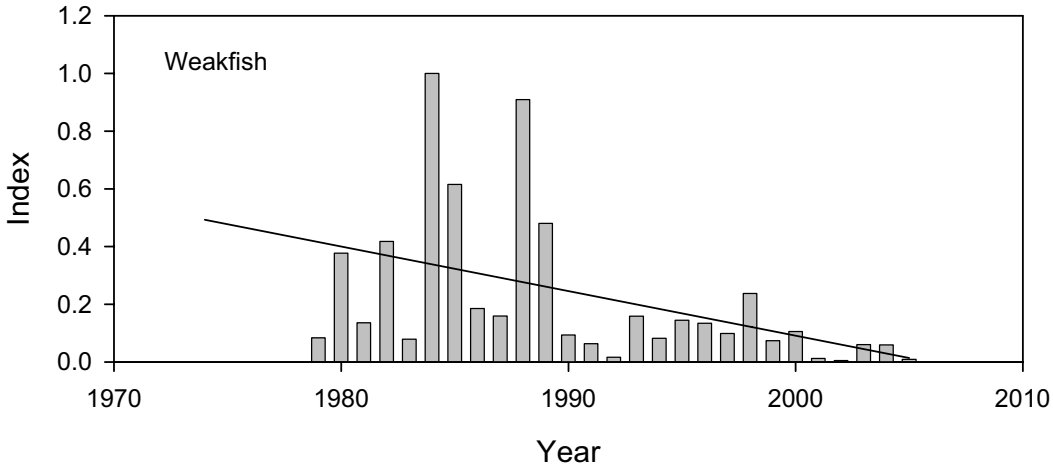

Figure 3: The standardised juvenile index for weakfish in the Hudson showing a decreasing trend though time.
The trend is significant (a = -0.0155, b = 31.0218, F = 7.0811, p = 0.0134) (Seaby and Henderson, 2007)

A 'Small' potential for adverse impact is defined on page H-32 vol 2 as:

> *"A SMALL potential for an adverse impact to an RIS population was determined if population trends had slopes that were not significantly different from zero (i.e., no detectable slope) and had ≤40 percent annual abundances falling outside a predetermined level of noise (defined here as +/-1 standard deviation from the mean of the first 5 years of data). This suggested that the RIS population had not changed detectably over time, and adverse environmental impacts were unlikely."*

The classification of the weakfish population line of evidence as Small in Table 4-4 if difficult to understand as there are clear signs that the population has shown a significant decline. If this is so, the population line of evidence should not be small, irrespective of the noise in the data set. The classification as small seems to arise because the weight of evidence (WOE) score (Table H-15, NUREG-1437, Vol. 2) assesses river-wide, river segment 4 and coastal scores

for potential adverse impact. River-wide there is a moderate adverse impact assessment; see p H-42:

> *"Analysis of abundance index data suggested a large potential for adverse population impacts for three RIS (American shad, white catfish, white perch) and a* ***moderate*** *potential for adverse impacts for bay anchovy, blueback herring, Atlantic tomcod, and* ***weakfish*** *)."*

However, within river segment 4 the impact is only assessed as 'Small'. The final result is an overall 'Small' level of impact.

Weakfish are mobile, migratory predators that never complete their life cycle within river segment 4. We therefore can see no justification for including the river segment 4 analyses in an assessment of adverse population trends.

We conclude therefore that the WOE scoring system, which uses both river-wide and river segment 4 data, and uses population decline criteria that include deviation from the mean of a normal distribution, produces results that do not necessarily reflect the actual population trends, and have the potential to understate the importance of recent changes in abundance. Examination of the river-wide abundance trends for white fish and weakfish indicates that both species have, since 1990, appreciably declined in abundance. Yet while the decline in white catfish is classified as 'Large', that in weakfish is 'Small'. Such differences are more a reflection of the arbitrary nature of the statistical and quantitative approach taken, than a real difference in the state and health of the populations.

