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February 15, 2008

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD

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USNRC

February 19, 2008 (8:00am)

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

Before Administrative Judges:  
Lawrence G. McDade, Chairman  
Dr. Richard E. Wardwell  
Dr. Kaye D. Lathrop

In the Matter of

Entergy Nuclear Operations, Inc.  
(Indian Point Nuclear Generating  
Units 2 and 3)

Docket Nos.  
50-247-LR  
and 50-286-LR

**RIVERKEEPER, INC.'S REPLY TO ENTERGY'S AND NRC STAFF'S  
RESPONSES TO HEARING REQUEST AND PETITION TO INTERVENE**

Pursuant to the Atomic Safety and Licensing Board's ("ASLB's") Order of January 31, 2008, Riverkeeper, Inc. ("Riverkeeper") hereby replies to the responses by Entergy Nuclear Operations, Inc. ("Entergy") and the U.S. Nuclear Regulatory Commission ("NRC") Staff to Riverkeeper's Request for Hearing and Petition to Intervene in Indian Point License Renewal Proceeding (November 30, 2007). Answer of Entergy Nuclear Operations, Inc. Opposing Riverkeeper's Request for Hearing and Petition to Intervene (January 22, 2008) ("Entergy Answer"); NRC Staff's Response to Petitions for Leave to Intervene filed by (1) Connecticut Attorney General Richard Blumenthal, Et Al. (January 22, 2008) ("NRC Staff Response").

Neither Entergy nor the NRC Staff objects to Riverkeeper's standing to obtain a hearing. Entergy Answer at 9, NRC Staff Response at 14. Entergy objects, however, to the admissibility of all of Riverkeeper's contentions, and the NRC Staff objects to the admissibility of all contentions except for portions of two: Contention TC-1 and Contention EC-1. As discussed

TEMPLATE = SECY-037

SECY-02

below, their arguments opposing admission of the contentions are without merit, and therefore the contentions should be admitted.

**CONTENTION TC-1: INADEQUATE TIME LIMITED AGING ANALYSES AND FAILURE TO DEMONSTRATE THAT AGING WILL BE MANAGED SAFELY**

Contention TC-1 asserts that:

Entergy's LRA fails to satisfy 10 C.F.R. § 54.21(c)(1) in the following respects:

1. Tables 4.3-13 and 4.3-14 identify four representative reactor coolant components for which Entergy's evaluation of Time Limited Aging Analyses ("TLAAs") is facially non-compliant with the standard of 10 C.F.R. § 54.21(c)(i)-(ii) for avoiding a demonstration, under 10 C.F.R. § 54.21(c)(iii), that it will adequately manage the effects of aging on the intended functions of the components during the license renewal term. For these four components – pressurizer surge line piping (IP2 & IP3), the RCS piping charging system nozzle (IP2), and pressurizer surge line nozzles (IP3) – the environmentally adjusted cumulative usage factor ("CUF") estimated by Entergy exceeds the regulatory threshold for submitting an aging management program. Yet, Entergy has failed to broaden its TLAA analysis beyond the scope of the representative components identified in Tables 4.3-13 and 4.3-14 to identify other components whose CUF may be greater than one; nor has it submitted any demonstration that it will adequately manage the aging of components with a CUF greater than one. Therefore Entergy's LRA does not satisfy 10 C.F.R. §§ 54.21(c) or (c)(iii).

2. Entergy's list of components with CUFs of less than one in Tables 4.3 -13 and 4.3-14 is incomplete, because Entergy's methods and assumptions for identifying those components are unrealistic and inadequate.

3. For a number of other components subject to the license renewal regulations, which are listed in Tables 4.3-3 through 4.3-12, Entergy has also failed to perform complete TLAAs. The TLAAs for these components are incomplete because they omit consideration of the exacerbating effects of environmental conditions on the fatigue of metal components. Therefore Entergy has failed to satisfy 10 C.F.R. § 54.21(c)(1)(i)-(ii). Nor has Entergy submitted an aging management program for these components, as required by 10 C.F.R. § 54.21(c)(1)(iii).

The NRC Staff does not oppose the admission of Contention TC-1, to the extent that it challenges whether Entergy's application has demonstrated the methodology it will use to manage the effects of aging or broaden its TLAA for components with a CUF greater than one. NRC Staff's Answer at 117. In addition, the Staff does not object to the contention to the extent

that it contends the Applicant's methods and assumptions used in calculating the CUF may be incorrect. *Id.* But the Staff objects to the remainder of the contention. NRC Staff Response at 117-18. Entergy objects to the admission of the entire contention. Entergy Answer at 31.

**1. The ASLB Should Disregard LRA Amendment 2**

Entergy asserts that its original LRA, submitted in April 2007, is sufficient to address NRC requirements for identification and management of fatigue. Entergy Answer at 34-35. But Entergy also asserts that on the day that it submitted its response to Contention TC-1, it submitted an amendment to its LRA that "demonstrates that the effects of EAF [environmentally assisted fatigue] will be adequately managed for the period of extended operation, in accordance with 10 C.F.R. § 54.21(c)(1)(iii)." Entergy Answer at 35, citing letter from Fred R. Dacimo, Entergy to U.S. Nuclear Regulatory Commission, "Subject: License Application Amendment 2" (Entergy Letter NL-08-021) (January 22, 2008) ("LRA Amendment 2"). Entergy did not supply a copy of LRA Amendment 2 with its Answer, but merely quoted "Commitment 33." *Id.* at 35-36. Amendment 2 was not publicly issued until February 6, 2008, when it was posted on the NRC's Agency-wide Document Access Management System ("ADAMS"). See <http://adamswebsearch.nrc.gov/scripts/rwisapi.dll/@pip1.env>.

To the extent that Entergy relies on LRA Amendment 2 in opposing the admission of Contention TC-1, its arguments should be disregarded. In fairness, just as Riverkeeper was required to base its contention on the contents of the original LRA<sup>1</sup>, so the Atomic Safety and Licensing Board's ("ASLB's") consideration of Entergy's response should be limited to the original LRA. After the contention is admitted, if Entergy believes that the issues it raises have

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<sup>1</sup> *Private Fuel Storage, L.L.C.*, Independent Spent Fuel Storage Installation), CLI-04-22, 60 NRC 125, 130 (2004) (contentions must be "concrete and specific to the license application").

been resolved by LRA Amendment 2, it should submit a motion to dismiss the contention or a motion for summary disposition. *Entergy Nuclear Vermont Yankee L.L.C. and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), LBP-05-24, 62 NRC 429 (2005). In the meantime, Riverkeeper plans to review LRA Amendment 2 and submit, within 30 days of February 6, 2008, any revisions to Contention TC-1 that are warranted by the contents of LRA Amendment 2. *Id.* at 431, citing *Duke Energy Corporation* (McGuire Nuclear Station, Units 1 and 2), CLI-02-28, 56 NRC 373, 383 (2002). Therefore, in Section 2 below, Riverkeeper addresses only Entergy's arguments with respect to its original LRA.

In the event that the ASLB considers the LRA Amendment to be relevant to the issue of admissibility of Contention TC-1 at this stage of the proceeding, *see, e.g., Entergy Nuclear Vermont Yankee L.L.C. and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), LBP-06-20, 64 NRC 131, 200 (2006), Riverkeeper addresses in Section 3 the failure of LRA Amendment 2 to resolve its concerns or otherwise warrant the rejection of Contention TC-1.

**2. Entergy Has Failed to Show That Riverkeeper's Challenge to Its Original LRA is Inadmissible.**

In defending its original LRA, Entergy fails to show that Contention TC-1 is inadmissible.

**a. Entergy's plan to re-calculate CUFs does not render Contention TC-1 inadmissible.**

With respect to Subpart 1 of Contention TC-1, Entergy argues that there will be no need for it to expand the scope of its time-limited aging analyses ("TLAAs") beyond the representative components identified in Tables 4.3-13 and 4.3-14, because Entergy is going to re-perform its TLAAs for the representative components and determine that the cumulative use

factor for each representative component is less than one. Entergy Answer at 34. In two important respects, Entergy's argument fails to establish the lack of a genuine and material dispute with Riverkeeper.

First, Entergy has failed to give any reason why, that when recalculated, the CUFs are likely to be less than one. The CUFs that are greater than one, as represented in Tables 4.3-13 and 4.3-14, are significantly in excess of one: the CUF for pressurizer surge line nozzles is 2.35, the CUF for pressurizer surge line piping is 9.21, and the CUF for the RCS piping charging system nozzle is 15.20. Entergy describes its new method for calculating CUF as "refined" (Entergy Answer at 35, 37), which implies the method may result in small changes, not reductions by a factor of 15 which are dictated by the results of Tables 4.3-13 and 4.3-14. Entergy also fails to show that Riverkeeper has no basis for asserting that (a) many CUFs already approach unity, even without an environmental correction; (b) the components in Tables 4.3-13 and 4.3-14 are merely representative; and (c) in Dr. Hopenfeld's expert opinion, Entergy will not be able to reduce CUFs significantly since many CUFs without the environmental correction already approach unity and the number of transients could increase as the plant ages. Riverkeeper, Inc.'s Request for Hearing and Petition to Intervene in Indian Point License Renewal Proceeding at 13 (November 30, 2007) ("Hearing Request").

Second, Entergy has not committed to re-calculate the TLAAs as part of its LRA, but instead states that it may wait until the NRC's LRA review process is over: the re-calculation is timed to take place "at least two years *prior* to the extended period of operation." Entergy Answer at 34 (emphasis in original), *id.* at 35. The time frame remains the same in LRA Amendment 2. *See* Entergy's Answer at 35. Given that Unit 2's license is due to expire in September 2013 and Unit 3's license is due to expire in December 2015, therefore, Entergy may

not perform the re-calculations until late 2011, more than two years after the NRC is scheduled to complete its license renewal review. *See*

[http://www.nrc.gov/reactors/operating/licensing/renewal/applications/indian-](http://www.nrc.gov/reactors/operating/licensing/renewal/applications/indian-point.html#schedule)

[point.html#schedule](http://www.nrc.gov/reactors/operating/licensing/renewal/applications/indian-point.html#schedule). Entergy must demonstrate compliance with 10 C.F.R. § 54.21(c)(1)(iii) in its license renewal application, however; and therefore the adequacy of the license renewal application to comply with 10 C.F.R. § 54.21(c)(1)(iii) is subject to challenge in this hearing. *Union of Concerned Scientists v. NRC*, 735 F.2d 1437, 1451 (D.C. Cir.1984), cert. denied, 469 U.S. 1132 (1985). Entergy may not defeat the admission of the contention by referring to calculations it does not intend to include in its LRA. The ASLB must admit Riverkeeper's contention based on the application that Entergy has submitted. If Entergy subsequently re-calculates the CUF for each representative component and determines that it is less than one, Entergy may revise its application and challenge the contention on the merits.

**b. Entergy fails to show that it calculated CUF for 60 years.**

Entergy argues that Riverkeeper's claim that Entergy improperly relied on the "CUF of Record" (40 years), instead of projecting the number of cycles to 60 years, is "factually incorrect." Entergy Answer at 37. In support of its position, Entergy quotes the following statement from the LRA:

The number of cycles accrued to date have been projected to determine the numbers of cycles expected *at the end of 60 years* of operation. Tables 4.3-1 and 4.3-2 also show the projected values for the period of extended operation. With the limited exceptions discussed below, the projected numbers of cycles for 60 years of operation do not exceed the analyzed numbers of cycles.

Entergy Answer at 37, citing LRA at 4.3-2. Riverkeeper agrees that Tables 4.3-1 and 4.3-2 show projected values for the period of extended operation. But the environmentally adjusted CUF values presented in Tables 4.3-13 and 4.3-14 are based on the "CUF of record," which is

commonly understood to be the current CUF, not the extended-period CUF. The “Environmentally Adjusted CUF” (listed in the last column of Tables 4.3-13 and 4.3-14) is a product of the value for “CUF of Record” (listed in the fifth column) and the Fen correction factor (listed in the sixth column). No other values, *i.e.*, for CUF projections beyond the current license term, are given in the tables.

