RIVERKEEPER®

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VIA FIRST CLASS MAIL AND E-MAIL

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Re: Entergy Nuclear Operations, Inc. Application for Section 401 – Clean Water Act Water Quality Certification for Indian Point Units 2 and 3, DEC Application ID Nos. 3-5522-00011/00030, 3-5522-00105/00031

Dear Mr. Hogan:

Riverkeeper, Inc. ("Riverkeeper") hereby respectfully submits the following comments on the above-referenced Application of Entergy Nuclear Operations, Inc. ("Entergy") under § 401 of the federal Clean Water Act for a Water Quality Certification for Indian Point Units 2 and 3 (hereinafter referred to as "Entergy's Application for WQC"). Entergy's Application for WQC was submitted to the New York State Department of Environmental Conservation ("DEC") on April 3, 2009 in connection with Entergy's pending application with the U.S. Nuclear Regulatory Commission ("NRC") to renew the operating licenses for Indian Point Units 2 and 3 for an additional 20 years beyond the expiration of their original operating licenses. DEC's Environmental News Bulletin ("ENB") issued on March 3, 2010 noticed DEC's determination that Entergy's Application for WQC was complete for the purposes of soliciting public comment and subsequent rendering of a final decision on the matter.

As DEC's ENB explains, § 401 of "[t]he federal Clean Water Act requires that, prior to the issuance of a federal license or permit, the State must certify that the action meets State water quality standards." Thus, Entergy is seeking certification from DEC that the proposed action of license renewal, i.e., continued operation of Indian Point Units 2 and 3 for twenty years beyond their current license terms, would not violate New York State water quality standards. A review of Entergy's Application for WQC and supplemental documentation in support thereof reveals that extended operation of Indian Point would fail to meet all relevant State water quality standards. Accordingly, DEC must deny Entergy's request for § 401 certification.

I. Riverkeeper's Interest

Riverkeeper is a not-for-profit organization dedicated to protecting the ecological integrity of the Hudson River.[1] Since its inception in 1966, Riverkeeper has used litigation, science, advocacy, and public education to raise and address concerns relating to the operation of the Indian Point nuclear power plant. For decades, Riverkeeper has fought tirelessly against Entergy's continued use of an environmentally destructive cooling water intake system at Indian Point. In more recent years, Riverkeeper has been actively involved in addressing newly discovered accidental leaks of radioactive water to the environment from degraded plant components. As parties in both the license renewal proceeding currently pending before the NRC, and in the ongoing Indian Point State Pollution Discharge Elimination System ("SPDES") permit renewal proceeding, Riverkeeper continues to play an integral role in addressing such issues.

With such extensive involvement in these matters, Riverkeeper is uniquely situated to provide valuable feedback to inform DEC's assessment of whether continued operation of Indian Point would be consistent with New York State water quality standards.

II. New York State Water Quality Standards

The operation of Indian Point has an impact upon the Hudson River, as well as the groundwater beneath and around the plant. New York State water quality standards applicable to these waters encompass intended designated uses of the water, as well as narrative and numerical water quality criteria, as set forth in 6 N.Y.C.R.R. Parts 701, 702, 703, and 704. For purposes of deciding if § 401 water quality certification is appropriate here, DEC must determine whether Entergy's proposed action of license renewal would comply with these standards.[2]

a. Relevant Designated Uses

Generally, New York State classifications of surface waters for their best uses dictate that the Hudson River "shall be suitable for fish, shellfish, and wildlife propagation and survival."[3] Moreover, for all portions of the Hudson River, DEC has consistently designated fishing as a "best usage."[4] In the particular region where Indian Point is located, the Hudson River is classified as "SB saline surface waters."[5] The "best usages" of this class of water are "primary

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[1] *See* Riverkeeper.org, Our Story, http://www.riverkeeper.org/ourstory_index.php (last visited March 24, 2010).

[2] Entergy's suggestion that compliance with past and future SPDES permits should be deemed compliance with New York State water quality standards for purposes of § 401 certification is utterly misplaced. Rather, as this is a proceeding that is completely separate from the ongoing SPDES case, DEC is tasked with making independent determinations regarding compliance with State standards.

[3] DEC has assigned varying classifications to different portions of the Hudson River including "Class I saline surface waters," "Class SB saline surface waters," "Class A fresh surface waters," "Class B fresh surface waters," "Class C fresh surface waters," and "Class AA fresh surface waters." *See* 6 N.Y.C.R.R. §§ 864.6, 858.4, 941.6. All of these classifications state that such "waters shall be suitable for fish, shellfish, and wildlife propagation and survival." *See* 6 N.Y.C.R.R. §§ 701.5, 701.6, 701.7, 701.8, 701.11, 701.13.

[4] The varying classifications of the Hudson River (*see supra* Note 3), all designate fishing as a "best usage." *See* 6 N.Y.C.R.R. §§ 701.5, 701.6, 701.7, 701.8, 701.11, 701.13.