3.3 Problems with the assessment of the strength of connection line of evidence

In comparison with the evidence from the trends resulting in the population line of evidence shown in column 2 of Table 4-4 (Figure 1), the final impact assessment in the right hand column only shows a large effect for one fish, the hogchoker. There is also a moderate to large effect for a single species, white perch. The reason why so few of the large trends are translated into a large impact relates to the strength of connection measure in the third column of the table. A consideration of this measure and how it is computed is therefore of key importance.

From NUREG-1437 Vol. 2 (page H-29) we have this description of how strength of connection is measured.

> *"Impingement and/or entrainment can also remove and reintroduce RIS prey into the aquatic system in a manner that alters food web dynamics and produces indirect effects that may result in decreased recruitment, changes in predator-prey*

relationships, changes in population feeding strategies, or movements of populations closer to or farther away from the cooling system intakes or discharges. Staff based the analysis of impingement on the concordance of two ranked proportions. The first proportion was the ratio of the number of YOY and yearling fish of each species impinged in relation to the sum of all fish impinged. The second proportion was the ratio of each species abundance in the river near IP2 and IP3 relative to the total abundance of all 18 RIS. A large rank for both proportions would mean that the proportion impinged for the given RIS and the proportion abundance in the river were both large. The ratio of these two ranks would then be close to 1, suggesting that the stationary sampler was sampling proportionately to the abundance in the river (a medium strength of connection)."

The first point to note is that the analysis is undertaken by comparing a species' **proportional rank abundance** in the power station kill with that living in the river. Rather oddly, a fish that contributes the highest proportion to the number of individuals killed by the power plant, and which is also the commonest in the river, only has a medium strength of connection. In our opinion, such a situation where a fish is killed in high numbers and is locally common would suggest a high linkage. This is a point that needs consideration and critical appraisal. The effect is to reduce the assessment of the power plant's impact on abundant, commonly-caught fish.

The second point to note is that a species which is ranked less common in the power plant kill than in the river will be scored small to moderate. The key point is that the power plant kill may actually reflect the abundance in the river, however the rank could decline if other species are killed in unusually high numbers. Thus, each species is not being fairly assessed on its own merits.

We will now examine the generation of these assessments of the strength of connection line of evidence in more detail. Figure 4 shows the Weight of Evidence for the Strength of Connection table.

Table I-32 Weight of Evidence for the Strength-of-Connection Line of Evidence Based on the Result Scores of Low = 1, Medium = 2, and High = 3

Measurement	Impingement Result Score		Entrainment Result Score		WOE Score[b]	Strength of Connection
	RIS	Prey	RIS	Prey		
Use and Utility[a]	1.9	2.0	1.6	2.1		
Alewife	2	1	2	1	1.5	Low to Medium
Bay Anchovy	2	1	2	1	1.5	Low to Medium
American Shad	2	1	2	1	1.5	Low to Medium
Bluefish	4	2	2	2	2.5	High
Hogchoker	4	1	2	1	2.0	Medium to High
Atlantic Menhaden	Unknown	1	Unknown	1	Unknown	Unknown
Blueback Herring	2	1	2	1	1.5	Low to Medium
Rainbow Smelt	2	1	4	1	1.9	Medium
Shortnose Sturgeon	Unknown	1	Unknown	1	Unknown	Unknown
Spottail Shiner	1	2	1	2	1.5	Low to Medium
Atlantic Sturgeon	Unknown	1	Unknown	1	Unknown	Unknown
Striped Bass	2	4	2	2	2.5	High
Atlantic Tomcod	2	1	2	1	1.5	Low to Medium
White Catfish	2	1	2	1	1.5	Low to Medium
White Perch	2	2	2	2	2.0	Medium to High
Weakfish	2	2	2	2	2.0	Medium to High
Gizzard Shad	Unknown	1	Unknown	1	Unknown	Unknown
Blue Crab	Unknown	1	Unknown	1	Unknown	Unknown

(a) Use and Utility: Low = <1.5, Medium = ≥1.5 but ≤2.0, High = >2.0

(b) WOE Score: Small = <1.5; Small-Moderate = 1.5; Moderate = >1.5 but <2.0; Moderate-Large = 2.0; Large = >2.0

Figure 4: A copy of Table I-32 from NUREG-1437, Vol 2, page I-47.

