RIVERKEEPER.
NY's clean water advocate

July 11, 2014

VIA USPS PRIORITY MAIL AND EMAIL

Hon. Maria E. Villa
Administrative Law Judge
Office of Hearings and Mediation Services
New York State Department of Environmental Conservation
625 Broadway, First Floor
Albany, New York 12233-1550

Re: Public Comments on Behalf of Riverkeeper, Inc. Concerning the Issue of Scheduled BTA Outages/Seasonal Protective Outages at Indian Point Energy Center (DEC App. Nos.: 3-5522-00011/00004 (SPDES No. NY-0004472); 3-5522-00011/00030 (WQC – IP2); and 3-5522-00105/00031 (WQC – IP3))

Dear Judge Villa:

Riverkeeper, Inc., the Natural Resources Defense Council, Inc., and Scenic Hudson Inc. (collectively hereinafter, "Riverkeeper"), hereby respectfully submit the following Comments[1] on the New York State Department of Environmental Conservation (Department or NYSDEC)

[1] While denominated for convenience's sake as "Comments," the presiding Administrative Law Judge has determined that parties to the pending proceeding and appeal have no obligation to submit petitions for party status with respect to the SPDES Outages Fact Sheet (*see* May 21, 2014 Notice of Public Comment Hearing and Issues Conference at 5). Riverkeeper accordingly offers these Comments in an effort to clarify that the record of this proceeding and appeal has addressed outages (including permanent outages) as BTA (*see* 6 NYCRR § 704.5) since at least February of 2004. And since at least May 17, 2013, via multiple pleadings and additional statements, Entergy has attempted to effectively: (1) strike from the record certain evidence adduced at hearing with respect to the necessity of outages achieving entrainment reductions commensurate with those provided by closed cycle cooling in order to comply with the Department's best usages standard (6 NYCRR § 701.11), and (2) preclude further adjudication of the question of permanent outages in the context of the Department's BTA (6 NYCRR § 704.5) and SEQR processes (*see* Entergy May 17, 2013 Best Usages sur-rebuttal brief [ruling to accept or reject as untimely or otherwise pending]). In any event, Riverkeeper respectfully offers these Comments in the interests of optimizing (for all parties) the public participation objectives of the Clean Water Act and New York's Uniform Procedures Act and to sharpen and focus the issues for adjudication. To that end, Riverkeeper's First Supplemental Expert Disclosures with respect to Department Staff's Outages Fact Sheet are included herewith as **Exhibit A,** pursuant to 6 NYCRR § 624.7[b][2] and CPLR 3101[d].

Staff's May 9, 2014 SPDES Fact Sheet on Scheduled BTA Outages/Seasonal Protective Outages (SPDES Outages Fact Sheet). Staff's SPDES Outages Fact Sheet addresses whether Indian Point Nuclear Unit 2 and Unit 3 (collectively, "Indian Point") can be operated in compliance with the NYSDEC best technology available (BTA) standard provided by 6 NYCRR 704.5 (the BTA standard). For purposes of 6 NYCRR § 704.5, however, a technology can only be "available" if its installation is feasible and if the costs of such technology are not "wholly disproportionate" to the environmental benefits provided thereby (*see In the Matter of Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC,,* Ruling of the Regional Director [November 28, 2012], at 2 [internal citations omitted]).

These Comments first address the fact that the only permanent annual fish protection outages mentioned in the SPDES Outages Fact Sheet which serve to demonstrate compliance with 6 NYCRR § 704.5 are the 32-week outages listed on Table 3 thereof. As is also explained herein, Department Staff's proffered outages scenarios contained in Table 3, Columns A-F of the SPDES Outages Fact Sheet would likewise fail to meet the best usages requirements of 6 NYCRR § 701.11, and fail to satisfy the requirements of antidegradation provided by 40 C.F.R. § 131.12 and the Department's antidegradation policy.[2]

These Comments next address how Department Staff's proposed permanent annual fish protection outages for Indian Point fail to address (1) the incremental ecological impacts of Indian Point's thermal discharge plume and cooling water intake structures (CWIS) and (2) compliance with thermal water quality criteria, best usages, antidegradation and SEQR (*see* 6 NYCRR §§ 701.11, 703.2, 704.1, 704.2, 704.3; 40 C.F.R. 131.12; ECL § 8-0109 [8]; 6 NYCRR § 617.11[d][5]; and NYSDEC O&D Memo 85-40 [September 9, 1985] *Water Quality Antidegradation Policy,* at 2). Finally, these comments also address the consistency of the SPDES Outages Fact Sheet with the public participation requirements of the federal Clean Water Act and New York's Uniform Procedures Act. **Exhibit A** hereto consists of Riverkeeper's supplemental expert disclosures with respect to the SPDES Outages Fact Sheet.

[2] *See* **Riverkeeper Exh. 102**, NYSDEC O&D Memo 85-40 (September 9, 1985), *Water Quality Antidegradation Policy* ("NYSDEC Water Quality Antidegradation Policy"), at 1-2.

Riverkeeper Comment No. 1: *The Annual Fish Protection Outages Provided in Table 3, Columns A-F of the SPDES Outages Fact Sheet Do Not Minimize Adverse Environmental Impacts Within the Meaning of 6 NYCRR § 704.5.*

The Department's BTA regulation (6 NYCRR § 704.5) implements CWA § 316[b] and requires the minimization of adverse environmental impacts in connection with point source thermal discharges. In this case, any alternative to closed-cycle cooling must "minimize adverse environmental impact to a level equivalent to that which can be achieved by closed-cycle cooling" (*In the Matter of Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC,* Interim Decision of the Assistant Commissioner, 2008 N.Y. ENV LEXIS 52 [August 13, 2008], at *50-51 [herein, "Interim Decision"], *citing* 2003 Draft SPDES Permit, Special Condition 28[c]).

The Department's BTA Policy also requires that a BTA alternative must offer entrainment reductions which are "equivalent" to closed-cycle cooling (that is, equal to at least 90% of the entrainment reductions achievable by closed-cycle cooling)[3] (*see In the Matter of Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC,* Indian Point 401 Issues Ruling, 2010 N.Y. ENV LEXIS 86 [December 13, 2010], at *30-31 [herein, "Indian Point 401 Issues Ruling"]). Closed-cycle cooling at Indian Point is projected to achieve entrainment reductions of roughly 97 percent.[4] Permanent outages would therefore need to achieve an approximate 88% annual reduction in entrainment in order to minimize adverse environmental impacts equivalent to closed-cycle cooling. Accordingly, 88% represents the minimum annual entrainment reductions required for Indian Point to meet 6 NYCRR § 704.5, as implemented via NYSDEC Commissioner's Policy CP#-52.

Any SPDES permit issued for Indian Point must demonstrate compliance with an 88% annual entrainment reduction, and such a SPDES permit condition must be based upon Department Staff's best professional judgment (BPJ). The exercise of BPJ requires "consideration of all reasonably available and pertinent data or information that forms the basis for the terms and conditions of a NPDES permit." (Interim Decision, 2008 N.Y. ENV LEXIS 52, at *22-23, *citing* U.S. EPA NPDES Permit Writers' Manual, at 68 [1996]). The SPDES Outages

[3] NYSDEC Commissioner's Policy CP-#52 / Best Technology Available (BTA) for Cooling Water Intake Structures (herein, "NYSDEC Commissioner's Policy CP-#52) at 2-3.