[5] *See* 6 N.Y.C.R.R. § 864.6 (classifying the portion of the Hudson River from the New York State Bronx County line to Bear Mountain Bridge as "Class SB saline surface waters").

and secondary contact recreation and fishing."[6] This includes "recreational activities where the human body may come in direct contact with raw water to the point of complete body submergence," such as "swimming, diving, water skiing, skin diving and surfing,"[7] and "recreational activities where contact with the water is minimal and where ingestion of the water is not probable," such as "fishing and boating."[8] Varying portions of the rest of the Hudson River have also been designated for such primary and/or secondary contact recreational purposes.[9]

Regarding groundwater, all fresh groundwaters of New York State are classified as "GA fresh groundwaters."[10] The groundwater at Indian Point falls within this classification.[11] The best usage of "GA fresh groundwater" is "as a source of potable water supply."[12] "Potable water" is defined as "those fresh waters usable for drinking, culinary or food processing purposes."[13]

b. Relevant Narrative Standards

Narrative standards applicable to the Hudson River and New York State groundwaters provide, *inter alia*, that toxic or other deleterious substances shall not be present in the water in amounts that "impair the waters for their best usages."[14]

Another pertinent water quality standard related to thermal water impacts states that "[a]ll thermal discharges to the waters of the State shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water."[15]

Lastly, New York's water quality standards also require that "[t]he location, design, construction and capacity of cooling water intake structures, in connection with point source thermal discharges, shall reflect the best technology available for minimizing adverse environmental impacts."[16]

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[6] 6 N.Y.C.R.R. § 701.11.
[7] 6 N.Y.C.R.R. § 700.1(a)(49).
[8] 6 N.Y.C.R.R. § 700.1(a)(56).
[9] The portion of the Hudson River from the mouth at the New York Harbor to the New York State Bronx County line is classified as "Class I saline surface waters," the best uses of which are for secondary contact recreation and fishing. *See* 6 N.Y.C.R.R. §§ 864.6; 701.13. Upstream of Indian Point, the Hudson River is classified as either "Class A fresh surface waters," "Class B fresh surface waters," "Class C fresh surface waters," or "Class AA fresh surface waters." *See* N.Y.C.R.R. §§ 858.4, 941.6. The "best usages" for all of these classes of water include "primary and secondary contact recreation." *See* N.Y.C.R.R. § 701.5, 701.6, 701.7, 701.8.
[10] 6 N.Y.C.R.R. §§ 701.18, 701.15.
[11] *See* Entergy's Detailed Responses to the New York State Department of Environmental Conservation's Request for Information, dated May 13, 2009) at 8, *available at*, http://www.dec.ny.gov/docs/permits_ej_operations_pdf/elecbdrdetresp.pdf.
[12] 6 N.Y.C.R.R. § 701.15.
[13] 6 N.Y.C.R.R. § 700.1(a)(48).
[14] 6 N.Y.C.R.R. § 703.2.
[15] 6 N.Y.C.R.R. § 704.1(a).
[16] 6 N.Y.C.R.R. § 704.5

III. The Cooling Water System At Indian Point Would Be Inconsistent With New York State Water Quality Standards

Since the operation of Indian Point Units 2 and 3 began in 1973 and 1975, respectively, an antiquated once-through cooling water intake structure has drawn in and discharged approximately 2.5 billion gallons of Hudson River water per day, killing millions of fish, eggs, and larvae annually through entrainment, impingement, and heat related impacts.[17] Submissions to DEC in support of Entergy's Application for WQC reveal Entergy's desired plan to continue using once-through cooling methodology during the proposed period of extended operation, and install "cylindrical wedge wire screens" to mitigate adverse aquatic impacts, in lieu of a closed-cycle cooling system. Notwithstanding dubious and as-yet uncorroborated statements that installation of cylindrical wedge wire screens would adequately mitigate fish mortality, the reality is that substantial entrainment, impingement, and thermal impacts would persist and continue to impact the Hudson River if Entergy operates in the manner proposed. This violates New York State water quality standards in the following ways.

a. The Cooling Water Intake Structure at Indian Point Would Fail to "reflect the best technology available for minimizing adverse environmental impacts"

Entergy's vision of operating Indian Point Units 2 and 3 for a 20-year extended operating period with continued use of a once-through cooling water intake structure and installation of cylindrical wedge wire screens utterly fails to meet New York State's water quality standard that cooling water systems "reflect the best technology available for minimizing adverse environmental impacts."

In fact, DEC recently put forth a proposed policy establishing "closed-cycle cooling or its equivalent as the performance goal for the best technology available (BTA) to minimize adverse environmental impact pursuant to Section 704.5 of 6 NYCRR" for all existing industrial facilities in New York.[18] This policy acknowledges that "[t]he demonstrated technology that achieves the greatest reduction in non-contact cooling water use is closed-cycle cooling."[19] DEC's new policy explains that wet closed-cycle cooling reduces cooling water requirements by at least 93-98 percent from that required by once-through cooling technology.[20] As DEC Commissioner Pete Grannis states, "[w]ith this policy, New York is saying that closed cycle cooling is the best

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[17] *See generally* Entrainment, Impingement and Thermal Impacts at Indian Point Nuclear Power Station, Pisces Conservation Ltd., November 2007, *available at*, http://www.riverkeeper.org/wp-content/uploads/2010/03/1397-PH-Henderson-Attachment-3-Expert-Report-Cont-EC-1.pdf (hereinafter "Pisces IP Report"); NYSDEC Fact Sheet, NY SPDES Draft Permit Renewal with Modification, Indian Point Electric Generating Station (Buchanan, NY – November 2003), at 2, Attachment B, page 1, http://www.dec.ny.gov/docs/permits_ej_operations_pdf/IndianPointFS.pdf ("Each year Indian Point Units 2 and 3. . . cause the mortality of more than a billion fish from entrainment of various life stages of fishes through the plant and impingement of fishes on intake screens. . . . Thus, current losses of various life stages of fishes are substantial.").