Entergy claims that: “Among other things, the LRA explains that the Fatigue Monitoring Program tracks and evaluates the design transients and requires corrective actions if the numbers of analyzed transients are approached.” Entergy Answer at 37-38. According to Entergy, this “ensures that the numbers of transient cycles experienced by the plan remain within the analyzed numbers of cycles, and hence the component CUFs remain below the values calculated in the design basis fatigue evaluations.” *Id.* Riverkeeper does not agree with Entergy that the promise to count transients and continuously reevaluate the CUF provides sufficient information to allow an assessment of the validity of the LRA. The LRA must be based on an anticipated number of transients during the life extension period. This number must be finite and must be supported by sound technical reasoning. Riverkeeper has no objections to Entergy continuing count plant transients in the future; but that does not relieve Entergy of its obligation to submit a definitive and complete LRA at the presents time.

**c. Contention TC-1 raises issues within the scope of the proceeding.**

Entergy also argues that TC-1 is inadmissible “because it posits stricter requirements than are contained in 10 C.F.R. Part 54 and addressed by NRC guidance, including the GALL Report.” Entergy Answer at 38. According to Entergy, there is “no legal or regulatory basis” for Riverkeeper’s assertion that Entergy must use higher environmental fatigue correction factors. *Id.* But Entergy’s reliance on the GALL Report may be challenged by Riverkeeper as an

inadequate means for complying with the regulations, because regulatory guides do not have the force of regulations but instead represent the Staff's view of how the regulations should be complied with. *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-96-7, 43 NRC 142, 147 (1996).

In addition, Entergy contests the admissibility of Riverkeeper's assertion that it should use generic CUF values in NUREG/CR-6260 for some components in Tables 4.3-13 and 4.3-14, rather than leave the table blank. Entergy Answer at 39. While Entergy is correct that there is no "legal or regulatory requirement" to do so, Riverkeeper has raised a genuine and material dispute as to how the regulations should be interpreted. Riverkeeper asserts – with the support of its expert, Dr. Joram Hopenfeld – that in order to demonstrate the adequacy of its aging management program, Entergy must demonstrate the fatigue potential for all affected components. The need to demonstrate the potential for fatigue problems in Indian Point components is not reduced simply because plant-specific CUF values are not readily available for five components. This represents a significant number of unanalyzed components, five out of a total of twelve for both IP2 and IP3). NUREG/CR-6260 specifically selected six component locations for each plant for the fatigue analysis because these locations are important from risk perspective. Entergy should not be excused from completing the analysis of all six NUREG/CR-6260 components at the fatigue limiting locations by simply claiming the unavailability of CUFs. It is Riverkeeper position that Entergy must perform usage factor calculations for the above five components to provide a base for a complete environmental fatigue evaluation as required by NUREG/CR-6260.



**d. Riverkeeper has made an admissible challenge to the Fen used by Entergy to calculate the CUF.**

Entergy claims that Riverkeeper has not provided adequate support for its contention that Entergy's methods and assumptions for identifying components with CUFs of less than one are "unrealistic and inadequate," because Riverkeeper relies on an expert opinion that is insufficiently explained. Entergy Answer at 39. The basis of Contention TC-1 asserts that in the opinion of Riverkeeper's expert, Dr. Joram Hopenfeld, "a Fen of 17 would be more consistent with the data in NUREG/CR-6909." Hearing Request at 14. Entergy argues that this statement does not satisfy the NRC's admissibility criteria because it does not identify the specific data on which Dr. Hopenfeld relies. Entergy Answer at 39.

Entergy's objection is without merit. Riverkeeper has provided the degree of specificity and support for its assertion that is required by the NRC's regulations. First, the contention meets the NRC's requirement for specificity because it disputes the adequacy of the application (providing specific page numbers) with respect to the identification of components with CUFs less than one. In particular, the contention disputes the conservatism of the Fen value used by Entergy. Second, in support of its assertion, Riverkeeper relies on an expert opinion that data provided in a specifically identified NRC guidance document call for the use of a higher Fen value.<sup>2</sup> Thus, as the ASLB concluded in *Entergy Nuclear Vermont Yankee L.L.C. and Entergy*

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<sup>2</sup> Entergy's complaint that it is difficult to see how Dr. Hopenfeld arrived at the recommended Fen value of 17 is hard to understand, since the figure is given in the NRC abstract of the report:

Under certain environmental and loading conditions, fatigue lives in water relative to those in air can be a factor of  $\approx 12$  lower for austenitic stainless steels,  $\approx 3$  lower for Ni-Cr-Fe alloys, and  $\approx 17$  lower for carbon and low-alloy steels.

NUREG/CR-6909 at 3. In any event, as stated in the contention, Dr. Hopenfeld's opinion is based on his expert interpretation of the data presented in the report. Having explained Dr.

*Nuclear Operations, Inc.*, LBP-06-20, with respect to a similar contention, Contention TC-1 is admissible because it is supported by “a concise statement of the alleged facts or expert opinions which support the requestor’s petitioner’s position.” 64 NRC at 186, citing 10 C.F.R. § 2.309(f)(v). *See also* Final Rule, Rules of Practice for Domestic Licensing Proceedings – Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168 (August 11, 1989), where the Commission stated that at the contention-filing stage, “[t]he protestant must make a *minimal* showing that material facts are in dispute, thereby demonstrating that an ‘inquiry in depth’ is appropriate.” 54 Fed. Reg. at 33,171 (emphasis added), citing *Connecticut Bankers Association v. Board of Governors*, 627 F.2d 245, 251 (D.C. Cir. 1980). The Commission also stated that “the quality of the evidentiary support provided at the summary disposition stage is expected to be of a higher level than at the contention filing stage.” *Id.* Thus, Entergy errs in demanding that Riverkeeper must make a detailed case on the merits at this stage of the proceeding.<sup>3</sup>

Entergy also claims that Riverkeeper “ignores a statement in NUREG/CR-6909 that is contrary to its claim,” *i.e.*, that “relative to the earlier expressions like those contained in NUREG/CR-6583 (as used by Entergy), the correction factors determined from Equation 28” [in NUREG/CR-6909] for low-alloy steels are ‘ $\approx$  18% lower.’” Entergy Answer at 41, quoting

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Hopenfeld’s opinion and identified the report as the source of the data on which Dr. Hopenfeld relies, Riverkeeper has met its obligations with respect to the admissibility of the contention. *See Entergy Nuclear Operations, Inc.*, LBP-06-20, 64 NRC at 186.

<sup>3</sup> *USEC, Inc.*, (American Centrifuge Plant), CLI-06-9, 63 NRC 433, 472 (2006), cited in Entergy’s Answer at 42 n.201, does not hold otherwise. In that case, the Commission affirmed the ASLB’s decision rejecting a contention supported by an expert opinion that “merely states a conclusion (e.g., the application is ‘deficient,’ ‘inadequate,’ or ‘wrong’) without providing a reasoned basis or explanation for that conclusion.” *Id.* The Commission also found that the petitioners had failed to identify any specific error in the application. *Id.* Here, in contrast, Dr. Hopenfeld criticized a specific aspect of the application for employing a non-conservative assumption in calculating CUF. He also pointed to specific data, generated by an NRC contractor, which calls for use of a more conservative assumption. Dr. Hopenfeld’s statement of opinion meets the NRC’s test for adequacy of expert and documentary support for a contention.

NUREG/CR-6909 at 38. But Entergy's self-servingly selective quotation of NUREG/CR-6909 neglects the first part of the same sentence, which states that "correction factors determined from Eq. 27 for carbon steels are  $\approx$  8% higher." More importantly, Entergy fails to acknowledge that the derivation of correction factors from Equation 27, Equation 28 and other equations used in NUREG/CR-6909 is only one step in a complex process for calculating Fen values, and that the constants in those equations "are different from the values reported earlier in NUREG/CR-6583 and -6815." *Id.* Finally, in selectively quoting from one portion of NUREG/CR-6909, Entergy disregards the report's overall conclusion that Fen values between 12 and 17 can be appropriate for components exposed to water. *See* note 2, *supra*, quoting NUREG/CR-6909 Abstract at 3. Accordingly, Entergy's argument is without merit.

**3. LRA Amendment 2 does not resolve the concerns raised in TC-1.**

Entergy does not disagree with Riverkeeper that the cumulative usage factor, CUF, of some components in section 4.3.3 will exceed a CUF of unity. Instead it argues that two years prior to the extended operations it will devise a plan which would address this issue. Entergy Commitment 33 of January 22, 2008, provides only vague promises such as to "update the fatigue usage calculations using refined fatigue analyses to determine valid CUFs less than 1.0" and may evaluate some other plant locations by applying "appropriate Fen factors to valid CUFs." Entergy still has not demonstrated that the CUFs for many reactor components will be less than unity.

For example, according to Entergy, LRA Amendment 2 clarifies that "the actions required by Commitment 33 will be implemented under the Fatigue Monitoring Program, which is described in Section B.1.12 of Appendix B to the LRA." Entergy Answer at 35. But LRA Amendment B does not satisfy any of the concerns raised in Contention TC-1. It does not, for

example, commit to re-doing the CUF analyses using more appropriately conservative assumptions; nor does it commit to doing those analyses in a timely way, *i.e.*, during this license renewal proceeding. It does not commit to projecting the CUF of Record out to 60 years. It does not commit to substituting data from NUREG/CR-6260 in the blanks in Tables 4.3-13 and 4.3-14. And it does not provide sufficient details about the contents of its program for monitoring, managing and replacing equipment affected by fatigue. In summary, LRA Amendment 2 provides no information that would warrant the rejection of Contention TC-1.

An aging management plan must demonstrate compliance with 10 C.F.R. §§ 54.21(a)(3) and 54.21(c)(1)(iii) by demonstrating that it will adequately manage the effects of aging during the license renewal term. *See also Entergy Nuclear Vermont Yankee*, 64 NRC at 186 (ruling that an aging management plan must provide sufficient detail to “demonstrate” that the applicant “will” adequately manage aging of equipment; it is not sufficient to merely “summarize options for future plans.” Instead of complying with these requirements, Entergy only states that it will try to lower current CUFs to less than unity. After trying for two years to lower the initially calculated CUFs for Vermont Yankee, Entergy is still not even close to demonstrating that the CUFs’ for many reactor components will be less than unity. Commitment 33, by stating that Entergy will go on trying to calculate a lower CUF, is not a substitute for an aging management program.

Accordingly, Entergy’s and the Staff’s objections to Contention TC-1 are without merit, and the contention should be admitted.

## **CONTENTION TC-2- FLOW ACCELERATED CORROSION (FAC)**

Contention TC-2 asserts that:

Entergy's program for management of Flow Accelerated Corrosion (FAC) -- an aging phenomenon with significant safety implications -- fails to comply with 10 C.F.R. § 54.21(a)(3)'s requirement that:

For each structure and component identified in paragraph (a)(1) of this section, demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.

Entergy also fails to follow the guidance of NUREG-1800, which requires that an aging management program, including a FAC program for life extension, must address each of the following elements:

- (1) Scope
- (2) Preventative actions
- (3) Parameters monitored or inspected
- (4) Detection of aging effects
- (5) Trending
- (6) Acceptance criteria
- (7) Corrective actions
- (8) Confirmation processes
- (9) Administrative processes
- (10) Operating experience

NUREG-1800, § A.1.2.3.