[4] CWW I (Entergy Biology Panel by Staff) at Tr. 1473:2-3.

Fact Sheet states that "protective outages provide a readily feasible alternative to the Department's preferred option of closed-cycle cooling to reduce, and in some instances minimize," the adverse environmental impact of Indian Point's entrainment and impingement (SPDES Outages Fact Sheet at 2). Manifestly, a technology that merely "reduce[s], and in some instances minimize[s]" adverse environmental impacts fails to demonstrate compliance with CWA § 316[b] and 6 NYCRR § 704.5.

The Department's BTA analysis involves a four-step process. The third step in the BTA analysis addresses "[w]hether practicable alternate technologies are available to *minimize*" adverse environmental impacts (*see* Interim Decision, 2008 N.Y. ENV LEXIS 52, *16 [internal citations omitted; emphasis added]). As a threshold matter, and as these Comments explain, none of the outage scenarios identified in Table 3, Columns A-F of the SPDES Outages Fact Sheet minimize adverse environmental impacts to *all* pertinent Hudson River fish species in *any* instance. Only the annual 32-week (February 15 to September 15) full-facility outages discussed in the SPDES Outages Fact Sheet (*see id.*, Table 3 and at 11 n. 5) would minimize adverse entrainment and impingement impacts to Hudson River fish species to a level commensurate with closed-cycle cooling within the meaning of 6 NYCRR § 704.5.

This is the case because even the most protective of the analyzed full-facility outage scenarios (e.g., Outages Fact Sheet, Table 3, Column C, 92-day [May 10 to August 10][5] outages) fails to provide much (if any) entrainment protection for the Atlantic tomcod, a commonly entrained and impinged species at Indian Point.[6] For the same reason, Department Staff's conclusion that the two partial-retrofit options considered in Table 3 (options *E* and *F*) are estimated to provide reductions in impact commensurate with a full closed-cycle cooling retrofit likewise appears to be manifestly incorrect. Most of the annual Atlantic tomcod early life-stage entrainment occurs at Indian Point between February and April. The imposition of 92-day annual outages from May 10 through August 10 at one or both units would miss the majority of

[5] The SPDES Outages Fact Sheet's estimates as to the timing of peak larval densities in the Indian Point region (May 10 to August 10) are generally consistent with the testimony of Department Staff biologist and Steam Electric Unit Leader William C. (Chuck) Nieder, who noted that a majority of entrainment at Indian Point has historically occurred between May 1 and August 15 of any calendar year (the entrainment season) (Nieder May 30, 2012 CWWII Direct at 36:5-6).

[6] **Entergy Exhibit 6,** *Biological Assessment of Alternative Intake Technologies for Indian Point Units 2 and 3* (Barnthouse, Heimbuch, Mattson and Young; February 2010) at 9.

the entrainment of Atlantic tomcod. In the case of "Option C," the status quo with respect to Indian Point's entrainment of tomcod by Units 2 and 3 would remain basically unchanged. In the cases of "Option E" and "Option F," while a closed-cycle cooling retrofit at Unit 2 would minimize the entrainment of tomcod year-round, the status quo of Indian Point's entrainment of tomcod by Unit 3 would basically remain unchanged, and the overall result would be an approximate 50% reduction in tomcod entrainment for Units 2 and 3 combined.

The evidence adduced to date shows that losses at Indian Point are distributed primarily among seven (7) species of fish, including bay anchovy, striped bass, white perch, blueback herring, Atlantic tomcod, alewife, and American shad. Of these, Atlantic tomcod, American shad, and white perch numbers were known to be declining in the Hudson River at the time Department Staff issued its draft SPDES permit for Indian Point in 2003.[7] The Atlantic tomcod population in the Hudson River has suffered a significant, long-term, un-recovered decline since 1974.[8]

With respect to Atlantic tomcod and other Hudson River species, Riverkeeper witness Dr. Peter Henderson, of PISCES Conservation Ltd., will present an update to his 2008 Report, *The Status of Fish Populations and the Ecology of the Hudson*,[9] using data available from the Hudson River Basin Monitoring Program's 2012 Year Class Report (the most recent Year Class Report available). The 2012 Year Class Report in particular shows that the Hudson River Atlantic tomcod population has continued its long-term and particularly significant negative trend since Dr. Henderson issued his 2008 Report.

Riverkeeper Comment No. 2: *Sufficiency of the Data and Other Information to Form the Basis for a Best Professional Judgment Technology-Based Permit Term Pursuant to 6 NYCRR § 704.5.*

6 NYCRR § 704.5 requires the minimization of adverse environmental impacts in connection with point source thermal discharges. Any alternative to closed-cycle cooling for Indian Point must "minimize adverse environmental impact to a level equivalent to that which

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[7] **Entergy Exhibit 26B**, NYSDEC SPDES Permit Biological Fact Sheet at 1 of 8.

[8] **Riverkeeper Exhibit 2**, *The Status of Fish Populations and the Ecology of the Hudson River* [Pisces, 2008] at 25-26 and Figure 22. Barnthouse July 22, 2011 Best Usages Direct at 54:17-21; *id.* at 56:1-2; Best Usages (Barnthouse by Riverkeeper) at Tr. 3721:19 to 3722:1-4.

[9] **Riverkeeper Exhibit 2**, PISCES Conservation Ltd. (2008).

can be achieved by closed-cycle cooling" (Interim Decision, 2008 N.Y. ENV LEXIS 52, at *50-51, *citing* 2003 Draft SPDES Permit, Special Condition 28[c]). The Department's BTA Policy likewise requires that a BTA alternative must offer entrainment reductions which are "equivalent" to, that is, equal to at least 90% of, the entrainment reductions achievable by closed-cycle cooling[10] (*see* Indian Point 401 Issues Ruling, 2010 N.Y. ENV LEXIS 86, at *30-31). Closed-cycle cooling at Indian Point is projected to achieve entrainment reductions of roughly 97 percent.[11] Permanent outages would therefore need to achieve approximately 88% reductions in entrainment in order to minimize adverse environmental impacts in a manner equivalent to closed-cycle cooling. Pursuant to NYSDEC Commissioner's Policy CP-#52 and with respect to Indian Point, 88% represents the *minimum* for entrainment reductions which would be required for Indian Point to meet 6 NYCRR § 704.5. Any SPDES permit issued for Indian Point must demonstrate compliance with such a condition.

Riverkeeper agrees with Department Staff insofar as the SPDES Outages Fact Sheet provides that: "Protective outages are effective for reducing entrainment due to the fact that the time of year a particular fish species will be present or spawn in the Hudson River is highly predictable." (SPDES Outages Fact Sheet at 4). Riverkeeper submits, however, that identifying the *exact calendar days* on which a particular fish species will be present at Indian Point for purposes of deriving a (5-year) permit term for fish protection outage days is a different matter.[12]

First, the pertinent and available entrainment abundance data for Indian Point is limited to data from the years 1984-1987 (*see* SPDES Outages Fact Sheet, Figure 1; *id.* Table 3, Columns A-F). An entrainment abundance dataset representing 4 of 40 years of Indian Point's operations does not provide sufficient facts and data to precisely identify a narrow date range (e.g., May 10 to August 10 of any given year for the next 5 years) for outages through which compliance with the required annual 88% entrainment reductions can be demonstrated.[13]

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[10] NYSDEC Commissioner's Policy CP-#52 at 2-3.