We will illustrate weaknesses with the approach taken using, as above, a specific example from the list of RIS species.

3.4 Rainbow smelt

Juvenile rainbow smelt have disappeared from the survey since the mid 1990s (Figure 5), and it is therefore unsurprising that Table 4-4 assesses the population line of evidence as '*Large*'. However, the impact of Indian Point 2 and 3 is assessed as moderate because the strength of connection is assessed as '*Medium*'.

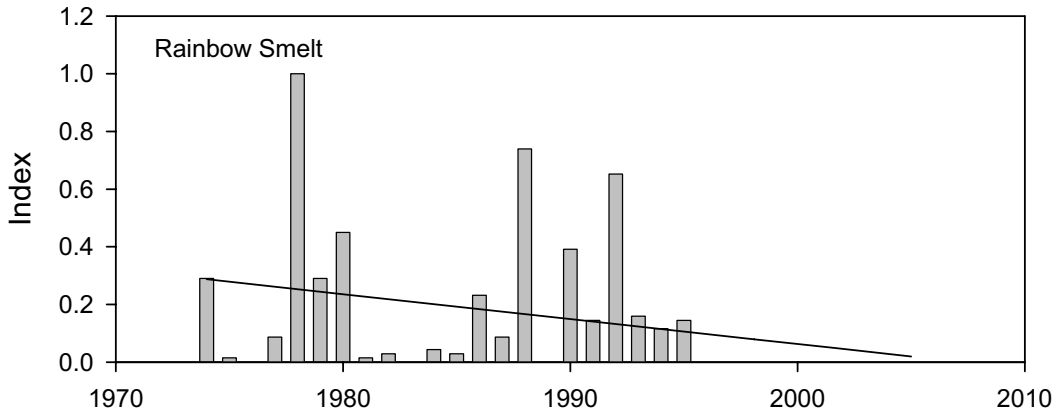

Figure 5: The standardised juvenile index for rainbow smelt in the Hudson.

Examination of Table I-32 (Figure 4) shows why the overall impact is only 'Moderate'. This table shows that both the impingement and entrainment of rainbow smelt has been appreciable, and entrainment has been given the highest score possible of 4. However, the strength of connection is only medium because both the impingement and entrainment prey scores are 1. The reason for this is stated in NUREG-1437, Vol. 2 page I-41.

> *"All remaining YOY RIS eat plankton, zooplankton, benthic invertebrates, and amphipods. These prey were assumed to be unaffected by the cooling systems, and a low strength of connection was concluded."*

This example demonstrates that an unsubstantiated and unproven assumption, that invertebrate prey species are not affected by the cooling water system, leads in turn to the conclusion that the rainbow smelt, a species which has effectively disappeared from the data in recent years and has been assessed as potentially highly impacted by entrainment, is only given a moderate impact in Table 4-4.

Before a conclusion of this nature could be justified, the assertion that the cooling water system has no impact on invertebrate prey species needs to be demonstrated. There is considerable evidence that large numbers of invertebrates are entrained and potentially killed by the cooling water system. There is therefore no reason to believe that invertebrate prey species such as amphipods are not adversely affected. This impact may extend beyond entrainment effects as the heated discharge water may also adversely affect them.

3.5 Other species

Examination of Table I-32 (Figure 4) shows that a number of the RIS species have a prey score for impingement and entrainment of 1, and thus are unlikely to score highly for the strength of connection. This feature of the scoring protocol is thus central to the final outcome. The Atlantic tomcod makes a telling further example. The tomcod population shows considerable year-to-year variation, but appears to be in long-term decline (Figure 6). The average standardised index from 1975 until 1995 is 0.158; in comparison the index for the last ten years of sampling (1996-2005) is only 0.0617. In the last 10 years, only 2001 produced a good recruitment, although there are signs of a recent slight improvement in tomcod numbers.