Entergy's program for management of FAC is deficient because it has not demonstrated that components in the Indian Point nuclear power plant that are within the scope of the license renewal rule and are vulnerable to FAC will be adequately inspected and maintained during the license renewal term. In particular, Entergy's program for management of FAC is deficient because it relies on the computer code CHECWORKS, without sufficient benchmarking of the IP operating parameters. In addition, Entergy's license renewal application fails to specify the method and frequency of component inspections or criteria for component repair or replacement.

Both Entergy and the NRC Staff oppose the admission of Contention TC-2.

Entergy argues that Contention TC-2 does not "directly controvert the LRA." This assertion is patently incorrect: Contention TC-2 specifically identifies the portion of the LRA that addresses management of FAC, and details the ways in which it is inadequate: (a) that it

does not address the elements required by NUREG-1800, and (b) that it relies inappropriately on CHECWORKS. With expert support, the contention also provides a detailed evaluation of the limitations of CHECWORKS, and describes the ways in which Entergy's reliance on CHECWORKS is inadequate. Hearing Request at 19.

Entergy appears to believe that its LRA is insulated from challenge in a contention if the LRA follows other NRC Staff guidance (in this case the GALL Report, NUREG-1801) and employs "longstanding industry practice." Entergy Answer at 46-7. As previously discussed with respect to Contention TC-1, however, the GALL Report is not the equivalent of a binding regulation, but instead represents the Staff's view of how the regulations should be complied with. *See supra* at 8, citing *Louisiana Energy Services, L.P.*, 43 NRC at 147. In any event, the GALL report implies that the code must be properly benchmarked before it can be used as management tool to control FAC. *Id.* at XI. M17 (5): "CHECWORKS was developed and benchmarked by using data obtained from many plants."

By the same token, however longstanding the industry practice may have been, it is not the equivalent of a regulation. By demonstrating that FAC has been a significant problem for many years, despite the use of CHECWORKS as prescribed by the GALL Report, Riverkeeper has raised a material issue regarding the adequacy of adherence to the GALL Report and industry practice to demonstrate compliance with NRC license renewal regulations.

Entergy also takes issue with Riverkeeper's claim that the LRA improperly excludes elements of the FAC Program set forth in NUREG-1800, Section A.1.2.3. Entergy Answer at 47. According to Entergy, the ten elements listed in Section A.1.2.3 of NUREG-1800 are "intended to assist the NRC in performing its safety reviews of LRAs," and NUREG-1800 "does

not impose on an *applicant* any requirements with regard to the contents of an LRA.” *Id.*<sup>4</sup> This argument is belied by the text of NUREG-1800, which specifically states that “[a]n *acceptable aging management program* should consist of the 10 elements described in Table A.1-1, as appropriate (Ref. 1). These program elements/attributes are discussed further in Position A.1.2.3 below.” NUREG-1800, Section A.1.2.2 at A.1-3 (emphasis added). Both Table A.1-1 and Position A.1.2.3 consist of the same list of required elements of an aging management program that are listed in Contention TC-2. Thus, Entergy’s argument is without merit.<sup>5</sup>

Entergy also argues that Riverkeeper is precluded from attacking the adequacy of CHECWORKS to support its aging management program, because the NRC “has expressly approved the use of CHECWORKS as part of license renewal FAC programs.” Entergy Answer at 49. Once again, as discussed above at page 8, Entergy confuses approval of a challengeable NRC Staff program with an unchallengeable NRC regulation.<sup>6</sup>

In addition, Entergy argues that Riverkeeper’s claim that it “must provide detailed information regarding the method and frequency of component inspections and its criteria for repair or replacement” is “beyond the scope of this proceeding.” Entergy Answer at 50. But NUREG-1800 specifically directs license renewal applicants to describe the

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<sup>4</sup> At page 47, Entergy’s Answer refers to “Section A.1.3.3.6” of NUREG-1800. This appears to be a clerical error, because NUREG-1800 does not have a Section A.1.3.3.6.

<sup>5</sup> Entergy also claims that it complies with industry guidance document NEI 95-10, and argues that it is an acceptable substitute for compliance with NUREG-1800. Entergy Answer at 47. But NEI 95-10 is the “Ref. 1” referred to in Section A.1.2.2 of NUREG-1800. Thus, NUREG-1800 presumes that NEI 95-10 requires that an aging management plan must address the same list of ten elements that is found in NUREG-1800.

<sup>6</sup> *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 179 (1998), cited by Entergy at page 50 n.233, does not hold otherwise. Instead, it merely states the general proposition that an adjudication “is not the proper forum for challenging applicable statutory requirements or the basic structure of the agency’s regulatory process.” The Staff’s endorsement of CHECWORKS in regulatory guidance documents is neither a regulation nor a regulatory process.

preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” trending,” and “acceptance criteria” for their aging management programs. *Id.*, § A.1.2.3. It is reasonable for Riverkeeper, supported by the expert opinion of Dr. Hopenfeld, to assert that these elements should include the method and frequency of component inspections and its criteria for repair or replacement. In fact, Entergy admits that it considered this very type of information to be relevant to its aging management program in the 2005 power uprate case. Entergy Answer at 51.

Contrary to Entergy’s next argument, the power uprate case does not “moot” Riverkeeper’s challenge to the adequacy of CHECWORKS to support its FAC aging management program. Entergy Answer at 51. As the ASLB held with respect to a similar contention challenging Entergy’s reliance on CHECWORKS without proper benchmarking in the LRA for the Vermont Yankee nuclear power plant:

We . . . reject the notion that NEC’s challenge to Entergy’s use of CHECWORKS in its aging management program for FAC is barred because similar issues were discussed during the NRC review of Entergy’s EPU [Extended Power Uprate] application. As NEC has claimed,

FAC is an aging phenomenon; the EPU proceedings assumed that the plant would operate six years, not 26 years at the high EPU velocities. The possibility of undetected wall thinning increases substantially with age. Therefore, it may be necessary to modify the FAC program as a plant ages. Entergy’s license renewal application does not explain how it proposes to use CHECWORKS as an aging management tool during the period of extended operation, or how it will overcome the problem of establishing valid trends at higher EPU velocities. . . .

We have previously stated that materials submitted as part of the EPU proceeding are not dispositive in this proceeding except to the extent that Entergy’s license renewal application, or other materials properly before *this* Board at this stage in the proceeding, indicates a commitment to continue existing programs.

*Entergy Nuclear Vermont Yankee L.L.C. and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), LBP-06-20, 64 NRC 131, 194-95 (2006).



The ASLB also held that:

Furthermore, even if such a commitment were made, the very nature of a license renewal proceeding prevents [the petitioner] from contesting the adequacy of Entergy's current FAC program to deal with the extent of corrosion that is likely over the coming 6 years. Rather, [the petitioner] is limited to contesting aging management plans for the next 20 years – in this case by questioning whether a program similar to the current one will be adequate to address the amount of corrosion that may occur during the 20 years of extended operation.

*Id.* at 195. By these principles, the use by Entergy of the CHECWORKS program for its 2005 power uprate does not moot Contention TC-2. In any event, Riverkeeper has explicitly challenged the adequacy of Entergy's current aging management program to account for the effects of the power uprate on plant equipment during the license renewal term. Hearing Request at 21.

Entergy also attacks the adequacy of the expert and documentary support provided by Riverkeeper for Contention TC-2. Entergy Answer at 52-53. While Entergy does not challenge the expert credentials of Riverkeeper's expert, Dr. Joram Hopenfeld, Entergy claims that the contention is "vague and conclusory." Entergy Answer at 52. But Entergy and the Staff ignore the specific factual assertions made in support of the contention, which are supported by Dr. Hopenfeld's expert opinion. For instance, Entergy claims that Riverkeeper provides no definition of "benchmarking" and provides no description of what that process entails (Entergy Answer at 52), without acknowledging the fact that the contention describes the need for benchmarking and the elements of an acceptable method for benchmarking. As the contention states (with the expert support of Dr. Hopenfeld), benchmarking is necessary because:

"Wall thinning is a local phenomenon. Local geometry, local metal composition and local turbulence affect FAC rates. Grooving and the formation of round holes are a manifestation of the interplay between these parameters. Once local corrosion has begun, geometrical changes as they occur may further intensify the local turbulence,

thereby increasing FAC in a non linear rate.<sup>7</sup> The identification of locations where FAC rates are the highest is made difficult by the fact that the local turbulence is not a directly measured quantity, nor is the local flow velocity.”

Hearing Request at 17. The contention also provides an itemized discussion of what is required for benchmarking empirical models: the program must benchmark “all relevant locations” for “relevant plant parameters,” its must determine that “relevant parameters do not change significantly over time,” and it must ensure that “benchmark data on relevant plant parameters are collected for a sufficiently long period of time.” *Id.* at 20. In sum, the “key requirements” for adequate benchmarking are “good data on FAC” and “science based algorithm in the structure of the model,” using a “sufficiently large number of measured points which were selected on the basis of plant history and knowledge of the FAC phenomena.” *Id.* at 20. Thus, Entergy’s and the Staff’s arguments that the contention does not support the need for benchmarking are completely baseless.

Moreover, in arguing that Riverkeeper fails to explain why six to fifteen years of data should be collected (Entergy Answer at 52; *see also* NRC Staff Response at 120), Entergy and the Staff ignore the fact that (a) the contention is based on the expert opinion of Dr. Hopenfled, whose considerable expertise regarding FAC is unchallenged; and (b) the contention itself explains the reason that extended benchmarking is needed: because wall thinning is a “local phenomenon.”<sup>8</sup>

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<sup>8</sup> At pages 54-55, Entergy disputes Riverkeeper’s reliance on an Advisory Committee on Reactor Safeguards (“ACRS”) subcommittee report and data in NUREG/CR-6936 for its assertion that CHECWORKS has limited effectiveness in detecting FAC. Entergy’s arguments only serve to bolster the admissibility of Contention TC-2, by showing that Riverkeeper and Entergy have a dispute regarding a material issue in the case. Similarly, Entergy’s attempt to qualify its claimed reliance on CHECWORKS (Entergy Answer at 58) highlights the existence of a genuine and material dispute between the parties regarding the adequacy of Entergy’s methods for detecting FAC. Entergy does not dispute the accuracy of Contention TC-2’s

Overall, Entergy seeks a level of documentary support that is not required at this stage of the proceeding. Riverkeeper, with the expert support of Dr. Hopenfeld, has provided sufficient explanation and documentary support for its contention to gain its admission. 10 C.F.R. § 2.309(f)(1)(v). As the ASLB held in the Vermont Yankee case:

The Board does not agree that such statements are “bald” or “conclusory.” . . . NRC regulations do not permit admission of a contention when petitioners offer no documentary or expert support for their positions. . . . But [the petitioner] has done considerably more here – Dr. Hopenfeld has submitted a sworn statement describing his professional reasoning and conclusions, and his qualifications to speak as an expert on this subject matter have not been challenged. As we have already stated, NEC is not required to prove its contention at this point or to provide all the evidence for its contention that may be required later in the proceeding. . . . Rather, it is required only to provide sufficient information that ‘the Applicants are sufficiently put on notice so that they will know at least generally what they will have to defend against or oppose, and that there has been sufficient foundation assigned to warrant further exploration of [the] contention.’

*Entergy Nuclear Operations, Inc.*, LBP-06-20, 64 NRC at 194, citing *Kansas City Gas & Electric Co.* (Wolf Creek Generating Station, Unit 1), LBP-84-1, 19 NRC 29, 34 (1984).

The NRC Staff makes additional arguments in opposition to admission of the contention. The Staff asserts, for example, that Riverkeeper has not identified “any particular system or component of concern.” NRC Staff Response at 119. But the Staff ignores the fact that Contention TC-2 challenges the adequacy of Entergy’s program as it applies to the following specific class of components: “safety-related and non-safety related carbon and low alloy steel components in systems containing high-energy fluids carrying two-phase or single-phase high-energy fluid  $\geq$  2% of plant operating time.” Hearing Request at 19. Thus, the Staff’s argument is without merit.