[11] CWW I (Entergy Biology Panel by Staff) at Tr. 1473:2-3.

[12] The 32-week, full-facility outage identified in Department Staff's 2003 Fact Sheet, on the other hand, allowed for a margin of safety with respect to any uncertainty resulting from data limitations and the inherent inter-annual variability of fish species in the Hudson River in terms of the precise timing annual spawning seasons and abundances of particular species.

[13] The appeal in this case is with respect to the April 2, 2010 Denial of Entergy's requested CWA § 401 Water Quality Certification. The SPDES application is a live matter before this Tribunal. The 401 application is not. By

Moreover, of the four years of data available (1984-1987), the data from 1984 in particular shows the entrainment of large numbers of early life stage aquatic organisms, and thus the data are heavily reliant on this one year (1984). In the absence of sufficient facts and data, it cannot be established that the 1984 entrainment abundances are typical (in some years the overall entrainment numbers at Indian Point were likely much higher than those recorded in 1984)[14] or reflect present conditions at Indian Point. For a full analysis as to whether entrainment would be minimized to a level commensurate with closed-cycle cooling during *each and every year* of a renewed 5-year SPDES permit term, the expected between-year variability would also need to be considered to assess the likelihood that the 88% reduction would not be achieved in every particular year.

The Entergy entrainment abundance data from the years 1984-1987, however, is insufficient to conduct such an analysis to a reasonable degree of scientific certainty. Accordingly, any outage conditions based on such data must provide an adequate margin of safety (in terms of additional fish protection outage days) to account for the uncertainty resulting from the paucity of entrainment abundance data and the inter-annual variability as to the precise calendar days which will comprise the respective Hudson River species' spawning seasons.

To be sure, Riverkeeper understands that Department Staff can only rely on the entrainment data that Entergy has provided to Department Staff. Department Staff's testimony from 2012, for example, relied upon the 1984-1987 Indian Point entrainment data to estimate the entrainment reductions obtained from fish protection outages taken in 1985, 1986 and 1987.[15] Dr. Henderson himself relied on Entergy's 1980s data from the Draft Environmental Impact

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letter to the Tribunal dated July 13, 2011, Riverkeeper objected to any evidence offered by Entergy which postdated April 2, 2010 in support of Entergy's appeal of the April 2, 2010 NYSDEC 401 Denial. July 13, 2011 Letter from Deborah Brancato, Esq. (counsel for Riverkeeper) to ALJs Maria E. Villa and Daniel P. O'Connell at 2. However, in a decision dated July 15, 2011, ALJ Villa ruled that evidence which post-dated the NYSDEC 401 Denial would be received in this joint SPDES proceeding and CWA § 401 appeal in connection with the joint adjudicatory hearings (*see* July 15, 2011 CWA § 401 Application Status Ruling at 4).

[14] Indian Point's CWISs have been operated at nearly 100% capacity during the entrainment season in recent years Nieder May 30, 2012 CWWII Direct at 37:6-7.

[15] *See also* Nieder June 29, 2012 CWWII Rebuttal at 65:10-15 (protective outages taken at Indian Point during the entrainment season in 1985, 1986, and 1987 resulted in reductions in the capacity utilization of the CWIS as well as an annual average reduction in entrainment of 45.2%).

Statement to estimate Indian Point's baseline annual entrainment for purposes of comparisons of closed-cycle cooling with Entergy's proposed cylindrical wedgewire screens.[16]

But, as noted, identifying the *exact calendar days* on which a particular fish species will be present at certain densities at Indian Point for purposes of deriving BPJ permit conditions for fish protection outage days in a SPDES permit is a different matter.[17] While the outage scenario contained in Column C of Table 3 of the SPDES Outages Fact Sheet (92-day, full-facility) includes an adequate margin of safety (i.e., the predicted 99.5% entrainment reduction efficacy is sufficient to ensure compliance with an annual 88% entrainment reduction standard), that outage scenario does not protect the Atlantic tomcod, as previously noted.

An adequate margin of safety is likewise required to account for community-level changes which have occurred to Hudson River fish species since 1984-1987. Statistical analysis shows that the fish community of the Hudson estuary has been continuously changing since systematic recording began in the 1980s, has been changing rapidly since 1985, and is now showing clear signs of increased instability with greater year-to-year variation in abundance.[18]

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[16] Henderson July 22, 2011 CWW I Direct at 12:18-26.

[17] In addition to issues with the sufficiency of the data, the inherent variability between years in the spawning seasons of particular species must be taken into account. Patterns of egg and larval abundance change with the relative abundance of species, as each species has a characteristic breeding season.The 32-week, full facility outage identified in Department Staff's 2003 Fact Sheet, on the other hand sheet allowed for a margin of safety with respect to any uncertainty resulting from data limitations and the inherent inter-annual variability of fish species in the Hudson River in terms of timing and abundances. Uncertainty and indeterminacy are fundamental characteristics of the dynamics of complex adaptive systems such as fish populations, and predicting the behaviors of these systems cannot be done with absolute certainty, regardless of the amount of scientific effort invested. Nieder September 30, 2011 Rebuttal 47:4-8, *quoting* EPA Phase I 316[b] Regulation Preamble, 66 Fed. Reg. 65256, 65293 (December 18, 2001).

[18] *See* **Riverkeeper Exhibit 2,** *The Status of Fish Populations and the Ecology of the Hudson River* [Pisces, 2008] at 14).Peer-reviewed and published scientific literature which describes the change in abundance of several important species and a change in dominant species supports Dr. Henderson's view that the Hudson River ecosystem has undergone considerable change (Best Usages [Mattson by Riverkeeper] atTr. 4177:9-14; *id.* [Mattson redirect by Entergy] atTr. 4221:7-12; **Staff Exhibit 75,** *Changes in Fish Assemblages in the Tidal Hudson River, New York* [Daniels, et al., American Fisheries Society, 2005] at 471-72). Entergy's biologists do not disagree that over the operation of Indian Point from 1974 through 2005, the fish community of the Hudson River Estuary has changed (Best Usages [Barnthouse by Riverkeeper] at Tr. 3644:20 to 3645:1). Entergy's Adverse Environmental Impact Report includes a community-level trends analyses which shows that, in that case, 71% to 73% of the species susceptible to entrainment at Indian Point examined in Entergy's community-level trends analysis showed population declines from August of 1974 through October of 2005 (**Entergy Exhibit 27,** AEI Report at 78; Best Usages [Young by Riverkeeper] at Tr. 3634:13-16).

For all the foregoing reasons, an adequate margin of safety (*see, e.g.*, Column C, Table 3, SPDES Outages Fact Sheet) must be built into any BPJ technology-based SPDES permit condition to demonstrate compliance with 88% annual entrainment reductions.