[18] NYSDEC Draft Policy, Best Technology Available (BTA) for Cooling Water Intake Structures (March 4, 2010), at 1, 4, *available at*, http://www.dec.ny.gov/docs/fish_marine_pdf/drbtapolicy1.pdf.

[19] *Id.* at 4.

[20] *See id.*

technology available and must be implemented to protect the environment . . . . This is a positive step forward that will result in long-term benefits for our natural resources."[21]

In connection with Entergy's Application for WQC, Entergy has essentially proclaimed the infeasibility of closed-cycle cooling at Indian Point and instead proposes an "alternative" cooling technology that would demonstrably fail to attain the performance level of a closed-cycle system. Aquatic biology experts at Pisces Conservation Ltd. have advised Riverkeeper that, overall, closed-cycle cooling is overwhelmingly superior to the proposed screens in reducing aquatic impacts. These experts have indicated that it would be impossible for the proposed screens to be as effective as closed-cycle cooling in reducing such impacts. Thus, despite Entergy's expert report which presents a self-serving and distorted cumulative impact analysis indicating otherwise (and the overall veracity of which is still the subject of active litigation to which Riverkeeper is a party), it is apparent that cylindrical wedge wire screens would not reduce aquatic impacts to any level approaching that which closed-cycle cooling could achieve. As such, operation of the facility during a license extension period as proposed would result in substantial avoidable impacts to aquatic life of the river, in violation of New York State's water quality standard that cooling water systems "reflect the best technology available for minimizing adverse environmental impacts."

b. The Cooling Water Intake Structure at Indian Point Would be Inconsistent with the Best Use of the Hudson River as "suitable for fish, shellfish, and wildlife propagation and survival"

The operation of Indian Point Units 2 and 3 for an additional 20 years beyond the expiration of their current operating licenses with continued use of a once-through cooling water intake structure would be completely inconsistent with the best use of the Hudson River as acceptable habitat for fish, shellfish, and wildlife.

The once-through cooling water system employed at Indian Point has a profound impact upon fish in the Hudson River.[22] For example, estimated averages for years where data is available show that the once-through cooling system at Indian Point has been recorded to entrain about 13 million American shad, 327 million bay anchovy, 467 million river herring, 158 million striped bass, and 243 million white perch annually, and impinge over 1.2 million fish a year among just 8 species sampled, causing significant mortality.[23] The decimation of aquatic life caused by the once-through cooling at Indian Point is truly staggering. DEC has characterized the destructive

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[21] NYSDEC Press Release, *DEC Takes Action to Protect Aquatic Life, Limit Water Intake by Certain Industrial Facilities* (March 10, 2010), http://www.dec.ny.gov/press/63408.html (last visited March 24, 2010).

[22] *See supra* Note 17.

[23] *See* NYSDEC Hudson River Power Plants FEIS (June 25, 2003), at 2-3, *available at* http://www.dec.ny.gov/docs/permits_ej_operations_pdf/FEISHRPP1.pdf (hereinafter "NYSDEC Power Plants FEIS"); Pisces IP Report at 12. This data captures only a limited number of fish species, offering a very conservative picture of the devastation that has been caused by the cooling system at Indian Point. *See id.* at 4 ("Notably, "[t]he species for which entrainment mortality has been quantified form only a very small proportion of the total species present in the estuary. As was noted in the FEIS (page 53): '*Finally, although impingement and entrainment mortality is measured, it is typically measured only for several of the 140 species of fishes found in the Hudson. Information about the impact on the full suite of aquatic organisms is limited.*' The impact on other species is un-quantified and may be significant.") (emphasis in original).

impacts associated with the operation of once-through cooling water intake structures as "comparable to habitat degradation; the entire natural community is impacted. . . . [I]mpingement and entrainment and warming of the water impact the entire community of organisms that inhabit the water column."[24]

Nearly 40 years of such degradation resulting from the use of once-through cooling at Indian Point has resulted in serious long-term impacts. Evidence indicates an increasingly unstable ecosystem and long-term declines for several signature Hudson River fish species. A Riverkeeper report released in May 2008 ("Pisces Report"), revealed that many Hudson River fish are in serious long-term decline.[25] As DEC has stated, such "[d]eclines in the abundances of several species and changes in species composition raises concerns and questions regarding the health of the River's fish community."[26] With, by far, the largest water intake on the Hudson estuary, slaughtering hundreds of millions, and possibly over a billion aquatic organisms every year, the once-through cooling water intake structure at Indian Point has undoubtedly contributed to such decline, destabilization, and loss of aquatic resources.[27]

Entergy's insistence on relying upon an obsolete cooling technology and refusal to implement a far-superior closed-cycle system, would lead to two additional decades of enormous entrainment, impingement, and heat impacts on an already precarious ecosystem. This will lead to ongoing habitat degradation, and only further exacerbate the current decline and destabilization of Hudson River fish populations. Thus, continued operation of Indian Point in the manner proposed is wholly contrary to New York State's water quality standard that the Hudson River be "suitable for fish, shellfish, and wildlife propagation and survival."