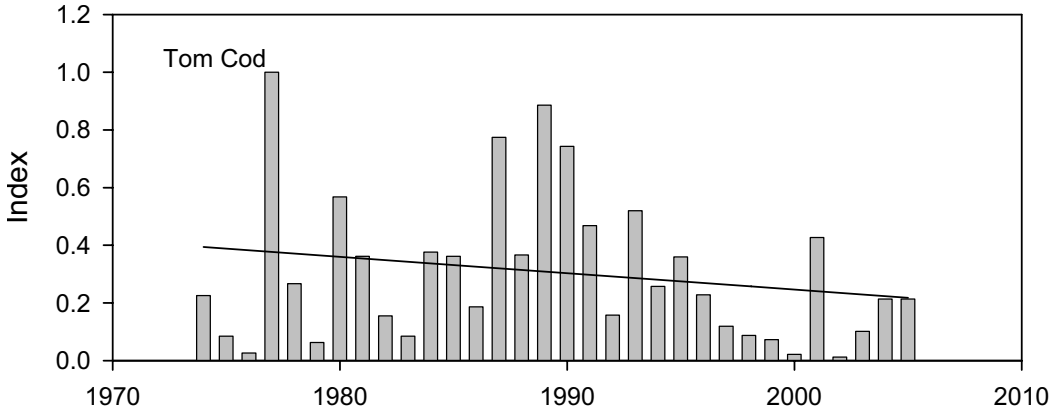

Figure 6: The standardised juvenile index for tomcod in the Hudson showing a decreasing trend though time. (Seaby and Henderson, 2007)

While the population line of evidence for a decline is large, the invertebrate prey of this species is primarily responsible for the low-to medium strength of connection and the final conclusion that the impact is small to moderate.

4 The age of the data

A key underlying point to note about the analysis of impingement and entrainment is the reliance on data collected between 1981 and 1990. These data are old, and may not reflect current conditions. Further, there are hints that the NRC staff did wonder if the data reflected present conditions. For example they noted that the data showed a declining dominance of RIS species:

> *"Until 1984, the RIS fish made up greater than or equal to 95 percent of all impinged taxa. This percentage has significantly decreased at a rate of 0.8 percent per year (linear regression; n = 16; p = 0.002) from 1985 to 1990."*

If impinged data were available for 2008 would we find that the impinged fish had changed even more? The risks inherent with the use of old data are not addressed.

It is worth noting that, although the impingement and entrainment data are over 17 years old, the population data that shows the decline in so many of these species is current. The differences in the population of fish between the 1990s and the present are great.

5 Threatened and Endangered Species

The NRC staff review the number of shortnose and Atlantic sturgeon that are impinged at Indian Point. The data used to assess the impact are old, and the lack of monitoring of impingement means that they do not know if current impingement rates are similar to those between the 1970s and 1990s. In addition, they admit that they cannot assess the thermal impact on these species (page 4-51). Given these large uncertainties the NRC staff come to no conclusion on the impact of Indian Point on theses species, giving a range of small to large for the future impacts.

6 Potential Mitigation Options and Cumulative Impacts

In section 4.1.5 the NRC staff state that they believe that the continued operation of Indian Point will have an adverse effect on the aquatic system of the lower Hudson River; we agree with this statement. However, they then go on to review some of the potential mitigation methods including many that are not viable method for this facility; we believe this review of mitigation options is meaningless. .

Finally, the cumulative adverse impacts of the many factors that affect the Hudson River are considered in section 4.8.1. The NRC staff conclude that the continued operation of Indian Point will have a large impact on some of the species examined, and could be detrimental to the shortnose sturgeon. They also consider that the effects of climate change could be substantial and are an important component of the likely adverse impact.

When all the various factors, including the operation of Indian Point, were considered (p4-58) the overall effects were considered large. Clearly, the Indian Point power plant must take its share of the responsibility and undertake to do as little damage a possible to an already stressed system.