Riverkeeper Comment No. 3: *None of the Outage Scenarios Delineated in SPDES Outages Fact Sheet Table 3, Columns A-F Demonstrate Compliance with 6 NYCRR § 701.11 or 40 C.F.R. 131.12 and the Department's Antidegradation Policy for Purposes of Entrainment.*

NYSDEC's April 2, 2010 Notice of Denial of Entergy's Application for WQC ("NYSDEC 401 Denial") found, *inter alia*, that Indian Point's continued operation in once-though cooling mode (either as currently configured or with cylindrical wedgewire (CWW) screens) would impair (or have the potential to impair) the best usages of the Hudson River and would therefore be inconsistent with the best usages of the Hudson River for fishing and for fish, shellfish and wildlife propagation and survival.[19]

For the reasons stated above, none of Department Staff's proffered outages scenarios (SPDES Outages Fact Sheet, Table 3, Columns A-F) would meet the best usages requirements of 6 NYCRR § 701.11 or satisfy the requirements of antidegradation provided by 40 C.F.R. § 131.12 and the Department's antidegradation policy[20] (which is implemented via both the SPDES and SEQR processes).[21] The issue of best usages has been litigated and briefed,[22] and both Department Staff and Riverkeeper are in agreement that entrainment reductions equivalent to closed-cycle cooling are required for Indian Point to continue operating consistently with 6 NYCRR § 701.11.[23]

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[19] **Entergy Exhibit 9,** April 2, 2010 letter from William R. Adriance, Chief Permit Administrator, NYSDEC, to Dara F. Gray, Entergy Nuclear Operations, Inc. at 10-11, 17-18.

[20] *See* **Riverkeeper Exh. 102**, NNYSDEC Water Quality Antidegradation Policy, at 1-2.

[21] *See* **Riverkeeper Exh. 102**, NYSDEC Water Quality Antidegradation Policy, at 2-3.

[22] As Judge Villa's 401 Issues Ruling explained, "In order to issue a SPDES permit, the Department must ensure that the permittee will be in compliance with the same water quality standards incorporated into the CWA Section 401 WQC process." (Indian Point 401 Issues Ruling, 2010 N.Y. ENV LEXIS 86, at *15, *citing* 6 NYCRR § 750-2.1 [b] and [k]; *see also* ECL 17-0801).

[23] Henderson July 22, 2011 Direct at 10:18-21; *see also* Nieder September 30, 2011 Rebuttal at 52:9-15; *id.* at 47:38 to 48:13; *id.* at 36:1-6; *id.* at 44:10-13; *id.* at 20:16-20; *id.* at 26:21-23, *citing* **Staff Exhibit 97**, April 29, 1991 letter from NYSDEC Commissioner Thomas C. Jorling to J. Phillip Bayne, President and Chief Operating Officer of the New York Power Authority; *id.* at 32:18 to 33:2; *id.* at 27:14-16; *id.* at 48:7-13; *id.* at 52:20 to 53:3; and *id.*at 54:4-15.

The question of whether any proposed permanent outages (other than the 32-week outages discussed in the 2003 Draft SDPES Permit) will achieve entrainment reductions equivalent to closed-cycle cooling[24] will be addressed in connection with the BTA analysis to be conducted pursuant to 6 NYCRR § 704.5. As a matter of supreme federal law, the most protective standard (BTA or best usages) to minimize entrainment must be applied to Indian Point's SPDES Permit.[25] As is set forth more fully below, Riverkeeper is proposing a 118-day full-facility annual entrainment outage which will achieve entrainment reductions equivalent to closed-cycle cooling, which must be achieved in order for any permanent outage scenario to minimize entrainment in order to comply with both 6 NYCRR § 704.5 (BTA) and 6 NYCRR 701.11 (best usages).

Riverkeeper Comment No. 4: *An Outage Scenario Which Would Reliably Reduce Entrainment to a Level Equivalent to Closed-Cycle Cooling Could Be Established to Minimize Indian Point's Entrainment.*

As discussed above, there is a need for a margin of safety to account for uncertainty with respect to whether the available data supports the proposition that an overall 88% entrainment reduction would occur in every year of a five-year SPDES permit term for Indian Point. As was also discussed above, even the 92-day period outage (May 10 to August 10, *see* SPDES Outages Fact Sheet, Table 3, Column C) could not possibly minimize the entrainment of Atlantic tomcod,

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[24] Such an approach is also consistent with the Department's Antidegradation Policy, which requires, *inter alia,* that the environmental impact statement issued in connection with a SPDES permit "explore ways to minimize adverse environmental effects or identify a potentially less damaging environmental alternative" which "could involve the imposition of more stringent or different types of permit conditions." (NYSDEC Water Quality Antidegradation Policy at 3).

[25] CWA section 301(b)(1)(C) requires application of any more stringent limitation, including those necessary to meet WQSs, treatment standards, or schedules of compliance, established pursuant to any State law or regulations which require the application of state water quality standards or other state legal or regulatory requirements which are more stringent than applicable technology-based limitations such as the BTA standard of CWA § 316[b] (*see In re Dominion Energy Brayton Point, L.L.C.,* 12 E.A.D. 490 [EPA Envtl. App. Bd.] [February 1, 2006], 2006 EPA App. LEXIS 9, at *24-25, *citing U.S. Steel Corp. v. Train*, 556 F.2d 822, 838 [7th Cir. 1977]). Protecting uses (designated and existing) pursuant to 6 NYCRR § 701.11 is a more stringent standard than the BTA standard of 6 NYCRR § 704.5 because so-called "best usages" must be supported and maintained without regard to cost or feasibility. As *Brayton Point* further explains, CWA Section 301[b][1][C]"requires unequivocal compliance with applicable [WQSs], and does not make any exceptions for cost or technological feasibility" (*Brayton Point, supra* 2006 EPA App. LEXIS at *332 n. 205, *quoting In re City of Moscow*, 10 E.A.D. 135, 168 [EAB 2001], and *citing In re City of Fayetteville, 2 E.A.D. 594*, 600-01 & n.15 [CJO 1988] [same] and *U.S. Steel Corp. v. Train*, 556 F.2d 822, 838 [7th Cir. 1977]).

because the majority of the entrainment of that species by Indian Point occurs in the early part of the year. Strictly for purposes of minimizing entrainment, an effective (closed-cycle cooling equivalent) full-facility annual fish protection outage SPDES permit term could be constructed. Such a term would consist of the full-facility outage 92-day period (May 10 to August 10, *see* SPDES Outages Fact Sheet, Table 3, Column C) *and* an additional 26-day full-facility outage window between February 23 and March 20 to protect the tomcod.

This 118-day outage would be effective for minimizing the entrainment of all species of common fish impacted at Indian Point (including tomcod) and would also serve to minimize impingement, as February through March are months of relatively high fish *impingement* at Indian Point. A 118-day outage would thus minimize Indian Point's adverse environmental entrainment and impingement impacts within the meaning of 6 NYCRR § 704.5. Since this 118-day outage would be equivalent to closed-cycle cooling (at least for entrainment and impingement purposes), it would also be consistent with the level of protection which both Department Staff and Riverkeeper have identified as necessary to maintain the Hudson River's best usages (6 NYCRR § 701.11) (at least with respect to Indian Point's CWIS).

That being said, and as is set forth more fully below, neither the Riverkeeper 118-day outage nor any shorter-duration outage proposed in the SPDES Outages Fact Sheet would address the ongoing water quality violations caused by Indian Point's thermal discharge.