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statement that its program for managing FAC is “largely based” on CHECWORKS. Contention TC-2 at 19. The degree to which Entergy may compensate for the inadequacies of CHECWORKS is a question for the merits proceeding, not a determination regarding the admissibility of the contention.

The Staff also argues that “Riverkeeper fails to demonstrate that its concerns about CHECWORKS have any basis or would materially affect the adequacy of the FAC program at IP.” Staff Response at 119. Again, the Staff’s argument is baseless, and ignores the language of the contention, which provides examples of serious nuclear power plant accidents caused by inadequate detection of FAC in an industry that has relied for many years on CHECWORKS as a means for predicting the occurrence of FAC. Hearing Request at 17-19.

The Staff argues, incorrectly, that “neither Riverkeeper nor its expert know (sic) how CHECWORKS is used in this FAC program.” NRC Staff Response at 119. While the Staff is correct that Dr. Hopenfled does not currently have access to Entergy’s proprietary documents regarding its use of CHECWORKS, the statements in Contention TC-2 show that Dr. Hopenfled is familiar with the program in general. Indeed, as demonstrated by Reference 4 in the list of patents in Dr. Hopenfled’s curriculum vitae, “Method for Monitoring Thinning of Walls and Piping Components (No. 4,922,748),” Dr. Hopenfled’s expertise with CHECWORKS dates to 1988 (when it was known as CHEC). Dr Hopenfled is also very familiar with the current user guide for CHECWORKS.

Accordingly, neither Entergy nor the Staff has demonstrated that Contention TC-2 is inadmissible.

#### **CONTENTION EC-1: FAILURE TO ADEQUATELY ANALYZE IMPACTS OF COOLING SYSTEM.**

Contention EC-1 asserts that:

**Contention:** Entergy’s Environmental Report violates the National Environmental Policy Act (“NEPA”) and NRC implementing regulations 10 C.F.R. § 51.45 and 10 C.F.R. § 51.53(c)(3)(ii)(B) because it fails to adequately analyze the adverse impacts on aquatic resources from heat shock, impingement

and entrainment caused by Indian Point's once-through cooling system. Entergy's Environmental Report also violates NEPA and NRC implementing regulations 10 C.F.R. § 51.45(b), (c), (d) because it fails to provide a complete analysis of the closed cycle cooling alternative for reducing or avoiding adverse environmental effects at Indian Point.

Entergy opposes the admission of Contention EC-1 on the grounds that it: (1) falls outside the "scope" of license-renewal; (2) lacks adequate factual or expert support; and (3) fails to establish a genuine dispute with Entergy on a material issue of law or fact.<sup>9</sup> As discussed below, Entergy's arguments opposing Contention EC-1 are without any merit. Contention EC-1 satisfies the requirements in 10 C.F.R. § 2.309(f)(1), and should be admitted in this proceeding as necessary to fulfill the applicable NRC and National Environmental Policy Act (NEPA) requirements.

**1. The Board should disregard Entergy Reports and Declarations submitted as Exhibits C-K of Entergy's Answer.**

In considering the parties' arguments, Riverkeeper respectfully requests that the ASLB disregard all arguments by Entergy that are based on licensing documents newly submitted as exhibits to Entergy's answer opposing EC-1, that did not exist at the time Riverkeeper submitted its contentions on November 30, 2007. In particular, Entergy relies on a report titled *Entrainment and Impingement at IP2 & IP3: A Biological Impact Assessment* ("AEI Report") and the declarations of Drs. Lawrence W. Barnthouse (Exhibit C); Douglas G. Heimbuch (Exhibit D); Webster Van Winkle (Exhibit F); John R. Young (Exhibit G); Mark T. Mattson (Exhibit H); J. Craig Swanson (Exhibit J); Charles C. Coutant (Exhibit E); and Charles V. Beckers, Jr. (Exhibit K).

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<sup>9</sup> Entergy Answer at 61.

As Entergy admits, the AEI Report was prepared in response to the Issues Ruling on Issues for Adjudication and Party Status (“Issues Ruling”)<sup>10</sup> in the state’s on-going Clean Water Act (“CWA”) re-permitting proceeding. Not only is this report premature, but it is specifically tailored for the state proceeding. Indeed, this Issues Ruling is now before the NYSDEC Commissioner, who will decide appeals filed by the parties; thus, it is not final. Moreover, Entergy acknowledges that the purpose of the AEI report is “to perform a comprehensive assessment of whether the operation of IPEC’s [cooling water intake system] CWIS can, as a scientific matter, be reasonably said to represent an adverse environmental impact to the aquatic ecosystem.”<sup>11</sup> In addition, Dr. Swanson “conducted an independent review of the 1999 Hydrothermal Modeling [for IPEC] to determine whether that modeling was based upon such conditions and whether it supports any allegations of non-compliance.”<sup>12</sup> This report is also premature and specifically tailored for the state re-permitting proceeding.

Just as Riverkeeper was required to rely on the LRA and Environmental Report in submitting its contentions, so Entergy should be restricted to the contents of the LRA in contesting the admissibility of this contention. After the contention is admitted, if Entergy believes that the issues it raises have been resolved by the submission of the above-referenced documents, it should submit a motion to dismiss the contention or a motion for summary disposition. *Entergy Nuclear Vermont Yankee L.L.C. and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), LBP-05-24, 62 NRC 429 (2005). Riverkeeper reserves the right to file a motion for leave to file a new or amended contention based on the information contained in the above-referenced Exhibits within a reasonable time of January 30,

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<sup>10</sup> Exhibit L to the Declaration of William Little.

<sup>11</sup> Entergy Answer at 85.

<sup>12</sup> Entergy Answer at 100.

2008, the date upon which Riverkeeper counsel received proper service of Entergy's complete Answer. In any event, as discussed in section 3 below, the information submitted by Entergy in said documents does not justify the exclusion of Contention EC-1.

**2. Contention EC-1 is Within the Scope of License Renewal**

**a. The 1987 SPDES Permit and Supporting documentation—namely the HRSA and Related Consent Orders—fail to satisfy § 51.53(c)(3)(ii)(B)**

Entergy's Answer in opposition to Contention EC-1 states that "a license renewal applicant, such as Entergy, need only provide current Clean Water Act ('CWA') § 316(a) and (b) determinations, or equivalent State Pollutant Discharge Elimination Permit ('SPDES') permits and supporting documentation, as it is undisputed that Entergy did in its license renewal application ('LRA')." <sup>13</sup> Entergy's asserts that "[t]he [1987] SPDES Permit, *including as it encompasses the [1981 Hudson River Settlement Agreement] HRSA and the consent orders*, was provided and discussed in IPEC's LRA." <sup>14</sup> Specifically, Entergy argues that, in the ER, "Entergy provided NRC with a copy of its current [New York State Department of Environmental Conservation] NYSDEC-issued SPDES Permit *and 'supporting documentation,' here the Consent Order containing NYSDEC's equivalent of § 316(a) and (b) determinations for IPEC.*" <sup>15</sup> Thus, Entergy claims, "it satisfied [10 C.F.R.] § 51.53(c)(3)(ii)(B)." <sup>16</sup> As discussed below, this argument is factually and legally flawed; hence, it must be rejected.

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<sup>13</sup> *Id.* at 62 (emphasis added).

<sup>14</sup> *Id.* at 69 (emphasis added) (citing to "See ER, Attachment C and at 4-90 (referencing FEIS, Appendices F-II (HRSA) and F-III (Fourth Amended Consent Order)).").

<sup>15</sup> *Id.* at 74-75 (citing again to "See ER, Attachment C and at 4-90 (referencing FEIS, Appendices F-II (HRSA) and F-III (Fourth Amended Consent Order))."). However, Entergy did not provide a copy of the FEIS. As noted in Riverkeeper's Petition (at 30 in footnote 12), the FEIS—without Appendices—is *available at* NYSDEC's website: <http://www.dec.ny.gov/permits/6061.html>. A copy of the FEIS is Exhibit L to the Declaration of William G. Little ("Little Declaration")

<sup>16</sup> Entergy Answer at 75.

To begin, these statements are inaccurate and misleading.<sup>17</sup> While it is undisputed that the ER included a copy of the 1987 SPDES Permit,<sup>18</sup> Entergy failed to include the required supporting documentation, which in Entergy's own words is "the HRSA and the consent orders."<sup>19</sup> Notably, the HRSA was annexed to 1987 SPDES Permit (as Appendix 2) and incorporated as a condition to the permit,<sup>20</sup> but it was not provided in the ER. Nor were any of the consent orders provided in the ER.<sup>21</sup>

The HRSA, which Entergy mischaracterizes as "the consensus authorization of open-cycle [once-through] cooling at IPEC,"<sup>22</sup> has been described by the NYSDEC, as follows:

*The HRSA was a 10-year agreement designed to obtain necessary data, impose needed analytical assessments, and develop an impact assessment to determine how best to mitigate impacts to the Hudson River from the three generating facilities [IPEC, Bowline and Roseton]. The HRSA was also executed by the USEPA, the NYS Attorney General, the Department, and involved NGO stakeholders including the Scenic Hudson Preservation Conference (Scenic Hudson), Hudson River Fishermen's Association (Riverkeeper), and the Natural Resources Defense Council (NRDC). The HRSA was effective for the ten year period from May 10, 1981 to May 10, 1991.*

The HRSA provided, among other things, for mitigative measures to reduce fish mortalities at each generation facility as a result of: (a) impingement of adult and juvenile fish on racks and screens at the plants' intake structures, and (b) entrainment of fish eggs and larvae through the respective units' cooling

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<sup>17</sup> Other similar erroneous and misleading statements by Entergy are: "Entergy's submission of its current SPDES Permit *and supporting documentation* (reflecting state determinations equivalent to § 316(a) and (b)), satisfies § 51.53(c)(3)(ii)(B)[], at 74 (emphasis added); and "In short, because Entergy has presented in the ER a current effective SPDES Permit (*including its supporting documentation*), that ER satisfies § 51.53(c)(3)(ii)(B), and Riverkeeper's Proposed Contention EC-1 should not be admitted." at 78 (emphasis added).

<sup>18</sup> ER, Attachment C.

<sup>19</sup> Entergy Answer at 60.

<sup>20</sup> NYSDEC, 1987 SPDES Permit, Facility ID#: NY 000 4472, Additional Requirement 7 (Part 1, Page 11 of 19); ER, Attachment C; Exhibit E to the Little Declaration.

<sup>21</sup> Copies of the First Amended Stipulation of Settlement and Judicial Consent Order ("First Consent Order") and of the Fourth Amended Stipulation of Settlement and Judicial Consent Order ("Fourth Consent Order") are included as Exhibits G and H, respectively, to the Little Declaration.

<sup>22</sup> Entergy Answer at 67.



apparatus. Those measures included seasonal “outages”, or discontinuing cooling water usage by ceasing plant operations. Those measures also included installation of variable speed pumps at Indian Point Units 2 and 3 within three and one-half years after the effective date of the agreement, to keep the volumes of Hudson River water used for cooling to the minimum required for efficient operation. In addition, the HRSA established a biological monitoring program for monitoring fish species and their life stages at different Hudson River locations during each season.<sup>23</sup>

Moreover, in this proceeding, the State of New York has clearly explained the fate of the HRSA:

The HRSA no longer has any basis in the reality of the once-through cooling operations at Indian Point. The HRSA has expired in its original form as an agreement among the various parties. The only vestige of that agreement is the current SPDES permit that Indian Point holds and has held since 1987. That permit, however, has been stretched to the breaking point and does not reflect the need to rectify the current reality of the harm to the Hudson River fishery by once-through cooling. Entergy simply has the benefit of a legal extension of its permit, under New York’s State Administrative Procedures Act (SAPA). This SAPA extension, however, should not and cannot be read to mean that once-through cooling should be perpetuated at this plant. Indeed, the draft permit that Entergy is currently challenging in an administrative proceeding before the State DEC is requiring closed-cycle cooling.