7 Thermal impacts

In NUREG-1437, Vol. 1, page 4-27 NRC staff conclude that thermal impacts associated with the discharge are small to moderate, principally on the grounds that there is no evidence for the scale of the impact:

> *"In the absence of specific studies, and in the absence of effects sufficient to make a determination of a LARGE impacts, the NRC staff concludes that thermal impacts from IP2 and IP# could thus range from SMALL to MODERATE depending on the extent and magnitude of the thermal plume, the sensitivity of various aquatic species and lifestages likely to encounter the thermal plume, and*

the probability of an encounter occurring that could result in lethal or sublethal effects."

The assertion that, because no appropriate evidence has been collected, therefore there is only a small to moderate impact is not logical.

Linked to thermal impacts must be a consideration of climate change impacts. The following conclusion is reached in H-60:

"Thus, the NRC staff has concluded that the cumulative effects of climate change cannot be determined."

We therefore have the odd situation where they are willing to conclude that thermal effects are small to moderate and can therefore be dismissed, yet they cannot determine the effects of climate change. We believe they should have, at the very least, concluded that they needed more data on thermal issues before reaching a conclusion.

8 Conclusion

The assessment of impact on the RIS species is based on a scoring system that initially appears objective and quantitative. However, detailed examination of the method shows that it makes assumptions about the statistical properties of populations, the impact of cooling water systems on invertebrates and the relative importance of local and larger scale changes in population number, that have not been justified.

A particular problem concerns the scoring method used to assess the strength of connection; this is a poor measure of the impact of the power plant on the species. The strength of connection is a flawed measure because it is based on rank abundance, furthermore the lack of importance given to impacts on invertebrates makes low to moderate levels of impact for many species almost inevitable.

The data relied on to measure impingement and entrainment is old, and many populations have shown marked changes since that period. This brings into question the reliability of the conclusions when applied to the future.

Although the NRC does not come to a definite conclusion about the effect of Indian Point on the sturgeon, they are concerned that they continuing operation will have adverse effects.

The cumulative effects of all the impacts on the River Hudson are assed as large. The power plant, along with other users, must take their share of the responsibility and undertake to do as little damage a possible to an already stressed system.

9 References

Seaby, R M H and Henderson, P A, 2007. The status of fish populations and the ecology of the Hudson. Prepared for Riverkeeper, New York.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
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Gloucester, MA 01930-2276

FEB 24 2009

David J. Wrona, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Program
US Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: Biological Assessment for License Renewal of the Indian Point Nuclear Generating Unit Nos. 2 and 3

Dear Mr. Wrona:

This correspondence responds to a letter dated December 22, 2008 (received January 2, 2009) regarding the initiation of formal consultation for the proposed renewal by the US Nuclear Regulatory Commission (NRC) of the Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3) operating licenses for a period of an additional 20 years pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended. The current operating licenses for these units expire on September 28, 2013 (IP2) and December 12, 2015 (IP3). Consultation with NOAA's National Marine Fisheries Service (NMFS) regarding the proposed license renewal is appropriate as the action may adversely affect the federally endangered shortnose sturgeon (*Acipenser brevirostrum*). Accompanying your letter was a Biological Assessment (BA) evaluating the impact of the proposed renewal on federally endangered shortnose sturgeon (*Acipenser brevirostrum*), as well as a copy of the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 39 Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3 Draft Report.* NMFS has completed an initial review of the BA and draft EIS and has determined that we have not received all of the information necessary to initiate consultation. To complete the initiation package, we will require the information outlined below.

Section 4 of the BA contains life history and status information for shortnose sturgeon. Several corrections are necessary in this section. In the Hudson River, shortnose sturgeon spawn when water temperatures are between 8 and 15°C, which typically occurs in April. Recent information suggests that the population estimate calculated by Bain, and included in the BA, likely overestimates the number of shortnose sturgeon in the Hudson River. Dr. Katherine Hattala, a

biologist with the State of New York, has examined the data used by Bain and determined that a more appropriate estimate is approximately 30,000 adult shortnose sturgeon.