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[24] NYSDEC Hudson River Power Plants FEIS (June 25, 2003), Public Comment Summary at 53-54, http://www.dec.ny.gov/docs/permits_ej_operations_pdf/FEISHRPP5.pdf (hereinafter "NYSDEC Power Plants FEIS Comment Summary").

[25] *See* The Status of Fish Populations and the Ecology of the Hudson, Pisces Conservation Ltd., April 2008, *available at*, http://www.riverkeeper.org/wp-content/uploads/2009/06/Status-of-Fish-in-the-Hudson-Pisces.pdf (hereinafter "Pisces 2008 Status of Hudson River Fish Report") (analyzing 13 "key" species of the Hudson River, and finding that 10 such species are in decline); *see also* NYSDEC Power Plants FEIS Comment Summary at 57 ("Several species of fish in the Hudson River estuary, such as American shad, white perch, Atlantic tomcod and rainbow smelt, have shown trends of declining abundance.").

[26] NYSDEC Power Plants FEIS Comment Summary at 58.

[27] *See, e.g.,* Pisces 2008 Status of Fish Report at 37-38 ("The impact of Indian Point is the largest of several impacts from once-through cooling on the Hudson. When all the power plants are considered, the impact is large. . . 'Tens- to hundreds-of-millions of eggs, larvae, and juvenile fishes of several species are killed per year for once-through users. The cumulative impact of multiple facilities substantially reduces the young-of-year (YOY) population for the entire river.' . . . in some years these effects have been very large . . . between 33 – 79% reductions in Young of Year population. . . . Even if the power companies are not the sole cause of degradation of the Hudson River fish community, the loss of such high proportions of the fish populations must be important." (quoting NYSDEC Water Quality 2006 Report)); *see also* NYSDEC Power Plants FEIS Comment Summary at 58 (expressly recognizing that "[t]he millions of fish that are killed by power plants each year represent a significant mortality and are yet another stress on the River's fish community" that "must be taken into account when assessing these population declines."); NYS Governor's Office, Press Release, *With American Shad Stocks at Historically Low Levels, Governor Paterson Announces New Initiatives to Rebuild and Protect Hudson River Fisheries* (May 28, 2008), *available at*, http://www.state.ny.us/governor/press/press_0528082.html (last visited March 24, 2010) (In the context of announcing that Hudson River fisheries are in trouble, recognizing that "[t]he number of fish entering water intake pipes each year at the two Indian Point nuclear power plants alone is significant – over 1.2 billion fish eggs and larvae, including bay anchovy, striped bass, and Atlantic tomcod – with the vast majority dying during the process. Another 1.18 million fish per year become trapped against intake screens and likely die.")

In addition to severely degrading the overall aquatic ecology of the Hudson River, the cooling water intake at Indian Point has also impacted endangered aquatic resources. Data indicates that about 700 endangered shortnose sturgeons were impinged at Indian Point from 1975 to 1990, the only timeframe for which any data is available.[28] Notably, Entergy does not currently have the required "take" permit to sanction such impacts. Additionally, proposed candidate species Atlantic sturgeon, which is currently undergoing consideration for listing by National Marine Fisheries Service in a 90-day finding proceeding,[29] has also been impacted by Indian Point's cooling water intake structure. Data shows that from 1975-1988, again, the only timeframe for which data is available, almost 4,000 Atlantic sturgeon were impinged by Indian Point.[30] No information exists to suggest that the historic rate of impingement of these critical species has changed since monitoring ceased, and presumably, harmful impacts to these fish have continued since 1990 and 1988, respectively. Entergy's plan to continue using once-through cooling methodology would result in ongoing mortality of endangered aquatic resources, once again, contrary to New York State's water quality standard that the Hudson River be "suitable for fish, shellfish, and wildlife propagation and survival."

c. *The Cooling Water Intake Structure at Indian Point Would be Inconsistent with the Best Use of the Hudson River for Recreational Fishing Purposes*

The operation of Indian Point Units 2 and 3 for an additional 20 years beyond the expiration of their current operating licenses with continued use of a once-through cooling water intake structure would be inconsistent with the best use of the Hudson River for recreational fishing purposes.

With Indian Point's destructive cooling water system contributing to overall declines in numerous fish populations in the Hudson River, diminished fish stocks exist in the river, and accordingly, less fish are available for the enjoyment of sport fisherman. With operation of the plant for an additional 20 years as proposed, such trends will persist. Ongoing entrainment, impingement, and excessive heat will continue to cause fish mortality and further contribute to general deterioration of fish communities, thereby impacting the ability to recreationally fish the river.