While Entergy and its predecessors, by agreeing to the HRSA, may have benefited by the decades of delay of constructing closed-cycle cooling, the data from the HRSA studies demonstrates that the time has now come to impose closed-cycle cooling.<sup>24</sup>

Turning to the consent orders, which were also not included in the ER, these are judicially approved consent orders that extended certain conditions of the HRSA between 1992

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<sup>23</sup> FEIS at 8.

<sup>24</sup> NYS Petition at 287 (Contention 31 ¶¶ 17-18) (footnotes omitted; citing to Little Declaration ¶¶ 19-20; 23 & 32); NYS Scoping Comments, at 5-6 (noting that “The HRSA required a thorough investigation of the ecology of the River for purposes of future technical decision-making on the SPDES permit application for Indian Point Units 2 and 3 and other Hudson River power plants.”).

and 1998.<sup>25</sup> As explained by the NYSDEC, five days after the expiration of the HRSA, “by correspondence dated May 15, 1991, the Department [the NYSDEC] and the generators executed an agreement to continue the mitigative measures established in the 1981 agreement until SPDES renewal permits were issued.”<sup>26</sup> However, “on September 13, 1991, Riverkeeper, Scenic Hudson, and NRDC filed a lawsuit against the NYSDEC and the four generators seeking: annulment of the May 15, 1991 agreement between the Department and the generators; participation by those three NGO entities in the permitting process; as well as resolution of outstanding issues regarding mitigation measures.”<sup>27</sup> On March 23, 1992, the parties to that legal proceeding executed a judicially approved consent order resolving the matter which provided that the generators would continue the HRSA mitigative measures.<sup>28</sup> The 1992 Consent Order which was extended by the parties on four separate occasions, having expiration dates of September 1, 1994, September 1, 1995, September 1, 1997, and February 1, 1998.<sup>29</sup>

It is beyond dispute—as Entergy concedes in its Answers to New York State and Riverkeeper—that, in order to satisfy 10 C.F.R. § 51.53(c)(3)(ii)(B), Entergy was required to submit a copy of IPEC’s current SPDES Permit and the NYSDEC’s equivalent of § 316(a) and (b) determinations and supporting documentation.<sup>30</sup> Here, Entergy failed not only to provide the

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<sup>25</sup> Hearing Request at 27; Little Declaration ¶¶ 21-23; Exhibit H to the Little Declaration ¶ 2, at 7.

<sup>26</sup> FEIS at 9 (noting that “With respect to Indian Point Units 2 and 3, the letter agreement also memorialized Con Ed’s and NYPA’s commitment to install special fish protective screens to reduce fish impingement at the intake structures.”).

<sup>27</sup> *Id.*

<sup>28</sup> *Id.* at 9-10.

<sup>29</sup> *Id.* See also Exhibit H to the Little Declaration ¶ 2, at 7; Little Declaration ¶ 23; Hearing Request at 27.

<sup>30</sup> *Id.* at 62 (emphasis added); see *id.* at 74, 75 and 78 (“Entergy’s submission of its current SPDES Permit *and supporting documentation* (reflecting state determinations equivalent to § 316(a) and (b)), satisfies § 51.53(c)(3)(ii)(B)[], at 74; and “In short, because Entergy has

HRSA and the consent orders, but misrepresents that the Consent Order “*continues to govern today*, pending the issuance of a renewed SPDES permit by the NYSDEC.”<sup>31</sup> Further, while there is no dispute that 1987 SPDES Permit has been “administratively extended” under NYS law, however, the HRSA and the last consent order have expired and are not “administratively extended.”

In fact, Entergy’s Answer contradicts earlier statements, including representations made in the ER. Notably, the ER stated, “[t]he most recent Consent Order expired in 1998.”<sup>32</sup> In the Answers to New York State and Riverkeeper, Entergy now retracts and takes the position that “[A]lthough the HRSA expired in 1991, its substantive conditions (except with respect to IPEC outage requirements) were continued in *seriatim* judicially approved consent orders, *the last of which continues to govern today*, pending the issuance of a renewed SPDES permit by the NYSDEC.”<sup>33</sup> As explained earlier, the State of New York, NYSDEC, and Riverkeeper—signatories to the HRSA and the consent orders—reject this assertion as being erroneous. On its face, the HRSA was valid and effective between 1981 and 1991, and the last of consent order expired in 1998.<sup>34</sup>

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presented in the ER a current effective SPDES Permit (*including its supporting documentation*), that ER satisfies § 51.53(c)(3)(ii)(B) [].” at 78.)

<sup>31</sup> Entergy’s Answer at 68 (emphasis added); Entergy’s Answer to NYS at 172-173 (emphasis added).

<sup>32</sup> ER, at 4-10 (citing to “NYSDEC (New York State Department of Environmental Conservation). 1997a. Fourth Amended Stipulation of Settlement and Judicial Consent Order, National Resources Defense Council, Inc. et al, vs. New York State Department of Environmental Conservation and Consolidated Edison Company of New York, Inc, New York Power Authority, Orange and Rockland Utilities, Inc., and Central Hudson Gas and Electric Corp.”).

<sup>33</sup> Entergy Answer at 68 (emphasis added); Entergy’s Answer to NYS at 172-173 (emphasis added).

<sup>34</sup> Hearing Request at 26-27.

While IPEC's prior owners (Con Edison and NYPA) stated that they would voluntarily continue certain activities mentioned in the last consent order,<sup>35</sup> such a vague commitment cannot be considered a NYSDEC's equivalent of CWA § 316(a) and (b) determinations. Indeed, as explained by NYSDEC:

When the *Fourth Amended Consent Order expired on February 1, 1998*, the parties, who were by then actively engaged in negotiations regarding elements of draft SPDES permits, did not reach agreement to continue with a fifth extension of the Consent Order. However, the generators [including ConEdison and NYPA] agreed to continue the mitigative measures included in the continuing SPDES permit and provisions of the Fourth Amended Consent Order until new SPDES permits were issued to them.<sup>36</sup>

Moreover, Entergy conceded in the ER that:

The HRSA, which was annexed to the 1982 SPDES Permit, *expired after its 10-year term*, but was *replaced by* four judicially approved consecutive Consent Orders, the first of which was executed in 1992, between the [prior] owners of IP2 and IP3 [ConEdison and NYPA], other Hudson River power generators, NYSDEC, and other stakeholders [including Riverkeeper]. Each of these Consent Orders effectively continued the HRSA terms and conditions, although without requiring outages at IP2 or IP3, or the continued operation of the striped bass hatchery []. *The most recent Consent Order expired in 1998* []. However, IP2 and IP3 voluntarily have agreed with NYSDEC to continue the activities required in the last Consent Decree.<sup>37</sup>

Thus, at this stage, Entergy cannot seriously dispute that the last consent order is expired.

In sum, although Entergy holds an administratively-extended SPDES Permit for IPEC—the 1987 SPDES Permit—that was provided in the ER, Entergy did not provide supporting

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<sup>35</sup> Little Declaration ¶ 23; FEIS at 10.

<sup>36</sup> FEIS at 10.

<sup>37</sup> ER at 4-10 (*citing to* "NYSDEC (New York State Department of Environmental Conservation). 1997a. Fourth Amended Stipulation of Settlement and Judicial Consent Order, National Resources Defense Council, Inc. et al vs. New York State Department of Environmental Conservation and Consolidated Edison Company of New York, Inc, New York Power Authority, Orange and Rockland Utilities, Inc., and Central Hudson Gas and Electric Corp."

documentation that reflect a current NYSDEC equivalent of CWA § 316(a) and (b) determination for IPEC. As stated in our Petition, “providing an outdated [and unsupported] SPDES permit, in lieu of a current CWA § 316(b) determination and CWA § 316(a) thermal variance, does not satisfy NRC regulations that exempt applicants having a once-through cooling system from conducting entrainment, impingement, and thermal analyses.”<sup>38</sup>

In short, “Entergy cannot satisfy the required analyses regarding entrainment, impingement, and heat shock by relying on a 20-year-old SPDES permit.”<sup>39</sup> Consequently, Entergy’s request that the NRC accept, as SPDES supporting documentation, the HRSA and the last Consent Order—which were not provided in the ER and lapsed in 1991 and 1998, respectively—must be rejected; it does not satisfy 10 C.F.R. § 51.53(c)(3)(ii)(B). Using Entergy’s own words, the “NRC must accept as dispositive IPEC’s current [1987] SPDES Permit, and supporting documentation [].”<sup>40</sup> Since the supporting documents encompass the HRSA and the consent orders that are no longer in force, and were not provided in the ER, Entergy cannot claim not satisfy 10 C.F.R. § 51.53(c)(3)(ii)(B).

**b. Admission of Contention EC-1 is Consistent within the Board’s and NRC’s Precedent**

Entergy contends that the recent NRC decision in *Entergy Nuclear Vermont Yankee* is instructive, and that Contention EC-1 “contradicts, without any attempt even to distinguish, this recent NRC precedent.”<sup>41</sup> Specifically, Entergy submits that “recent NRC decisions make clear that a source satisfies [10 C.F.R.] § 51.53(c)(3)(ii)(B) by submitting an administratively extended

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<sup>38</sup> Hearing Request at 28-29.

<sup>39</sup> *Id.* at 29.

<sup>40</sup> Entergy Answer at 74.

<sup>41</sup> *Id.* at 76-77; *Entergy Nuclear Vt. Yankee* (Vermont Yankee Nuclear Power Station), CLI-07-16, 65 NRC 371 (2007).

state-issued NPDES permit;”<sup>42</sup> and that “the fact that a state SPDES permit might be in ‘limbo’ pending a state’s decision whether to renew that permit was ‘irrelevant.’”<sup>43</sup> Entergy’s argument is misplaced and without merit because *Vermont Yankee* concerns a different factual setting. Further, as discussed below, admission of Contention EC-1 is within the scope of the proceeding, and is consistent within the Board’s and NRC’s precedent.

*Vermont Yankee* dealt with the modification in thermal effluent limitations (a 1°F increase for the summer season) in a state CWA permit.<sup>44</sup> In that proceeding, the Petitioner’s key premise was that the modified permit did not qualify as a valid CWA Section 316(a) determination.<sup>45</sup> However, the Fact Sheet appended to the permit modification “leaves no doubt ... that the Agency considered its permit to be a [CWA] Section 316(a) determination,” stated the Commission.<sup>46</sup> The NRC noted that that the Fact Sheet states, among other things the following: “[T]he Agency has made a *determination* that the proposed increase in thermal effluent limits will maintain a level of quality that fully supports all designated uses;” and that “the Agency has made a *finding* that the Applicant’s request meets the requirements for thermal discharges pursuant to § 316(a).”<sup>47</sup> The Commission explained: “All we may do is examine whether the EPA or the state agency considered its permit to be a Section 316(a) determination.”<sup>48</sup>

In this proceeding, as discussed in the previous section, NYSDEC’s well-known position is that the judicially-approved settlements regarding IPEC’s CWA Sections 316(a) and (b)

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<sup>42</sup> Entergy Answer at 76.

<sup>43</sup> *Id.*

<sup>44</sup> *Entergy Nuclear Vt. Yankee*, 65 NRC at 385.

<sup>45</sup> *Id.* at 385.

<sup>46</sup> *Id.* at 386.

<sup>47</sup> *Id.* (emphasis in original).