Section 4.3.2 of the BA assesses the impact of impingement on shortnose sturgeon. The BA contains a summary of the available information on impingement of shortnose sturgeon (Table 2). NMFS requests that NRC staff provide the following information in regards to Table 2: (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. It is our understanding that no impingement monitoring has been conducted since traveling Ristroph-type screens were installed at the facility in 1991. As noted in the BA, the lack of information makes it difficult to predict the effects of relicensing and an additional 20 years of operation on shortnose sturgeon. If the NRC is not able to require the applicant to conduct monitoring in support of relicensing, NMFS requests that the NRC provide an estimate, based on the best available scientific information, of the likely number of shortnose sturgeon impinged at the facility with the traveling Ristroph-type screens in use. NMFS expects that the NRC could use the existing impingement data in conjunction with data on the effectiveness of Ristroph-type screens to calculate this estimate. As noted in the BA, another important factor is the mortality rate of impinged sturgeons. NMFS requests that NRC provide an estimate of the mortality rate for impinged shortnose sturgeon. NMFS 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.

Section 4.3.3 of the BA discusses thermal impacts. As noted in the BA, without a model of the thermal plume it is extremely difficult to predict what the level of exposure to elevated water temperatures is for shortnose sturgeon. If NRC is unable to require that the applicant conduct modeling of the thermal plume in support of relicensing, NMFS requests that the NRC use the best available scientific information to estimate the likely temporal and spatial extent to which shortnose sturgeon will be exposed to water temperatures where adverse effects are likely (i.e., greater than 28°C).

It is NMFS understanding that the proposed action is the relicensing of the facility with no modification to the existing intakes. However, in the DEIS, the NRC discusses alternatives including cooling towers. NMFS seeks clarification as to the process by which the NRC will determine whether the installation of cooling towers, or other measures, will be required of the applicant. NMFS also seeks clarification regarding the current requirements of the National Pollutant Discharge Elimination System (NPDES) Permit issued by the State of New York and the potential outcome of the adjudication process currently ongoing regarding this permit, as well as the potential for the State NPDES permit to require cooling towers.

The formal consultation process for the proposed action will not begin until we receive all of the requested information or a statement explaining why that information cannot be made available. We will notify you when we receive this additional information; our notification letter will also outline the dates within which formal consultation should be complete and the biological opinion

delivered. My staff is available to discuss these information needs with NRC staff. I look forward to continuing to work with you and your staff during the consultation process. If you have any questions or concerns about this letter or about the consultation process in general, please contact Julie Crocker at (978) 282-8480.

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

cc: Crocker, F/NER3 (hardcopy)
Damon-Randall, Hartley – F/NER3 (pdf)
Rusanowsky– F/NER4 (pdf)
Logan – NRC (pdf)