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[28] *See* Generic Environmental Impact for License Renewal of Nuclear Plants, Supplement 38, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3, Draft Report for Comment, December 22, 2008, *available at* http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/supplement38/, ("IP Relicensing DSEIS"), at pg. 4-51 to 4-52.

[29] *See* Endangered and Threatened Wildlife; Notice of 90–Day Finding on a Petition to List Atlantic Sturgeon as Threatened or Endangered under the Endangered Species Act (ESA), Docket No. 0912231440–91443–01, RIN 0648–XT28, 75 Fed. Reg. 838 (Jan. 6, 2010).

[30] *See* IP Relicensing DSEIS at pg. 4-51 to 4-52; *see also* Letter from F. Dacimo (Entergy Nuclear Operations, Inc.) to U.S. Nuclear Regulatory Commission, Re: Transmission of Additional Requested Information Regarding Sturgeon Impingement Data, Indian Point Nuclear Generating Unit Nos. 2 & 3, Docket Nos. 50-247 and 50-286, License Nos. DPR-26 and DPR-64 (July 1, 2009), ADAMS Accession No. ML091950345, Table 2c., pgs. 24-37, Table 3c., pg. 40, Table 3d., pg. 42 and Table 4, pg. 42; Letter from F. Dacimo (Entergy Nuclear Operations, Inc.) to U.S. Nuclear Regulatory Commission, Re: Entergy Nuclear Operations Inc. Reply to Request for Additional Information (RAI) Environmental Report - Impingement Data, Indian Point Nuclear Generating Unit Nos. 2 & 3, Docket Nos. 50-247 and 50-286, License Nos. DPR-26 and DPR-64 (September 24, 2009), ADAMS Accession No. ML092810351.

Moreover, diminishing numbers of fish in the Hudson River, due in part to once-through cooling water system impacts, have led to efforts to affirmatively ban certain kinds of recreational fishing. For example, DEC recently announced regulations which prohibit recreational fishing of American shad, a popular sport fishing target of Hudson River anglers,[31] due to historically low levels of the species in the river.[32] Similarly, the Atlantic States Marine Fisheries Commission recently approved an amendment to the Interstate Fisheries Management Plan which establishes a coastwide moratorium on commercial and recreational fishing of river herring as of January 1, 2013, absent a showing of sustainability.[33] With herring in peril in the Hudson River,[34] New York may very well seek to impose a ban on fishing of that species in the near future as well. Such bans on fishing would demonstrably impede the ability of fisherman to freely recreate in the Hudson River. Notably, data indicates that the once-through cooling water intake structure at Indian Point has impacted such species, thereby contributing to the population decline that has necessitated such measures.[35] For example, Indian Point has killed as many as 10 million American shad and 371 million river herring per year due to entrainment alone.[36] Operation of Indian Point with massive water withdrawals for 20 additional years will only lead to ongoing impacts that will continue to contribute to the need for prohibitions against certain fishing in the river.

It is, therefore, clear that continued operation of Indian Point as proposed by Entergy would conflict with New York State's designated best use of the Hudson River for fishing.

d. The Cooling Water Intake Structure at Indian Point Would be Inconsistent with the Narrative Standard that All Thermal Discharges "assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water"

Operating Indian Point with a once-through cooling water system during a 20 year extended operating period would be inconsistent with New York State's narrative criteria that thermal discharges support healthy fish habitat.

The billions of gallons of water that would continue to be withdrawn from the Hudson River on a daily basis would absorb huge amounts of heat as it is used to cool plant systems. This massive amount of heated water will continue to be released into the Hudson River, resulting in ongoing deleterious impacts to aquatic life. A scientific report prepared for Riverkeeper in 2007 discussing the effects of heated water on river life explains that "[t]emperature can affect survival, growth and metabolism, activity, swimming performance and behavior, reproductive

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[31] *See* NYSDEC, Hudson River Recreational Fishing Survey, http://www.dec.ny.gov/animals/37214.html (last visited March 24, 2010.)

[32] NYSDEC Press Release, *DEC Proposes American Shad Fishery Closures* (November 18, 2009), *available at*, http://www.dec.ny.gov/press/59881.html (last visited March 24, 2010); NYSDEC Press Release, *DEC Enacts Closures and Restrictions for American Shad Fisheries* (March 17, 2010), *available at*, http://www.dec.ny.gov/press/63619.html (last visited March 24, 2010).

[33] *See* Atlantic States Marine Fisheries Commission, News Release, *ASMFC Approves American Shad Amendment*, February 5, 2010 *available at*, http://www.asmfc.org/press_releases/2010/pr05ShadAmendment3.pdf.

[34] *See* Pisces 2008 Status of Hudson River Fish Report.

[35] *See generally* Pisces IP Report.