Riverkeeper Comment No. 5: *In Terms of Thermal Considerations, None of the Outage Scenarios Delineated in SPDES Outages Fact Sheet Table 3, Columns A-F Demonstrate Compliance with the Thermal Criteria of Part 704 (6 NYCRR § 704.1, 704.2, 704.3), Best Usages (6 NYCRR § 701.11), Section 316[a] of the Clean Water Act, 40 C.F.R. 131.12, SEQR or the Department's Antidegradation Policy.*

Consistent with both the plain language of 6 NYCRR § 704.5[26] and the EPA Administrator's recognition of the interdependence of Sections 316[a] and 316[b] of the Clean Water Act (*see Matter Of Public Service Company Of New Hampshire, Et Al.* [*Seabrook Station, Units 1 And 2*], NPDES Appeal No. 76-7 1 E.A.D. 332 [June 10, 1977], 1977 EPA App. LEXIS

[26] In particular, 6 NYCRR § 704.5 provides that: "The 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 impact. 6 NYCRR § 704.5 (emphasis supplied).

16, *19-20), the incremental impacts of Indian Point's thermal discharge and cooling water intake must be considered in connection with each other. The implementation of annual seasonal fish protection outages (118 days as proposed by Riverkeeper or the shorter-duration outages proposed by Department Staff) for entrainment purposes does not serve to demonstrate that Indian Point's thermal discharge would ensure compliance with the following applicable regulatory provisions:

(1) the Hudson River's best usages (6 NYCRR §§ 701.11, 703.2);

(2) thermal water quality criteria (6 NYCRR §§ 704.1, 704,2 and 704.3);

(3) Section 316[a] of the Clean Water Act (33 U.S.C. § 1326[a]);

(4) SEQR (ECL Art. 8), or;

(5) antidegradation (40 C.F.R.§ 131.12; NYSDEC O&D Memo 85-40 [September 9, 1985], *Water Quality Antidegradation Policy*).

Based upon Entergy-provided and other publicly-available data, Riverkeeper witness Dr. Henderson will show that that even in the case of a 92-day outage extending to August 10, there are appreciable periods later in August when ambient river temperatures and Indian Point thermal discharges would combine to create temperatures which would be lethal to organisms in violation of 6 NYCRR §§ 701.11, 702.3, 704.1, 704.2 and 704.3.[27]

Riverkeeper Comment No. 6: *The SPDES Outages Fact Sheet is Consistent with the Public Participation Requirements of the federal Clean Water and the SPDES and SEQR Processes Under New York's Uniform Procedures Act.*

The Tribunal's October 18, 2013 Memorandum Ruling (which directed Department Staff to issue the SPDES Outages Fact Sheet) addressed an October 4, 2013 Entergy motion which sought to preclude consideration of permanent outages on the grounds that "the public and all parties have operated under the same fundamental assumption *that permanent outages were not a part of this proceeding*" (October 18, 2013 Memorandum Ruling of ALJ Villa at 2, *citing* Entergy October 4, 2013 Motion to Preclude Permanent Outages at 2 [emphasis is in original]).

[27] To be sure, many of the least temperature-tolerant of the species impacted by the incremental effects of Indian Point's intake and thermal discharge (e.g., tomcod, alewife, rainbow smelt, yellow perch, and American shad) have shown long-term and particularly significant negative population trends over the operational history of Indian Point.

Given that Riverkeeper had raised the necessity for Indian Point to achieve cooling water capacity and entrainment reductions commensurate with closed-cycle cooling (by any means, including outages), in its 2004 SPDES Petition for Party Status, Riverkeeper disagreed with Entergy that permanent outages were not "part of this proceeding."[28]

Under the Clean Water Act, the purpose of the fact sheet is to bolster the administrative record and assist in the creation of the draft permit (40 C.F.R. §§ 124.9[b], 124.18[b]). The SPDES Outages Fact Sheet amply provides "a brief summary of the basis for draft permit conditions." (40 C.F.R. §124.8 [b][5]). While the SPDES Outages Fact Sheet does analyze a range of outages options, Department Staff clearly indicates its conclusion that only three (3) of the scenarios presented in Table 3 thereof (Options C, E and F) would minimize adverse environmental impacts within the meaning of 6 NYCRR § 704.5 (*see* SPDES Outages Fact Sheet at 12). The SPDES Outages Fact Sheet accordingly contains "the principal facts and the significant factual, legal, methodological and policy questions considered in preparing" Department Staff's BTA alternative (*see* 40 C.F.R. § 124.8[a]).

A CWA permitting agency is free to raise new issues in response to comments provided after the distribution of the permit fact sheet (*see In re City of Attleboro, Ma Wastewater Treatment* NPDES Appeal No. 08-08, 2009 EPA App. LEXIS 26, *160-165). In Riverkeeper's view, Department Staff's action to address permanent outages is supported (if not indeed mandated) by a number of critical developments in this case since Department Staff first issued its SPDES Fact Sheet in 2003.

First, the Assistant Commissioner's 2008 SPDES Interim Decision found in pertinent part that "the magnitude of the mortality rate at the Stations demonstrates that an adverse environmental impact exists as a matter of law" within the meaning of 6 NYCRR § 704.5. (Interim Decision, 2008 N.Y. ENV LEXIS 52, at *32-34). The Interim Decision conclusively determined that "it has been demonstrated that the Stations' cooling water intake structures have caused, and are continuing to cause, an adverse environmental impact" (*id.* at *51, n. 18).

Thereafter, NYSDEC's April 2, 2010 Notice of Denial of Entergy's Application for WQC ("NYSDEC 401 Denial") found, *inter alia*, that the Indian Point's continued operation in

[28] Riverkeeper October 11, 2013 Memorandum of Law in Opposition to Entergy Motion as a Matter of Law to Preclude Permanent Outages at 11-12, *quoting* Riverkeeper February 13, 2004, SPDES Petition for Party Status at 18.

once-though cooling mode (either as currently configured or with cylindrical wedgewire (CWW) screens) would impair (or have the potential to impair) the best usages of the Hudson River and would therefore be inconsistent with the best usages of the Hudson River for fishing and for fish, shellfish and wildlife propagation and survival.[29]

Department Staff first offered testimony with respect to the effectiveness of fish protection outages as early as May 30, 2012.[30] As the above proceeding and appeal progressed, and in the light of both the record evidence and the Interim Decision's finding as to Indian Point's ongoing adverse environmental impact, Department Staff first sought summary abatement relief in the form of outages for Indian Point in December of 2012.[31] Both Department Staff and Riverkeeper have presented testimony which explained that immediate entrainment reductions commensurate with closed-cycle cooling were required in order for Indian Point to continue operating consistently with the Hudson River's best usages.[32]

Following the hearings and briefings on best usages, Department Staff then proposed permanent outages as a SEQR alternative for Indian Point in connection with the 2013 hearings.[33] There, Department Staff proposed a "feasible" SEQR alternative to significantly reduce entrainment (consisting of either a partial closed-cycle cooling retrofit of one Unit, in conjunction with the other unmodified Unit taking fish protective outages from May 1 through August 15 of each calendar year, or a full-facility outage scenario with Units 2 and 3 both taking fish protection outages during the entire period from May 1 through August 15 each calendar year.[34]

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[29] **Entergy Exhibit 9,** April 2, 2010 letter from William R. Adriance, Chief Permit Administrator, NYSDEC, to Dara F. Gray, Entergy Nuclear Operations, Inc. at 10-11, 17-18.