<sup>48</sup> *Id.* at 385-386.

determinations—the HRSA and the consent orders—have expired. IPEC is simply allowed to continue operating its once-through cooling system under an “administratively extended” permit, pending the outcome of the adjudication. The HRSA and consent orders have not and cannot be administratively extended. Besides, the NYSDEC has issued a Fact Sheet appended to the Draft SPDES Permit that leaves no doubt that the state agency considers the pending renewal to be a Section 316(b) determination, while postponing the Section 316(a) determination until further thermal studies are undertaken.<sup>49</sup> Thus, the NRC must recognize that the underlying HRSA and consent orders of IPEC’s 1987 SPDES permit have expired, and do not satisfy NRC regulations at 10 C.F.R. § 51.53(c)(3)(ii)(B) that exempt applicants having a once-through cooling system from conducting entrainment, impingement, and thermal analyses.

The *Vermont Yankee* decision also discussed the status of a permit modification, subject to litigation, in connection with 10 C.F.R. § 51.53(c)(3)(ii)(B). The Commission held that the court’s “stay is irrelevant to the issue now before us” and that “the pendency of the appeal ... and any resulting ‘uncertainty’ as to the permit’s status are not relevant here.”<sup>50</sup> Entergy attempts to draw similarities between this aspect of the *Vermont Yankee* decision and the instant proceeding.<sup>51</sup> However, in *Vermont Yankee* the NRC was referring to the pendency of the permit modification, which was being challenged in state court, not to the administratively-extended state permit (which was not at issue). Clearly, the *Vermont Yankee* decision does not hold, as

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<sup>49</sup> The Fact Sheet is *available at* NYSDEC’s website: <http://www.dec.ny.gov/permits/6061.html>; IPEC’s Draft Permit is also available at this website and is included as Exhibit M to the Little Declaration.

<sup>50</sup> *Entergy Nuclear Vt. Yankee*, 65 NRC at 384.

<sup>51</sup> Entergy’s Answer at 76 (“To the contrary, recent NRC decisions make clear that a source satisfies § 51.53(c)(3)(B)(ii) by submitting an administratively extended state-issued NPDES permit: As the Commission reasoned in *Entergy Nuclear Vermont Yankee*, the fact that a state SPDES permit might be in ‘limbo’ pending a state’s decision whether to renew that permit was ‘irrelevant.’”)

Entergy submit, “that a source satisfies § 51.53(c)(3)(B)(ii) by submitting an administratively extended state-issued NPDES permit.”<sup>52</sup> Thus, Energy’s disingenuous argument, not to mention incorrect, is out of context and misplaced; thus, it must be rejected.

Moreover, Riverkeeper is not asking the NRC to look behind the NYSDEC’s 1987 SPDES Permit and supporting documentation to make an independent determination as to whether it qualifies as a *bona fide* Section 316(a) and 316(b) determinations. On its face, as NYSDEC repeatedly states, the 1987 SPDES Permit is “administratively extended” pending the outcome of the renewal proceeding, but the underlying CWA Sections 316(a) and 316(b) determinations in the HRSA and the consent orders have lapsed as per their express terms. As discussed in the previous section, it is copiously clear that the HRSA expired in 1991, and the last consent orders lapsed in 1998. The fact that Entergy now retracts the obvious cannot be considered a serious claim that the ER satisfied § 51.53(c)(3)(B)(ii). Indeed, if Section 316(a) and (b) determinations are to be taken “at face value” by looking at the 1987 SPDES permit and supporting documentation, Entergy has not satisfied § 51.53(c)(3)(B)(ii).

### **3. Contention EC-1 has Adequate Factual and Expert Support**

By means of misrepresentations and flawed arguments, Entergy alleges that Contention EC-1 lacks factual and qualified expert support. First, Entergy claims that Contention EC-1 calls for “a generic assessment of the Hudson River as a resource, without regard to IPEC.”<sup>53</sup> Second, Entergy acknowledges that Drs. Peter Henderson and Richard Seaby of Pisces Conservation Ltd. (“Pisces”) are qualified fisheries consultants, but criticizes “the absence of experience with the

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<sup>52</sup> *Id.*

<sup>53</sup> Entergy Answer at 62.



Hudson River [].”<sup>54</sup> Lastly, Entergy submits that Riverkeeper improperly advances a thermal contention without a qualified expert to assess hydrothermal modeling.<sup>55</sup>

**a. Contention EC-1 is Not Calling for a Generic Assessment of the Hudson River as a Resource, Without Regard to IPEC**

Entergy asserts that “Riverkeeper’s Proposed Contention [EC-1] is grounded in the fundamentally incorrect proposition that NRC’s jurisdiction extends (beyond IPEC’s potential aquatic impacts) to consideration of the Hudson River as a resource.”<sup>56</sup> Further, Entergy claims that “Drs. Henderson and Seaby ask NRC to perform a generic assessment of the Hudson River as a resource, without regard to IPEC.”<sup>57</sup> This objection, or rather exaggeration, is baseless and quite astounding. Nowhere in the Pisces’ expert opinion, or even in Riverkeeper’s Hearing Request, is there a call to perform a generic assessment of the Hudson River as a resource, without regard to IPEC. Obviously, NRC generic aquatic resource assessment is not within the purview of the NRC’s regulatory mandate.

Remarkably, to support this baseless argument Entergy cites to the Hearing Request, but it leaves out an essential part of the sentence. Entergy’s cite of the Hearing Request is as follows:

Entergy’s [ER] ... failed to acknowledge that many species of fish in the Hudson River show signs of declining abundance, and that the ecosystem also appears to be declining in terms of stability.<sup>58</sup>

In contrast, the complete sentence in Riverkeeper’s Petition reads:

Entergy’s Environmental Report—*both in the background section on aquatic resources (under section 2) and in the section on entrainment, impingement, and heat shock (section 4)*—failed to acknowledge that many species of fish in the

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<sup>54</sup> *Id.*

<sup>55</sup> *Id.*

<sup>56</sup> *Id.* at 79.

<sup>57</sup> *Id.* at 62.

<sup>58</sup> Entergy Answer at 79.

Hudson River show signs of declining abundance, and that the ecosystem also appears to be declining in terms of stability.<sup>59</sup>

Indeed, the Petition and the Pisces expert opinion is clearly focused on the ER, and specifically addresses the data and references relied upon by Entergy to attempt an assessment of aquatic impacts by IPEC. As is evidently clear from the Petition, the ER relies extensively on the 2004 Year Class Report,<sup>60</sup> which is the annual compilation for the Hudson River Estuary Monitoring Program, namely the HRSA-established (and later incorporated in the 1987 SPDES Permit) “biological monitoring program for monitoring fish species and their life stages at different Hudson River locations during each season.”<sup>61</sup>

To comment on the environmental and ecological background impacted by IPEC, as a necessary step in order to be able to address entrainment, impingement, and thermal issues at IPEC, both Riverkeeper and the NYSDEC used the 2005 Year Class Report. Entergy used the 2004 data, while Riverkeeper and the NYSDEC used the more recent report, which incorporates all the data in the 2004 Year Class Report (dating back to the 70s) and the 2005 data.<sup>62</sup> In any event, Pisces expert opinion, which was produced utilizing over 30-years of data from the Year Class Reports for the Hudson River Estuary Monitoring Program (1973-2005), clearly contradicts statements in the ER that are based on the same Year Class Reports (although without data for 2005). Thus, what we have here is the classical “battle of the experts.”<sup>63</sup>

In short, Pisces’s expert opinion comprises two parts. First, Pisces prepared the document *The Status of Fish Populations and the Ecology of the Hudson* on the environmental setting

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<sup>59</sup> Petition at 32.

<sup>60</sup> *Id.* at 32-36.

<sup>61</sup> FEIS at 8.

<sup>62</sup> Petition at 32-37; Declaration of Roy A. Jacobson Jr. (“Jacobson Declaration”), ¶ 8; Exhibit B to the Jacobson Declaration.

impacted by IPEC.<sup>64</sup> Second, Pisces prepared a second document *Entrainment, Impingement and Thermal Impacts at Indian Point Nuclear Power Station*, specifically on the environmental impact of IPEC. As explained in the second document, “[t]his document examines the estimates of the numbers of fish impinged and entrained at Point power plant, on the Hudson River. A previous report, *The status of fish populations and the ecology of the Hudson* (Pisces Conservation 2007) gives supporting information.”<sup>65</sup>

**b. Contention EC-1 has Sufficient Factual and Expert Support**

Contention EC-1 has sufficient factual and expert support, and satisfies the requirements of 10 C.F.R. § 2.309(f)(1)(v) for a concise statement of the alleged facts or expert opinion supporting the contention, including references to sources and documents relied upon in the Contention. Indeed, Contention EC-1 raises significant factual allegations about the matters at issue and provides ample support for its contention. Moreover, it relies on Pisces’ expert opinion that specifically reviews the ER. In any event, Petitioners are not required to prove alleged facts at the contention admissibility stage.<sup>66</sup>

Entergy faults Contention EC-1, for lacking “expert support for the proposition that IPEC is the *cause* of purported ecosystem changes it claims have occurred.”<sup>67</sup> In addition, Entergy claims that “Riverkeeper has established no credible basis for its position that IPEC has caused any decline in fish populations, as it must to satisfy NRC requirements for admission of its

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<sup>63</sup> *Entergy Nuclear Vt. Yankee*, ASLBP No. 06-849-03-LR (2007), at 2.

<sup>64</sup> Petition, Contention EC-1, Exhibit 1, Attachment 2.

<sup>65</sup> Petition, Contention EC-1, Exhibit 1, Attachment 3 at 3.

<sup>66</sup> Rules of Practice for Domestic Licensing Proceedings- Procedural Changes in the Hearing Process, 54 FR 33168, at 33170 (August 11, 1989). See *Louisiana Energy Serv. L.P.* (National Enrichment Facility), CLI-04-35, 60 NRC 619 (2004).

<sup>67</sup> Entergy Answer at 80 (emphasis in original).

Proposed Contention. This failure to establish *causation* is a fatal error.”<sup>68</sup> These statements are totally misplaced. First, Petitioners are not required to prove alleged facts at the contention admissibility stage.<sup>69</sup> Second, Contention EC-1 clearly shows that ER’s assessment of the environmental conditions in the Hudson River estuary, where IPEC is located is faulty and unreliable. Contention EC-1 also shows that IPEC causes adverse environmental impact on aquatic resources. Pisces concludes, “[E]ntrainment and impingement mortality each year is in the order of billions and hundreds of thousands of fish respectively.”<sup>70</sup> Or, as NYSDEC’s expert puts it, IPEC’s mortality “is astounding, with over 1.2 billion fish eggs and larvae entrained each year.”<sup>71</sup>

Still, Entergy attempts to claim there is “uncontroverted evidence is that IPEC’s CWIS operations, and its thermal discharge, have had no adverse impact on the Hudson River fish populations or community, whether through entrainment and impingement or thermal discharges.”<sup>72</sup> This is remark is quite astonishing. More far-fetched are Entergy’s arguments in support of this claim:

Indeed, the NYSDEC ALJs in the pending SPDES Permit proceeding determined that Entergy has a right to establish that IPEC’s [cooling water intake structure] CWIS operations have no adverse environmental impact (attributable to entrainment and impingement) on the Hudson River ecosystem.

Further, with respect to thermal-discharge issues, Entergy and NYSDEC reached consensus (without objection from Riverkeeper) on a proposed SPDES permit condition requiring a tri-axial thermal study to be performed after the conclusion of the pending SPDES Permit proceeding. Viewed in light of the ALJs’ Issues Ruling, and NYSDEC’s position (unchallenged by Riverkeeper) that thermal

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<sup>68</sup> *Id.* at 80-81 (emphasis in added).

<sup>69</sup> *See supra* footnote 66.

<sup>70</sup> Attachment 3 to the Declaration of Peter Henderson, at 1.

<sup>71</sup> Jacobson Declaration, ¶ 20, at 10.