[36] *See* NYSDEC Power Plants FEIS at 3.

timing and rates of gonad development, egg development, hatching success, and morphology" of Hudson River fish species.[37] Many such effects on fish species can occur well below upper lethal temperature levels.[38] Increased water temperature from heated discharges of once-through cooling structures many also interfere with proper fish migration.[39]

The thermal discharges from Indian Point indisputably reach levels that produce such adverse impacts.[40] As revealed from the discussion above, such impacts have also played a role in the overall decline and destabilization of Hudson River fish populations. Now Entergy would like to operate for 20 additional years with a cooling water system that would not mitigate the thermal impacts to aquatic life of the river in any way. Mere installation of cylindrical wedge wire screens with use of once-through cooling would do nothing to modify the severe thermal output which emanates from the plant. Clearly, continued operation in this manner will not "assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water" as required by New York's narrative water quality standard.

IV. Radioactive Discharges from Indian Point are Inconsistent with New York State Water Quality Standards

a. The Radioactive Leaks at Indian Point Would Violate the Best Use of Groundwater for Potable Purposes

DEC correctly identifies concerns related to previous and ongoing long-running leaks from spent fuel pools and other systems, structures, and components at Indian Point.[41] Leakage issues at Indian Point have proven to be a persistent problem. Decades of surprise inadvertent releases of radioactive water have resulted in at least two extensive groundwater plumes underlying the site.[42] With no intentions to remediate the contamination, the radionuclide plumes will remain in the groundwater and/or slowly leach to the Hudson River for decades to come.

If the Indian Point units are operated for an additional 20 years during an extended operating period, it is reasonably foreseeable that future accidental leaks will add to the existing plumes.

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[37] Pisces IP Report, at 29-36.

[38] *See id.* at 25, 30.

[39] *See generally id.* at 32-35.

[40] *See, e.g. id.* at 25, 36 ("The cooling water discharge [from Indian Point] is large and affects the receiving waters of the Hudson River. In recent years (2000 to 2007), the discharge temperature regularly exceeded 90°F and in summer frequently exceeded 100°F. A temperature exceeding 100°F will produce lethal conditions for aquatic life of all kinds, including algae, crustaceans and fish. . . . [A]n upward trend in the background temperature of the river, and a corresponding trend down in dissolved oxygen . . . will result in increased harm from thermal pollution, if present levels of heat discharge continue into future. . . . The spatial and vertical extent of the Indian Point plume is sufficient to raise concerns about the passage of fish and impacts on the benthic life of the river.").

[41] Contrary to Entergy's assertions that DEC has no authority to inquire about the radioactive leaks at the plant, DEC is charged with making a decision as to whether the contamination is consistent with the State's water quality standards. Determining such consistency is a far cry from "regulating the operation of a nuclear power plant" as Entergy maintains.

[42] *See* E-mail from James Noggle, NRC, to Timothy Rice and Larry Rosenmann of the NYSDEC (Nov. 6, 2006), NRC ADAMS Accession No. ML070400157; 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.

This is especially so with regard to potential future leakage from the Indian Point spent fuel pools. In fact, Entergy has yet to even definitely prove that active leaks from the spent fuel pools have ceased. This is because Entergy has been unable to inspect 40% of the Unit 2 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.[43] Entergy has explicitly acknowledged that "active leaks cannot be completely ruled out."[44] Such potential leakage would continue to add to the present groundwater contamination.

Furthermore, Entergy has no preventative measures in place to be able to detect future leaks from the pools during the proposed relicensing term.[45] Rather, Entergy relies upon a one-time inspection of the limited accessible portion of the liner for its assurance that the liner is sound and will remain sound throughout the proposed 20-year relicensing term. Instead of committing to necessary augmented inspections of the spent fuel pool liners now and during a period of extended operation, Entergy would simply depend upon a groundwater monitoring program. However, such a method would only be able to discover leaks *after* they occur. With a history of problems indicating a degraded condition of the spent fuel pools, failure to fully discern the extent of the current leakage, and no measures in place to be able to anticipate and avert future leaks from the pools, it is likely that additional accidental releases of radioactive water from the spent fuel pools will occur and add to the already extensive contamination in the groundwater.

It is further foreseeable that leaks from other plant systems may occur and thereby contribute to the existing radionuclide plumes. As a facility with a noted history of safety problems and aging plant components, such occurrences are prone to happen in the future.

Thus, the operation of Indian Point for an additional 20 years will lead to foreseeable radioactive leaks from plant systems, structures and components, and, as a result thereof, persistent and ever-accumulating contamination in the groundwater beneath the site. This is inconsistent with New York State water quality standards for the following reasons.

The designated best usage of the groundwater beneath Indian Point is as a source of potable water supply, i.e., for drinking, culinary, or food processing purposes. New York State's narrative standard applicable to groundwater dictates that deleterious substances not "impair the

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[43] *See* 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, NRC ADAMS Accession No. ML090150653 ("IP SER").

[44] *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; *see also* IP SER at 3-123 (expressing concern that spent fuel pool leakage problems have not been permanently corrected). Notably, Entergy has never provided any information on the feasibility of examining the remainder of the pool liner, or explained any other steps it intends to take to find any and all sources of leaks from the pools, now, or in the future.