[30] *See* Nieder May 30, 2012 CWWII Direct at 37:6-7; Nieder June 29, 2012 CWWII Rebuttal at 65:10-15.

[31] *See* Department Staff Best Usages December 21, 2012 Opening Best Usages Brief *and* April 1, 2013 Rebuttal Best Usages Brief. Energy has further submitted an untimely best usages sur-rebuttal brief dated May 17, 2013, to which Department Staff and Riverkeeper have objected.

[32] *See* Riverkeeper December 21, 2012 Best Usages Opening Brief at 69-70; Department Staff's December 21, 2012 Best Usages Opening Brief at 22-34.

[33] Nieder May 31, 2013 CWW III Direct at 21:1-17; *id.* at 32:3 to 34:4.

[34] Nieder May 31, 2013 CWW III Direct at 21:1-17; *id.* at 32:3 to 34:4. SEQR affirmatively directs the Department to avoid, or to minimize to maximum extent practicable, the type adverse environmental effects which would be associated with allowing the continued operation of Indian Point (ECL § 8-0109 [8]; 6 NYCRR § 617.9 [c][2][i]). SEQR goes beyond the quantitative standards found in Department regulations and allows the Department to either impose additional conditions on a particular project to satisfy SEQR or in the alternative, deny the project (*In the*

Based on all the foregoing, neither Entergy nor any other party can legitimately claim that Department Staff's determination to also address permanent outages as a BTA alternative pursuant to 6 NYCRR § 704.5 results in any procedural irregularity under state or federal law. Not only did Riverkeeper raise the issue in its SPDES Petition for Party Status in 2004, but the entire course of the proceeding, including the law of the case and undisputed evidence adduced at the hearings, has made consideration of permanent outages an indispensible aspect of creating a fully-informed record upon which a final BTA determination can be made by the Department.

Conclusion

In the light of all reasonably available and pertinent data and information that must form the basis for the terms and conditions outlined in the SPDES Outages Fact Sheet, it is clear that none of the outage scenarios contained in Columns A-F of Table 3 of that Fact Sheet meet the NYSDEC BTA standard by demonstrating that adverse environmental (entrainment) impacts would be minimized (6 NYCRR § 704.5). Nor would the outage scenarios contained in Columns A-F of Table 3 of that Fact Sheet meet the more stringent standards discussed herein, one of which (best usages) served as a basis for the denial of Entergy's requested CWA § 401 water quality certification (*see also In re Dominion Energy Brayton Point, L.L.C.,* 12 E.A.D. 490 [EPA Envtl. App. Bd.] [February 1, 2006], 2006 EPA App. LEXIS 9, at *24-25, *citing U.S. Steel Corp. v. Train*, 556 F.2d 822, 838 [7th Cir. 1977] and CWA § 301[b][1][C], 33 U.S.C. § 1311[b][1][C]). Nothing short of the 32-week outages discussed in Table of the SPDES Outages Fact Sheet, or the Riverkeeper 118-day outages proposed herein, would serve to meet the NYSDEC BTA standard (6 NYCRR § 704.5) for entrainment.

The Department must also assess the incremental impacts of Indian Point's thermal discharge and cooling water intakes in connection with each other, consistent with both the plain language of 6 NYCRR § 704.5[35] and EPA administrative precedent which recognizes the

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Matter of Cobleskill Stone Products, Inc., Ruling on Issues and Party Status, 2008 N.Y. ENV LEXIS 4 7, *citing Matter of Lane Construction,* Commissioner Decision, June 26, 1998 [emphasis added]). The Interim Decision also clearly contemplated that additional SPDES Permit conditions may be imposed as a result of the SEQR review of the Indian Point Draft SPDES Permit (Interim Decision, 2008 N.Y. ENV LEXIS 52, at * 78, n. 23).

[35] In particular, 6 NYCRR § 704.5 provides that: "The 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 impact." 6 NYCRR § 704.5 (emphasis supplied).

interdependence of Sections 316[a] and 316[b] of the Clean Water Act (*see Matter Of Public Service Company Of New Hampshire, Et Al.* [*Seabrook Station, Units 1 And 2*], NPDES Appeal No. 76-7 1 E.A.D. 332 [June 10, 1977], 1977 EPA App. LEXIS 16, *19-20). In that regard, neither the Riverkeeper proposed 118-day outage nor the outage scenarios proposed in Columns A-F of the SDPES Outages Fact Sheet serve to demonstrate that Indian Point's thermal discharge will be compliance with applicable water standards, as discussed herein.

Respectfully submitted,

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Abigail M. Jones, Esq.
Zoe Kheyman, Legal Intern
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Enclosure

cc: Hon. Daniel P. O'Connell, NYSDEC ALJ
Indian Point Service List

EXHIBIT A

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

In the Matter of a Renewal and Modification of a State Pollutant Discharge Elimination System ("SPDES") Permit Pursuant to Article 17 of the Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York Parts 704 and 750 *et seq.* by Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC, Permittee,

DEC # 3-5522-00011/00004
SPDES # NY-0004472

-and-

In the Matter of the Application by Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc., for a Certificate Pursuant to Section 401 of the Federal Clean Water Act.

DEC # 3-5522-00011/00030
DEC # 3-5522-00011/00031

RIVERKEEPER, INC., SCENIC HUDSON, INC., NATURAL RESOURCES DEFENSE COUNCIL, INC., SUPPLEMENTAL EXPERT DISCLOSURE TO ENTERGY NUCLEAR INDIAN POINT 2, LLC, ENTERGY NUCLEAR INDIAN POINT 3, LLC, AND ENTERGY NUCLEAR OPERATIONS, INC. AND TO THE CITY OF NEW YORK

PLEASE TAKE NOTICE that Riverkeeper, Inc., Scenic Hudson, Inc., and the Natural Resources Defense Council, Inc., (collectively, "Riverkeeper"), hereby and with particular respect Department Staff's May 9, 2014 SPDES Fact Sheet on Scheduled BTA Outages/Seasonal Protective Outages (herein, "Outages Fact Sheet"), submit their combined supplemental response to Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc.'s (collectively, "Entergy") and the City of New York's Expert Witness Demand (collectively and hereinafter, the "Expert Demands"),[1] and further responds as follows:

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[1] Entergy Expert Witness Demands to Riverkeeper dated January 28, 2011 and December 14, 2012; City of New York's First Expert Witness Demand to Riverkeeper dated January 24, 2014. Riverkeeper incorporates by reference the responses and objections to the Expert Demands served by Riverkeeper on February 17, 2014; January 30, 2013; July 18, 2011; and February 28, 2011.

OBJECTIONS

1. Riverkeeper objects to the Expert Demands to the extent they seek disclosure of information beyond the scope of CPLR 3101[d] (including the definitions and instructions contained therein), and with particular respect to the interrogatory demanding a statement of the date of all reports rendered by Riverkeeper's experts (Entergy Expert Demand No. 3[e]).