<sup>72</sup> Entergy Answer at 81.

issues are not a priority, Riverkeeper's Proposed Contention EC-1 amounts to empty, and incredible, speculation.<sup>73</sup>

With respect to the first argument, Entergy fails to disclose that this issue has been opposed and appealed to the NYSDEC Commissioner, both by NYSDEC Staff and by Riverkeeper (together with NRDC and Scenic Hudson). In any event, even the ALJ puts it in a different light, and, moreover, adopts a definition of adverse environmental impact that is ignored by Entergy and its consultants. The ALJ ruled as follows:

Although Entergy characterizes this as a "threshold" issue, the threshold is a low one. *EPA has defined the term "adverse" in this context to mean "unfavorable, harmful, difficult, or detrimental."* [citing: *In re Brunswick Steam Electric Plant*, Initial Decision (Permit No. NC007064), EPA Region 4 (Nov. 7, 1977); and, *Matter of Athens Generating Co., LP*, Issues Ruling, at 25, 2000 WL 33341186, \* 18 (Apr. 26, 2000)]. In *Matter of Athens*, ALJ O'Connell cited to a draft EPA guidance document (the "Guidance") [USEPA Office of Water, *Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment*: Section 316(b) PB 92-500 (Draft, 1977)] that indicates that *adverse impacts "would occur whenever biota were damaged as a result of entrainment or impingement as a result of the operation of a facility's cooling water intake structure."* *Id.* While the Guidance states that "[t]he extent of fish losses of any given quantity needs to be considered on a plant-by-plant basis," and "some level of intake damage can be acceptable if that damage represents a minimization of environmental impact," once adverse impacts exceed some *de minimis* level, there is no precise threshold of significance which must be met before adverse impacts must be minimized by applying BTA. Guidance, at 3.<sup>74</sup>

With respect to the second argument, Entergy has completely distorted the facts and the ALJ's ruling, which states:

Entergy's comments argued that Department Staff's determination to require a thermal study was unfounded ... Riverkeeper took the position that the Stations' compliance with [thermal] water quality standards is not a foregone conclusion, and supported the permit condition mandating that the study [a tri-axial thermal study] be performed.<sup>75</sup>

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<sup>73</sup> *Id.* 81-82

<sup>74</sup> Exhibit N to the Little Declaration at 26-27 (emphasis added).

<sup>75</sup> *Id.* at 35.

As Entergy admits, in response to the Issues Ruling, which is pending before the NYSDEC Commissioner, it has retained experts “to perform a comprehensive assessment of whether the operation of IPEC’s CWIS can, as a scientific matter, be reasonably said to represent an adverse environmental impact to the aquatic ecosystem.”<sup>76</sup>

While we object to this unauthorized submission and reserve the right to respond to the so-called “AEI Report”, if appropriate, it is apparent that Entergy’s experts disagree with Riverkeeper’s and NYS’s experts. Thus, if the ALSB takes into account this report, it clearly supports Riverkeeper’s and NYS’s request for admissibility of the contentions related to aquatic impacts. On its face, the AEI report seems out of the scope of this proceeding. It also seems immaterial to findings that are required under NEPA and the NRC’s regulations. Indeed, as stated in Entergy’s Answer, the report refers to hypothesis, such a whether “[i]ncreased predation by the rapidly growing Hudson River striped bass population is the most likely cause of recent declines in the abundance of Atlantic tomcod, river herring and bay anchovy.”<sup>77</sup> These types of scientific debates should be left outside from this proceeding, where the purpose is to take into account the environmental harms and benefits of the proposed action. The role of the NRC is to factor the environmental impacts from the use of the CWIS at IPEC into the NEPA analysis.<sup>78</sup> As stated above, the Pisces’ expert opinion responds to the ER’s discussion of the affected environment as well as to the ER’s sections on entrainment, impingement and heat shock. Thus, the AEI Report does not seem responsive to Contention EC-1, or to NYS’s aquatic impact contentions.

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<sup>76</sup> Entergy Answer at 85.

<sup>77</sup> *Id.* at 88.

<sup>78</sup> *Public Service Co. of N.H. (Seabrook Station, Units 1 and 2), Seabrook*, CLI-78-1, 7 NRC at 26; *Entergy Nuclear Vt. Yankee*, 65 NRC at 389.

Similarly, Contention EC-1 has sufficient factual and expert support (which will be addressed further below), with respect to the thermal/heat shock issue and has satisfies the requirements of 10 C.F.R. § 2.309(f)(1)(v) for a concise statement of the alleged facts or expert opinion supporting the contention, including references to sources and documents to be relied upon. Contention EC-1 has raised significant factual allegations about the thermal issue and provided various support for its contention. Moreover, it relies on expert reports specifically commissioned to review the ER's thermal section—not to critique or conduct an analysis of IPEC's thermal plume modeling. As noted earlier, Riverkeeper is not required to prove alleged facts at the contention admissibility stage.<sup>79</sup>

Contention EC-1 alleges that the ER's thermal analysis is inadequate and insufficient, supported by various facts, documents, sources and a reasoned fact-based argument, and asserts the need assess the thermal impacts, and to factor these impacts into the NEPA cost-benefit analysis.<sup>80</sup> Any references in our Petition to NYSDEC's statements that IPEC may be out of compliance with New York State thermal criteria do not undermine Contention EC-1. On the contrary, these statements show the seriousness of the thermal issue.

Contention EC-1's thermal issues go beyond "generalized statements", as Entergy claims, linking IPEC's thermal discharge to the potential effects on aquatic life, which are impacts that need to be accounted for in the NEPA review. For instance, Pisces has identified many of those potential effects at IPEC, taking into account the know near-field and far-field thermal characteristics.<sup>81</sup> At this stage, it is not necessary to submit an analysis or scientific estimation of

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<sup>79</sup> See *supra* footnote 66.

<sup>80</sup> *Public Service Co. of N.H.* (Seabrook Station, Units 1 and 2), *Seabrook*, CLI-78-1, 7 NRC at 26 (1978); *Entergy Nuclear Vt. Yankee*, 65 NRC at 389.

<sup>81</sup> See Attachment 3 to the Declaration of Dr. Henderson, at 19-36.

what in fact occurs at IPEC.<sup>82</sup> Thus, the thermal aspects of Contention EC-1 have sufficient factual and expert support.

**c. Pisces has the Required Qualifications and Expertise**

Entergy concedes that the independent experts consulted by Riverkeeper, Drs. Henderson and Seaby from Pisces Conservation Ltd., based in the U.K., are qualified fish biologist to support Contention EC-1. However, Entergy's counsel raises three concerns: 1) Pisces' "absence of experience with the Hudson River";<sup>83</sup> 2) Pisces's "no demonstrable grasp of the American legal framework that governs this Proceeding"<sup>84</sup> because supposedly "Drs. Henderson and Seaby ask NRC to perform a generic assessment of the Hudson River as a resource, without regard to IPEC;"<sup>85</sup> and, finally, 3) that Drs. Henderson and Seaby "are not engineers qualified to assess hydrothermal modeling."<sup>86</sup> All three concerns are without merit, and will be discussed below.

Entergy's statement that Pisces are "British fisheries experts without any demonstrated expertise with Hudson River conditions (or even American ecosystems or regulatory standards) beyond their advocacy work for Riverkeeper,"<sup>87</sup> is flatly. As Entergy certainly knows, for almost 10 years, Pisces has been involved with assessing the environmental impact of Indian Point due to entrainment, impingement, and thermal pollution. Pisces prepared comments to the 1999 Draft Environmental Impact Statement (DEIS) in connection with IPEC's state SPDES re-permitting, which were addressed by the NYSDEC in the 2003 FEIS.<sup>88</sup> Pisces also prepared an expert report

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<sup>82</sup> As noted earlier, Dr. Swanson's post-ER review of the 1999 Hydrothermal Modeling should be disregarded.

<sup>83</sup> Entergy Answer at 62.

<sup>84</sup> *Id.*

<sup>85</sup> *Id.*

<sup>86</sup> *Id.*

<sup>87</sup> *Id.* at 80.

<sup>88</sup> FEIS, Public Comment Summary (Page 39-46) and Exhibit F-I. Note that Pisces submitted comments on behalf of Riverkeeper, as well as on their own behalf.



regarding NYSDEC's 2003 Draft SPDES for IPEC that supported Riverkeeper's (together with NRDC and Scenic Hudson) Petition for Party Status and Issues for Adjudication. The contentions that the ALJ admitted for adjudication were unopposed by Entergy, which is represented by Elise Zoli, Esq.<sup>89</sup> Ms. Zoli, who is now appearing in this NRC proceeding as Entergy's co-counsel, did not raise any objections as to Pisces' "absence of experience with the Hudson River" or lack of "demonstrable grasp of the American legal framework."

Moreover, Pisces has rendered qualified expert opinions and provided testimony in connection with the impacts of several power stations in the Hudson River, including the Mirant Bowline Units 1, 2 and 3, and the Mirant Lovett facility; the Dynegy Danskammer and Dynegy Roseton power plants; and the Bethlehem Energy Center. Pisces' has also submitted comments to the EPA with regards to regulations for cooling water intake structures. Finally, Pisces has provided expert opinion and/or testimony at state proceedings in Michigan and California, not to mention their experience in Europe and throughout the world. This information has been provided in their resumes.<sup>90</sup>

Certainly, Drs. Henderson and Seaby are not engineers qualified to assess hydrothermal modeling. Pisces's opinion was not offered as a critique of the hydrothermal modeling that IPEC's prior owners did back in 1999. Riverkeeper offered Pisces' qualified expert opinion to support the thermals aspects in Contention EC-1.

In any event, as discussed in the previous section, Contention EC-1 is supported by various facts, documents, sources and a reasoned fact-based argument, and asserts the need to

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<sup>89</sup> Exhibit N to the Little Declaration at 42.

<sup>90</sup> Attachment 1 to the Declaration of Dr. Henderson; Attachment 1 to the Declaration of Dr. Seaby.

assess the thermal impacts, and to factor these impacts into the NEPA analysis.<sup>91</sup> At this stage, it is not necessary to submit an analysis or scientific estimation of what in fact occurs at IPEC. Thus, the thermal issues of Contention EC-1 have sufficient factual and expert support, and should be admitted.

**4. Contention EC-1 Provides Sufficient Information to Show a Genuine Dispute on a Material Issue of Law or Fact**

Finally, Entergy claims that Contention EC-1 fails to comply with the NRC's requirement of materiality, "because the Contention implicates matters that do not, and cannot, affect the outcome of this Proceeding, and therefore is not admissible."<sup>92</sup>

Entergy's main argument here is that Entergy, Riverkeeper and NYSDEC "are parties to an active pending adjudicatory proceeding ... *regarding the substance of the Proposed Contention.*"<sup>93</sup> According to Entergy, the proceeding "awaits trial of the very concerns" and that "admission of these contentions would duplicate regulatory proceedings, squander public and private resources and risk conflicting outcomes."<sup>94</sup> Entergy distorts the scope of Contention EC-1, and is again wrong in the fact and the law.

Riverkeeper's unopposed issues for adjudication in the pending adjudicatory proceeding are, as follows:<sup>95</sup>

- Whether closed cycle cooling, augmented by design protections such as wedgewire and Ristroph screens, is the best technology available to minimize Indian Point's adverse environmental impacts.
- Whether closed cycle cooling is available technology at Indian Point within the five year SPDES permit period or shortly thereafter.

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<sup>91</sup> *Public Service Co. of N.H.* (Seabrook Station, Units 1 and 2), *Seabrook*, CLI-78-1, 7 NRC at 26; *Entergy Nuclear Vt. Yankee*, 65 NRC at 389.

<sup>92</sup> Entergy Answer at 63.

<sup>93</sup> *Id.* (emphasis added).

<sup>94</sup> *Id.*

<sup>95</sup> Exhibit L to the Little Declaration at 42.