[45] *See* IP SER at 3-123 (NRC Staff expressing concern about the lack of a system at IP2 to monitor, detect and quantify potential leakage through the spent fuel pool liner); NRC Request for Additional Information for the Review of the Indian Point Nuclear Generating Unit Nos. 2 and 3, License Renewal Application – Open Items (April 3, 2009), ADAMS Accession No. ML090920150 (NRC expressing concern that Entergy's aging management plans do not include any method for determining if a degraded condition exists in the spent fuel pools during the period of extended operation, nor any explanation of how Entergy will adequately manage potential aging of the spent fuel pool in the future).

waters for their best usages."[46] So, the groundwater beneath Indian Point during the extended operating period must not be impaired for use as drinking, culinary, or food processing water, notwithstanding whether the groundwater is *actually* used for such purposes.[47] However, the current and future groundwater contamination caused by radioactive leaks at Indian Point would conflict with such uses during the extended license term.

The extensive groundwater contamination caused by radioactive leaks at Indian Point has regularly exceeded maximum contaminant levels ("MCL") allowed by the U.S. Environmental Protection Agency ("EPA") in drinking water.[48] Quarterly monitoring reports prepared on behalf of Entergy encompassing data from 2008 (the most recent monitoring well data in Riverkeeper's possession at this time), reveal that certain wells continue to show radionuclide levels in excess of such limits.[49] Thus, the contamination currently remains at levels that would not allow potability. Current and potential future radioactive releases will likely cause the contamination to remain at such a level. In any event, given the notable lack of ability to preventatively detect future leakage at the plant, it is impossible to conclude that the groundwater plumes at Indian Point would reach and maintain levels that are acceptable for potability purposes. Therefore, the groundwater contamination at Indian Point during a 20-year period of extended operation would be wholly inconsistent with New York State's designated best use for the groundwater for potable purposes.

b. Radioactive Discharges from Indian Point Would Violate the Best Use of the Hudson River for Primary Contact Recreational Purposes

In addition to large plumes of groundwater contamination that are, and will continue to, slowly migrate into the Hudson River, Entergy also discharges radioactive liquid effluent into the river on a regular basis as part of routine operations. For example, Entergy's 2008 Radioactive Effluent Release Report indicates that throughout 2008, 667 curies of tritium were released to the Hudson River through liquid effluent.[50] Moreover, the operation of Indian Point also results in accidental releases of radioactive water to the Hudson River. For example, in February 2009, a sudden underground pipe leak at the facility resulted in over 100,000 gallons of tritiated water

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[46] 6 N.Y.C.R.R. § 703.2

[47] Thus, Entergy's reliance upon the fact that the groundwater underlying Indian Point is not used for drinking water is completely immaterial.

[48] *See, e.g.*, E-mail from James Noggle (NRC), to Timothy Rice (DEC) with attached NRC Data from Indian Point Split Monitoring Well Samples (Aug. 23, 2007), ADAMS Accession No. ML072840497 (monitoring well data showing cesium-137 and strontium-90 levels well above EPA limits); E-mail from James Noggle, NRC, to Timothy Rice and Larry Rosenmann of the NYSDEC (Nov. 6, 2006), NRC ADAMS Accession No. ML070400157 (discussing monitoring well groundwater sampling data indicating levels of tritium, strontium-90 well in excess of EPA MCL's). EPA limits for radionuclides in drinking water are as follows: tritium, 20,000 pCi/l; strontium-90, 8 pCi/l; cesium-137, 200 pCi/l. *See* U.S. EPA, *Radionuclides in Drinking Water: A Small Entity Compliance Guide* (February 2002); *see also* U.S. EPA, Commonly Encountered Radionuclides, http://www.epa.gov/rpdweb00/radionuclides/index.html.

[49] *See* GZA GeoEnvironmental, Inc., Final IPEC Quarterly Long-Term Groundwater Monitoring Report, Quarter 4 2008, at Table 3: 2008 Groundwater Analytical Results and Averages, Table 4: 2008 4th Quarter Groundwater Analytical Results (Sept. 1, 2009) (data showing levels of tritium in excess of EPA's MCL in monitoring wells 31, 33, and 111, levels of strontium-90 in excess of EPA's MCL in monitoring wells 36, 37, 42, 49, 50, 54, 55, 57, 66, 67, and levels of cesium-137 in excess of EPA's MCL in monitoring well 42).

[50] 2008 Radioactive Effluent Release Report, Entergy Nuclear Operations, Inc., Indian Point Nuclear Generating Units Nos. 1, 2 & 3, at 17.

being released directly into the waterway.[51] An extended operating license for Indian Point would result in 20 additional years of intentional and accidental discharges to the river. This would be inconsistent with New York State water quality standards for the following reasons.