2. Riverkeeper objects to the Expert Demands as premature insofar as they seek the production of information and/or materials which Riverkeeper would be otherwise obligated to produce in its pre-filed testimony pursuant to 6 NYCRR § 624.7[e].

3. Riverkeeper objects to the Expert Demands insofar as they seek the production of attorney-client communications and/or work product information and/or materials prepared in anticipation of litigation. *See* CPLR 3101[d][2].

4. Riverkeeper objects to the Expert Demands as premature as made in advance of the completion of Riverkeeper's discovery upon Entergy, the City of New York and other parties concerning any of the remaining issues which have been identified for adjudication and as to which a final scheduling order is presumably pending.

5. Riverkeeper reserves the right to narrow or expand the scope of any Riverkeeper witness's testimony as it deems necessary, and to otherwise amend and/or supplement these expert disclosures pursuant to CPLR 3101[d][1][i] and CPLR 3101[h].

RIVERKEEPER'S RESPONSES TO EXPERT DEMANDS

Pursuant to CPLR 3103[d][1][i] and 6 NYCRR § 624.7[b][2] and subject to Riverkeeper's above-stated objections and without waiving the same, Riverkeeper presently intends to call the following witnesses at the adjudicatory hearing in the above-captioned SPDES proceeding and CWA § 401 appeal concerning Department Staff's Permanent Outage BTA Alternative (*see* May 9, 2014 SPDES Fact Sheet on Scheduled BTA Outages/Seasonal Protective Outages, *citing* Memorandum Ruling of DEC Administrative Law Judge Maria E. Villa [October 18, 2013] at 8):

Expert Witnesses:

Dr. Frank Ackerman
Synapse Energy Economics, Inc.
485 Massachusetts Ave, Suite 2
Cambridge, MA 02139

Dr. Ackerman is a Senior Economist at Synapse Energy Economics (Synapse). Dr. Ackerman has over thirty years of experience as an economist and has been widely-published with respect to issues relating to the economics of climate change and energy, cost-benefit analyses and environmental regulations, and other related issues. Dr. Ackerman has directed studies and reports for a wide and diverse range of clients, including state agencies, international organizations, and leading environmental groups. Dr. Ackerman also has recently taught a course on "Electricity, Economics and the Environment" at the Massachusetts Institute of Technology.

At Synapse since 2012, Dr. Ackerman has testified on power plant and utility economics before state agencies in Indiana and Kentucky. Dr. Ackerman also coauthored reports relating to water constraints on energy production, the economic impact of liquefied natural gas (LNG) exports, forecasts of potential future CO_2 prices, and other issues.

Prior to joining Synapse, Dr. Ackerman was the director of the Stockholm Environment Institute's Climate Economics Group. He has also served as director of the Research and Policy Program at Tufts University's Global Development and Environment Institute, worked at the Tellus Institute, and taught economics at Tufts University and the University of Massachusetts campuses at Amherst and Boston. Dr. Ackerman has a B.A. in mathematics and economics from Swarthmore College, and a PhD in economics from Harvard University. His full *curriculum vitae*, which accurately reflects his background and experience, is attached hereto as **Attachment 1**.

With respect to the upcoming hearings on the issue of permanent fish protection outages, Dr. Ackerman is expected to present testimony as to the so-called "fourth step" of the best technology available ("BTA") analysis conducted by the New York State Department of Environmental Conservation (the "Department" or "NYSDEC") pursuant to the Department's Commissioner's BTA Policy, CP-#52.

In particular, Dr. Ackerman is expected to testify with respect to whether the costs of permanent outage scenarios as set forth in Table 3 of the NYSDEC Outages Fact Sheet (as well

as any other permanent outages scenario offered by any party) are wholly disproportionate to the environmental benefits conferred by such operating measures. Dr. Ackerman is also expected to testify in the same regard with respect to Riverkeeper's proposed annual full-facility 118-day fish entrainment protection outage requirements.

Dr. Ackerman's testimony is expected to evaluate the proportional costs of any proposed permanent fish protection outages for Indian Point against the environmental benefits of such permanent fish protection outages. Dr. Ackerman's testimony will consider the costs of permanent fish protection outages in terms of the estimated change in cash flow (over an assumed 20 year project life) that would result from implementing such an operational measure. Dr. Ackerman is expected to express the proportional cost for said operational measures as the ratio of the cost of the mitigation alternative to the projected revenues for that facility.

Dr. Ackerman is also expected to offer testimony with respect to the SEQRA balancing of the environmental factors associated with the proposed permanent fish protection outages with social and economic considerations relating to the public need and benefit of the project, while assigning appropriate weight to the protection and enhancement of the environment.

Dr. Ackerman's testimony is further expected to address his review of the economic analysis provided in reports and/or testimony submitted by Entergy, NYSDEC, and/or any other party with respect to the Outages Fact Sheet and any other outage scenario offered by any party, and any related reports, analyses, data, studies, information, references, and/or supporting documents. Dr. Ackerman may review additional documents that will be produced during the course of these proceedings, or other materials, as needed, to prepare and/or supplement his testimony. Pursuant to 6 NYCRR § 624.7[e], Dr. Ackerman's testimony will identify all "reports, studies and documents relied upon."

Mr. Robert M. Fagan
Synapse Energy Economics, Inc.
485 Massachusetts Ave, Suite 2
Cambridge, MA 02139

Mr. Fagan, a principal associate at Synapse Energy Economics (Synapse), is a mechanical engineer and energy economics analyst with over 25 years' experience analyzing energy industry issues. Mr. Fagan holds an MA from Boston University in Energy and Environmental Studies (1992) and a BS from Clarkson University (then Clarkson College) in

Mechanical Engineering (1981). Mr. Fagan has experience with and is expert in various aspects of the electric power industry including: technical and economic analysis and modeling of electric supply and delivery systems; wholesale and retail electricity provision; energy and capacity market structures and operation; physical transmission network characteristics; local capacity requirements for reliability; renewable resource alternatives and energy integration (including onshore and offshore wind and solar PV); energy efficiency and demand response alternatives; the technical and economic dimensions of wind and solar power integration into utility power systems; congestion management; and utility demand side management and demand response impacts on the power system. Mr. Fagan's full *curriculum vitae*, which accurately reflects his background and experience, has been received as evidence in the above-captioned proceedings as **Riverkeeper Exhibit 108**.

With respect to the upcoming hearings on permanent fish protection outages, Mr. Fagan is expected to present testimony and other evidence with respect to the effect, if any, that the implementation of the permanent fish protection outages (including outages scenarios as set forth in Table 3 of the Outages Fact Sheet, Riverkeeper's proposed annual full-facility 118-day fish entrainment protection outages, and any other permanent outages scenario offered by any party) may have on electric system reliability, air emissions, and electricity sector prices, in New York State, for the purpose of informing the Department's environmental review and findings pursuant to SEQRA. In relation to the potential impact to electric system reliability in New York State if Indian Point is out of service as a result of permanent fish protection outages or other outages proposed as an interim measure, Mr. Fagan is expected to present testimony regarding the likelihood of threshold reliability impacts in light of the availability of alternative (new or existing) capacity resources, demand-side resources and transmission resources, and regarding current plans being undertaken in New York State to ensure system reliability in the absence of Indian Point. In relation to air emission and price impacts that could be expected in New York State if Indian Point undergoes permanent fish protection or other forced outages, Mr. Fagan is expected to present testimony regarding different projections of power plant emissions and price impacts stemming from production cost modeling of the regional electric power sector using an industry standard modeling method.