File Code: Sec 7 NRC Indian Point Nuclear Plant Relicensing

PCTS: F/NER/2009/00619

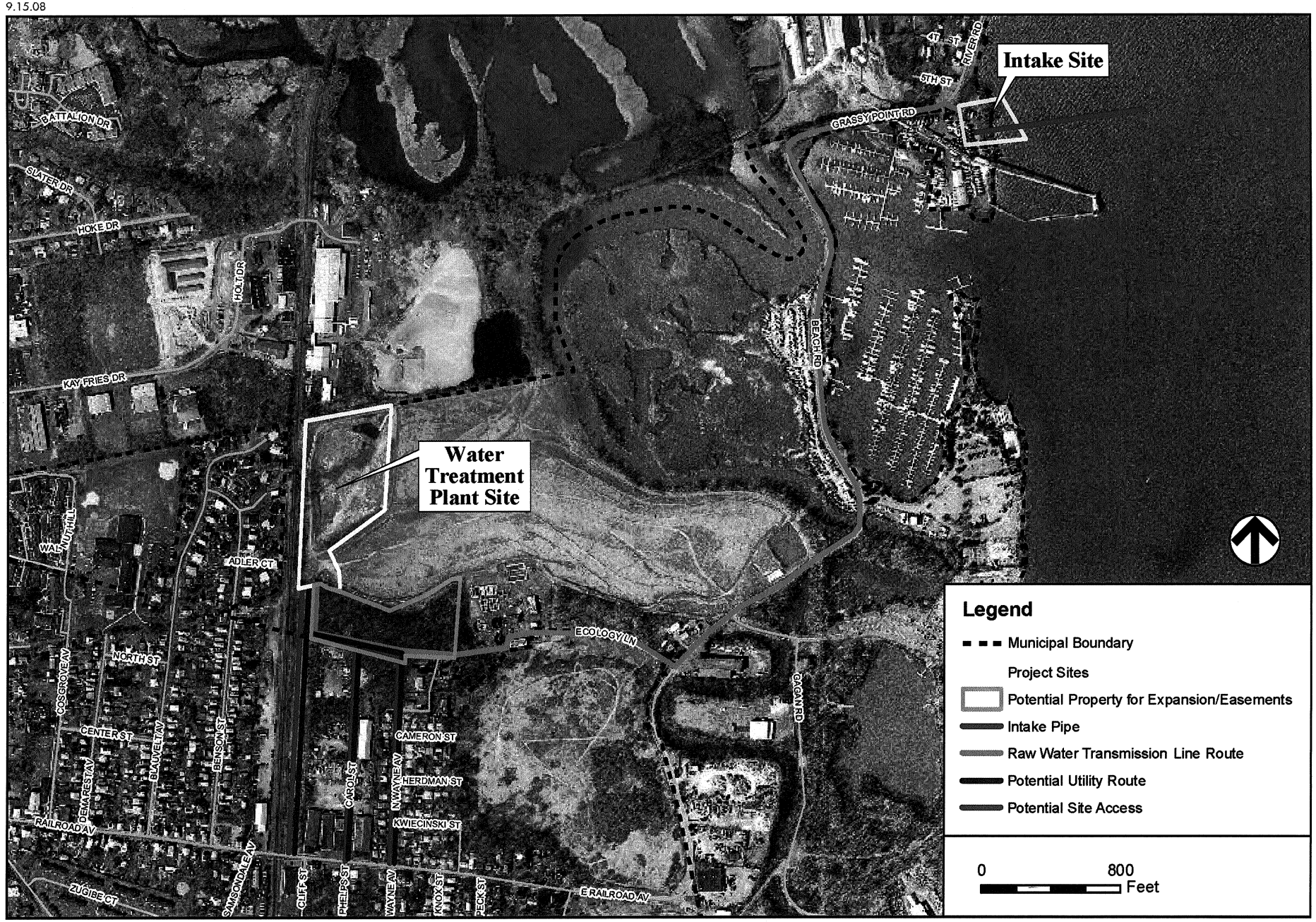
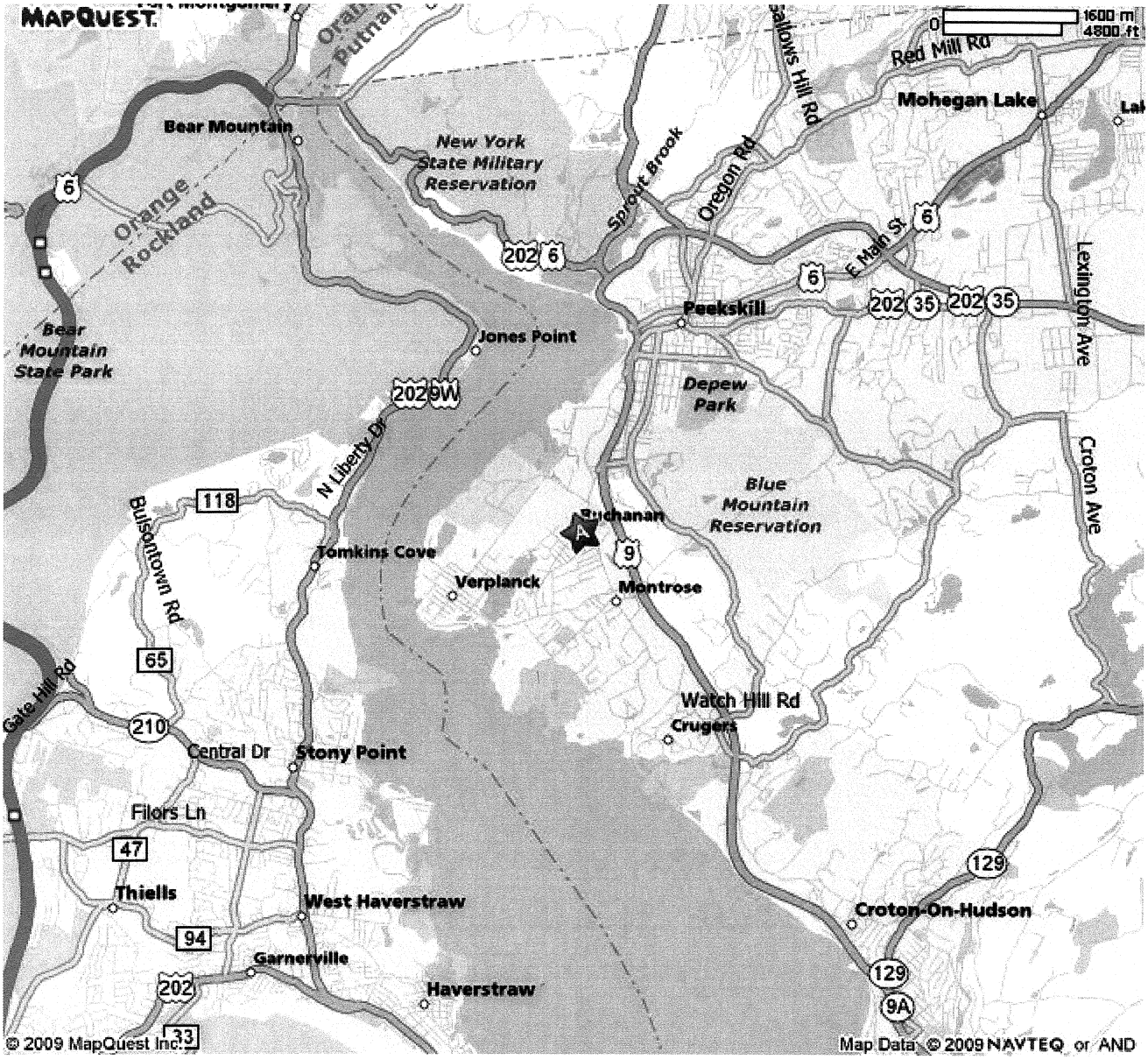