The future releases of radioactivity from the plant to the Hudson River would conflict with the ability of the public to engage in primary contact recreational activities. Entergy's "[l]iquid offsite dose calculations involve fish and invertebrate consumption pathways only."[52] Thus, there is no guarantee that the public would be safe when engaging in recreational activities "where the human body may come in direct contact with raw water to the point of complete body submergence"[53] in the Hudson River. Members of the public may face health risks if they decide to go swimming on a day when Entergy happens to perform a sizeable liquid effluent release, or if they participate in primary contact activities in the river over longer periods of time, and thereby face long-term exposure to the radioactivity that is discharged from Indian Point, both intentionally, and inadvertently. Notably, the National Academies Biological Effects of Ionizing Radiation report ("BEIR VII") indicates that there is no safe level of radiation.[54] This report revealed a "linear-no-threshold" association between exposure to radiation and a persons risk of cancer, i.e., "that the risk of cancer proceeds in a linear fashion at lower doses without a threshold and that the smallest dose has the potential to cause a small increase in risk to humans."[55]

Consequently, because Indian Point will continue to contaminate the Hudson River with harmful radionuclides with the potential to affect any members of the public who partake in primary contact activities in the Hudson River, continued operation is inconsistent with New York State water quality standards.

V. The Security Exclusion Zone at Indian Point Violates New York State Water Quality Standards

In the wake of the terrorist attacks of September 11th, 2001, the U.S. Coast Guard established a "safety and security zone" around Indian Point encompassing "[a]ll waters of the Hudson River within a 300-yard radius of the IPNPS [Indian Point Nuclear Power Station] pier."[56] Pursuant to the Coast Guard's regulations, "[e]ntry into or remaining in a safety or security zone is prohibited unless authorized by the Coast Guard Captain of the Port, New York."[57] Should Entergy obtain the extended operating licenses it seeks for Indian Point, this exclusion zone

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[51] *See* Annie Correal, *Indian Pt. Broken Pipe Spurs Safety Worries*, THE NEW YORK TIMES (Feb. 27, 2009).
[52] 2008 Radioactive Effluent Release Report, Entergy Nuclear Operations, Inc., Indian Point Nuclear Generating Units Nos. 1, 2 & 3, at 34.
[53] 6 N.Y.C.R.R. § 700.1(a)(49).
[54] The National Academies, Health Risks From Exposure to Low Levels of Ionizing Radiation, BEIR VII (National Academies Press 2006).
[55] *See id.*; *see also* The National Academies, BEIR VII: Health Risks From Exposure to Low Levels of Ionizing Radiation, Report in Brief, http://dels.nas.edu/dels/rpt_briefs/beir_vii_final.pdf ("The BEIR VII report concludes that the current scientific evidence is consistent with the hypothesis that, at the low doses of interest in this report, there is a linear dose-response relationship between exposure to ionizing radiation and the development of solid cancers in humans. It is unlikely that there is a threshold below which cancers are not induced").
[56] Safety and Security Zones: New York Marine Inspection Zone and Captain of the Port Zone, 33 C.F.R. § 165.169(a)(1).
[57] *Id.* at §165.169(b)(1).

would be in effect for an extra 20 years.[58] This would be entirely incompatible with New York State water quality standards since it would interfere with several designated best uses of the river.

An exclusion zone protruding out into the Hudson River around Indian Point conflicts with both primary and secondary contact recreational activities that the river is designated to accommodate in that region. This restriction against use of the river makes a substantial, critical segment of the Hudson River off-limits for recreational use. The use of the Hudson River by small boats, particularly kayaks, has exploded in recent years. Most kayakers follow the shoreline of the river in order to avoid conflicts with commercial shipping in the main channel and to avoid getting caught far from shore in adverse weather. The Indian Point exclusion zone makes it impossible for kayakers to travel from Montrose Point to Peekskill along the East shore of the Hudson River – kayakers must detour into the shipping channel at a particularly dangerous place, where visibility is limited because of the bends in the river at Jones Point and at Montrose Point. Small boats such as kayaks are difficult to see and enter the shipping channel in an area of limited visibility at great personal risk. Continued operation of the Indian Point Units 2 and 3 would, thus, require kayakers and other small boaters to choose either to avoid this stretch of the Hudson River or to take the substantial personal risk of entering the shipping channel in an area of poor visibility. Either situation results in a violation of New York State's designated use of the river for boating.

The exclusion zone further impedes the public's ability to engage in any kind of primary contact recreation in that area for the same reasons. As discussed above, primary contact activities include swimming, diving, water skiing, skin diving and surfing. It is truly doubtful that people could partake in any such activities (including windsurfing) when having to compete with shipping vessel traffic and recreational boaters in a narrowed section of usable river.

Accordingly, it is apparent that the "safety and security zone" that would continue to be instituted at Indian Point during a period of extended operation, contravenes New York's designated uses of the Hudson River.

VI. Conclusion

Based on the foregoing, it is abundantly clear that license renewal of Indian Point Units 2 and 3 for an additional 20 years beyond the terms of their current licenses would result in multiple violations of New York State water quality standards due to a variety of issues. Therefore, DEC must deny Entergy's Application for WQC, and Riverkeeper urges DEC to do so.

[58] When operations of Indian Point cease and the site is remediated to a greenfield status for unrestricted use in accordance with federal regulations, the Coast Guard regulation requiring an exclusion zone will no longer be applicable. An extended operating period would, thus, at a minimum, lead to an overall 20-year delay in rendering the exclusion zone inapplicable.

Riverkeeper appreciates your consideration of the above comments. Should you require any clarification, or additional information, please do not hesitate to contact the undersigned at (914) 478-4501.

Sincerely,

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