The testimony presented by Mr. Fagan is expected to rely upon various documents, including, but not limited to, recent documentation available through the New York Independent

System Operator, documents available through the New York Department of Public Service relating to the Indian Point Reliability Contingency Plan proceeding and other proceedings, reports submitted by Entergy, NYSDEC, or other parties in these proceedings, and any related reports, analyses, data, studies, information, references, and/or supporting documents. Mr. Fagan may review additional documents that will be produced during the course of these proceedings, or other materials, as needed, to prepare and/or supplement his testimony. Pursuant to 6 NYCRR § 624.7[e], Mr. Fagan's testimony will identify all "reports, studies and documents relied upon."

Dr. Peter A. Henderson
Pisces Conservation Ltd.
IRC House, The Square
Pennington, Lymington
Hampshire, SO45 1BW
United Kingdom

Dr. Henderson is a Director at Pisces Conservation Ltd. where he works as an ecological and fisheries consultant. He specializes in the ecological effects of large industrial plants, and power stations in particular. Dr. Henderson is also a Senior Research Associate at the Department of Zoology, University of Oxford, England, where he lectures in population dynamics and marine ecology. He has over 30 years' experience working on the design and impacts of power plant cooling water systems. He is the author of the standard textbooks *Ecological Methods* and *Marine Ecology: Concepts and Applications* and over 50 peer reviewed articles. Dr. Henderson's most-current *curriculum vitae* has been received as evidence as **Riverkeeper Exhibit 1A**.

Dr. Henderson is expected to present written and/or oral testimony and other evidence with respect whether any of the proposed entrainment protection outages (including Department Staff's outage scenarios as set forth in Table 3 of the Outages Fact Sheet), would serve to minimize adverse environmental (entrainment-only) impacts within the meaning of Section 316[b] of the Clean Water Act and 6 NYCRR § 704.5 and to a level commensurate with closed-cycle cooling.

Based on the data discussed in and supporting the Outages Fact Sheet, Dr. Henderson is expected to testify that annual 118-day full facility fish entrainment protection outages

(consisting of a first annual outage from February 23rd through March 20th and a second annual outage from May 10th through August 10th, hereinafter the "Riverkeeper Entrainment Abatement Outage") would serve to minimize adverse environmental (entrainment and impingement only) impacts as a matter of best professional judgment within the meaning of the technology-based Section 316[b] of the Clean Water Act and 6 NYCRR § 704.5. Dr. Henderson is further expected to testify as to the necessity of including the annual outage window from February 23rd through March 20th to minimize the entrainment of one of Entergy's so-called "representative important species"[2] (the Atlantic tomcod, a species whose population has shown a significant, long-term negative trend while being subjected to entrainment by Indian Point's cooling water intakes and thermal discharge impacts for the last forty years). Dr. Henderson is also expected to testify that such 118-day full facility fish entrainment protection outages would minimize adverse environmental (entrainment and impingement only) impacts to a level commensurate with closed-cycle cooling.

Dr. Henderson is further expected to testify with respect to the interrelated and incremental impacts of Indian Point's cooling water intakes and thermal discharge (*see In The Matter Of Public Service Company Of New Hampshire, Et Al.* [*Seabrook Station, Units 1 And 2*], NPDES Appeal No. 76-7, 1 E.A.D. 332 (June 10, 1977), 1977 EPA App. LEXIS 16, *19-20). Dr. Henderson is also expected to testify that neither the Riverkeeper Entrainment Abatement Outage nor any of the outage scenarios as set forth in Table 3 of the Outages Fact Sheet would serve to demonstrate Indian Point's thermal discharge compliance with New York's thermal water quality criteria (6 NYCRR §§ 703.2, 704.1; 704.2; 704.3 and 704.4) or Section 316[a] of the Clean Water Act.

Dr. Henderson's testimony will rely on Hudson River Basin Monitoring Program data, year-class reports, and other entrainment data provided by Entergy. Dr. Henderson will also review additional documents that will be produced during the course of these proceedings, or other materials, as needed, to prepare and/or supplement his testimony. Pursuant to 6 NYCRR § 624.7[e], Dr. Henderson's testimony will identify all "reports, studies and documents relied upon."

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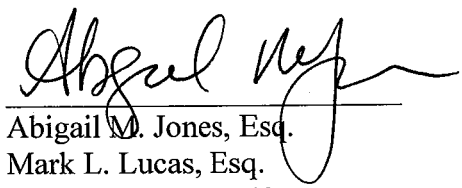
[2] Entergy's RIS species include: (1) striped bass; (2) white perch; (3) American shad; (4) Atlantic tomcod; (5) alewife; (6) blueback herring; (7) bay anchovy; and (8) spottail shiner (**Entergy Exhibit 27**, AEI Report at 7).

Additional Witnesses:

Riverkeeper hereby incorporates into its List of Witnesses by reference each individual identified in the witness lists of all other parties in this proceeding.

Dated: July, 11, 2014
Ossining, New York



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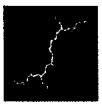
cc: Service List

ATTACHMENT 1



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PROFESSIONAL EXPERIENCE

Synapse Energy Economics Inc., Cambridge, MA. *Senior Economist*, 2012 – present.

Consults on issues of energy economics, environmental impacts, climate change policy, and environmental externalities valuation.

Massachusetts Institute of Technology, Cambridge, MA. *Lecturer*, 2014

Taught seminar on "Electricity, Economics, and Environment" in Department of Urban Studies and Planning.

Stockholm Environment Institute – US Center, Somerville, MA. *Senior Economist and Director of Climate Economics Group*, 2007 – 2012.

Wrote extensively for academic, policy, and general audiences, and directed studies for a wide range of government agencies, international organizations, and nonprofit groups.

Tufts University, Global Development and Environment Institute, Medford, MA. *Senior Researcher*, 1995 – 2007.

Editor of GDAE's *Frontier Issues in Economic Thought* book series, a coauthor of GDAE's macroeconomics textbook, and Director of the institute's Research and Policy program. Taught courses in the Tufts Department of Urban and Environmental Policy and Planning.

Tellus Institute, Boston, MA. *Senior Economist*, 1985 – 1995.

Responsible for research and consulting on aspects of economics of energy systems and of solid waste and recycling.

University of Massachusetts, Amherst, and Boston, MA. *Visiting Assistant Professor of Economics*, 1982 – 1984.

Dollars and Sense, Somerville, MA. *Editor and Business Manager*, 1974 – 1982.

EDUCATION

Harvard University, Cambridge, MA
Doctor of Philosophy in Economics, 1975

Swarthmore College, Swarthmore, PA
BA in Mathematics and Economics, 1967

AFILLIATIONS

Economics for Equity and the Environment (E3 Network), Portland, OR
Co-founder and steering committee member, 2007 – present

Center for Progressive Reform, Washington, DC
Member scholar, 2002 – present

BOOKS

Ackerman, F., E. A. Stanton. 2014. *Climate Change and Global Equity.* London: Anthem Press.

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