Figure 2-2

UNITED WATER Haverstraw Water Supply Project

Project Site Boundaries



New York State Department of Environmental Conservation
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21 South Putt Corners Road, New Paltz, NY 12561-1620
Phone: (845) 256-3033 • **FAX:** (845) 255-3042
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

March 9, 2009

Ms Rebecca Troutman
Riverkeeper
828 South Broadway
Tarrytown, NY 10591

Dear Ms Troutman:

Thank you for your letter of January 12, 2008 regarding United Water New York, Inc.'s Proposal to Build a Desalination Plant in Rockland County. Your letter expressed the concern that that "every component of this Project warrants the highest scrutiny under applicable federal and state laws, and all relevant policy considerations," and urged the Department to assume Lead Agency status under the State Environmental Quality Review Act for the project.

The Department's regional staff, on February 10, 2009, forwarded to Riverkeeper staff letters addressing the environmental review of this proposal. These letters are attached for your consideration. These letters addressed the Department's intentions regarding the SEQRA review of both the pilot plant and the long-term plant associated with this proposal, and indicated the Department's intent to be the lead agency for such review.

The Department has not received any objections to our lead agency status, and no such objections being submitted as required by law, now assumes the Lead Agency role for the environmental review. In response to your letter, the Department intends to conduct a full and thorough SEQRA review as required by law, and welcomes full and open participation of the public in that process as it moves forward.

Thank you for your interest in the Department's role in the consideration of the proposed project. We look forward to your and others participation.

Sincerely,

William C. Janeway
Regional Director