- Whether the “technologies” required by the permit will not equal or even approach the protection offered by closed cycle cooling.
- Whether DEC would unnecessarily delay implementation of BTA requirements years after the expiration of the permit.

Thus, the resolution of these issues will determine what CWIS IPEC will utilize, in accordance with the requirements of the CWA. In other words, the proceeding focuses on the CWIS that represents the “best technology available” to obtain a § 316(b) determination and comply with the CWA.

Finally, related to these issues, the NRC Staff claims that the “discussion of the validity of the SPDES permit and issues pertaining to closed cycle cooling are beyond the authority of the NRC under the Clean Water Act,”<sup>96</sup> Contention EC-1 does not ask that the NRC undertake an independent analysis of aquatic impacts already assessed by the NYSDEC in connection with IPEC’s SPDES re-permitting; it asks that the NRC, pursuant to § 51.53(c)(3)(B)(ii), assess heat shock, impingement, and entrainment, and take these impacts into account in the NEPA review. As stated in *Seabrook*, the permitting agency, here the NYSDEC, determines what cooling system a nuclear power facility may use, and NRC factors the impacts resulting from use of that system into the NEPA analysis.<sup>97</sup> At this time, because NYSDEC has not finalized the re-permitting of IPEC’s CWIS, the NRC must factor the impacts from the existing system and the impacts of the NYSDEC-proposed system into the NEPA analysis, as reflected in Contention EC-1.

Contention EC-1 is not contrary to Section 511(c)(2) of the CWA that expressly prohibits the NRC from “review[ing] any effluent limitation or other requirement established pursuant to”

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<sup>96</sup> NRC’s Answer at 110.

<sup>97</sup> *Seabrook*, CLI-78-1, 7 NRC at 26.

the CWA. Indeed, Contention EC-1 does not ask for, or require, that the NRC impose or review any intake or effluent limitation. As a result of the state proceeding, the NYSDEC will establish IPEC's limitations on the amount of intake water for cooling and other aspects of the CWIS, as well as effluent water temperature to replace the lapsed HRSA and consent orders. Indeed, following the NRC's instructions in *Seabrook*, when the NYSDEC reaches the necessary factual findings for re-permitting of IPEC's cooling system, after full administrative proceedings, the NRC must defer to the NYSDEC-issued permit.<sup>98</sup> In any event, NRC's duty to assess the Category 2 impacts due to entrainment, impingement and thermal impact from IPEC's once-through cooling, is necessary under NRC's NEPA-implementing regulations.

Accordingly, Entergy's arguments are without merit, and Contention EC-1 is admissible.

#### **CONTENTION EC-2: INADEQUATE ANALYSIS OF SEVERE ACCIDENT MITIGATION ALTERNATIVES**

Contention EC-2 asserts that:

**Contention:** Entergy's analysis of severe accident mitigation alternatives ("SAMAs") in its Environmental Report fails to satisfy NEPA, 42 U.S.C. § 4321-4370f, because its analysis of the baseline of severe accidents is incomplete, inaccurate, nonconservative, and lacking in the scientific rigor required by NEPA. In particular:

1. **Inadequate analysis of probability and scope of severe accidents.** In the first step of its analysis, *i.e.*, establishing the baseline of severe accidents, Entergy has failed to address several significant contributors to the costs of severe accidents, which Entergy represents by a "present value of cost risk" indicator. To determine that indicator, Entergy monetizes the estimated consequences of radioactive releases, multiplies those monetized consequences by their estimated probabilities, and sums the resulting values over time with discounting to the present. Entergy uses that indicator to compare the economic costs of particular SAMAs with the benefits to be derived from them (*i.e.*, the averted costs of severe accidents). *See* ER at Section 4.21. In particular:

(a) Entergy has failed to properly consider the contribution to severe accident costs from severe accidents involving reactor containment bypass via induced failure of steam generator tubes.

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<sup>98</sup> *Seabrook*, CLI-78-1, 7 NRC at 26; *Entergy Nuclear Vt. Yankee*, 65 NRC at 389.

(b) Entergy has failed to consider the contribution to severe accident costs by a fire in either of the spent-fuel pools at Indian Point Units 2 and 3.

(c) Entergy has failed to consider the contribution to severe accident costs by intentional attacks on the Indian Point Unit 2 or Unit 3 reactors or respective spent fuel pools.

**2. Inadequate consequence analysis for severe accidents.** In the radiological consequence calculations performed by Entergy in support of its SAMA analysis, Entergy has significantly (by more than a factor of three) underestimated population doses and other off-site costs resulting from a severe accident at Indian Point. These underestimates are due in part to (a) Entergy's use of a source term that results in unusually low mean off-site accident consequences in comparison to results obtained with source terms vetted by independent experts and recommended for use by NRC; (b) Entergy's failure to adequately consider the uncertainties in its consequence calculations resulting from meteorological variations; and (c) Entergy's inappropriate use of the \$2,000/person-rem dose conversion factor. As a result of its underestimate of mean population doses and other off-site costs, and its failure to appropriately incorporate uncertainties due to meteorological variations into its analysis, Entergy has significantly underestimated the off-site costs of severe accidents. Entergy's erroneously low cost estimate has therefore led it to underestimate the benefits of SAMAs that would mitigate or avoid the environmental impacts of severe accidents. Entergy should be required to repeat its SAMA analysis by conducting a consequence assessment incorporating complete and accurate inputs and based on rigorous scientific methods.

In summary, Contention EC-2 charges that Entergy's analysis of severe accident mitigation alternatives ("SAMAs") in its Environmental Report fails to satisfy NEPA because its analysis of the baseline of severe accidents is incomplete, inaccurate, nonconservative and lacking in the scientific rigor required by NEPA. Hearing Request at 54. Both Entergy and the Staff oppose admission of the contention.

**1. Subpart 1(a) of Contention EC-2 is admissible.**

In Subpart 1(a) of Contention EC-2, Riverkeeper asserts that Entergy's SAMA analysis is deficient in that Entergy has failed to properly consider the contribution to severe accident costs from severe accidents involving reactor containment bypass via induced failure of steam generator tubes. Hearing Request at 55. The conclusions of Subpart 1(a) to Contention EC-2, as presented in Tables 4-1, 5-7, and 7-7 of the expert report of Dr. Gordon Thompson, *Risk-Related*

*Impacts from Continued Operation of the Indian Point Nuclear Power Plants* (November 28, 2007) (“Thompson Report”), can be summarized in the following consolidated table, which provides a comparison of Entergy and Riverkeeper estimates of present value of cost risks (PVCr) associated with atmospheric release of radioactive material from a core-damage event at the Indian Point 2 (IP2) or Indian Point 3 (IP3) reactor.

**Estimated Present Value of Cost Risks Associated with Atmospheric Release from a Core-Damage Event at the IP2 or IP3 Reactor**

Source and Type of Estimate	Estimated Present Value of Cost Risks For Affected Facility	
	Indian Point 2 Reactor	Indian Point 3 Reactor
License Renewal Application, for internal initiating events only	\$1.3 million	\$1.3 million
Estimate in preceding row corrected by accounting for containment bypass during High/Dry sequences	\$7.2 million	\$4.3 million
License Renewal Application, for internal + external initiating events (excluding attack) plus uncertainty in core-damage probability	\$10.7 million	\$10.7 million
Estimate in preceding row corrected by accounting for containment bypass during High/Dry sequences	\$58.0 million	\$34.1 million

**Notes:**

- (a) Estimates in rows one and three are by Entergy. Estimates in rows two and four are corrected from the Entergy estimates to account for containment bypass. The correction factors are 5.42 for the IP2 reactor and 3.18 for the IP3 reactor.
- (b) Core-damage events arising from intentional attacks are not considered in this table.

As shown in the third row of the table, Entergy has estimated the PVCr at \$10.7 million for the IP2 reactor and the same amount for the IP3 reactor, when external initiating events and uncertainty in core-damage probability are considered. As shown in the fourth row, Dr.

Thompson has adjusted those numbers upward by a factor of 5.42 for the IP2 reactor and 3.18 for the IP3 reactor, to account for reactor containment bypass via induced failure of steam generator tubes. That adjustment corrects Entergy's estimates of the baseline risk associated with the IP2 and IP3 reactors. The correction amount is \$47.3 (58.0 minus 10.7) million for the IP2 reactor and \$23.4 (34.1 minus 10.7) million for the IP3 reactor. That amount is a lower bound to the break-even cost of a SAMA that would eliminate the potential for reactor containment bypass via induced failure of steam generator tubes.<sup>99</sup>

The NRC Staff makes no response at all to Subpart 1(a) of the contention, and thus it may be presumed that the Staff has no grounds on which to oppose its admissibility. The Staff's failure to comment on Subpart 1(a) may, in fact, be due to the fact that Riverkeeper relies on NRC-sponsored studies in support of its contention that the averted costs of SAMAs designed to protect against containment bypass are higher than estimated by Entergy. *See, e.g.,* Thompson Report at 16.

In general, Entergy claims that Riverkeeper lacks adequate factual support or expert support for Subpart 1(a), and fails to establish a genuine dispute with Entergy. Entergy Answer at 112. Entergy accuses Riverkeeper of "seek[ing] to manipulate the inputs and assumptions underlying Entergy's SAMA analysis, so as to create the false appearance that Entergy has improperly excluded potential cost-beneficial SAMAs. Entergy Answer at 112."<sup>100</sup>

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<sup>99</sup> See Thompson Report at 50.

<sup>100</sup> Entergy's argument that Dr. Thompson has not demonstrated his expert qualifications in probabilistic risk assessment ("PRA") and SAMA analysis (Entergy Answer at 112) is spurious. Dr. Thompson's high level of expertise, extensive experience, and the reliance on his work by government agencies is thoroughly detailed in his declaration and curriculum vitae. Dr. Thompson's qualifications in the field of probabilistic risk assessment also were recognized by

More specifically, Entergy asserts that Riverkeeper relies on “worst-case” assumptions arbitrarily concocted by Dr. Thompson, without regard to their probability. Entergy Answer at 112-13. But this is not the case. Dr. Thompson’s correction of Entergy’s estimates of PVCR, as shown in the above table, is by no means a worst-case exercise. In addressing the potential for a containment bypass accident, Dr. Thompson did not assume worst-case conditions, or otherwise use arbitrary or unreasonable assumptions. Indeed, for most of his analysis, Dr. Thompson relied on Entergy’s own assumptions along the chain of analysis of the potential for conventional accidents. *See, e.g.,* Thompson Report at 17.<sup>101</sup> Dr. Thompson made one exception to his reliance on Entergy’s assumptions: he corrected for Entergy’s failure to properly account for reactor containment bypass via induced failure of steam generator tubes. But even in that case, Dr. Thompson did not rely on his own assumptions; instead, he used findings presented in studies by Entergy, preceding licensees of the Indian Point nuclear power plants, and the NRC Staff. Thompson Report at 16-18. While the Thompson Report provides a full explanation of the process by which Dr. Thompson corrected Entergy’s estimates of PVCR (*see* pages 14-18), including identification of the Entergy and NRC Staff studies on which he relied, Entergy simply ignores that process.

For instance, one of the major steps in the process of correcting Entergy’s PVCR estimate, as summarized in Tables 5-1 and 5-2 of the Thompson Report, was to determine the fraction of core-damage frequency (CDF) arising from High/Dry sequences. For that determination, Dr. Thompson relied entirely on studies performed by Entergy (to the extent that

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the ASLB in *Carolina Power and Light Co.* (Shearon Harris Nuclear Power Plant), LBP-01-09, 53 NRC 239, 251 (2001).

<sup>101</sup> By using Entergy’s assumptions for most of his analysis, Dr. Thompson did not concede that they are accurate. *See* Thompson Report at 56. It was not necessary, however, to



those studies are accessible) and studies performed by preceding licensees. *See* Thompson Report at 17.

A second major part of the process was to determine the conditional probability that a High/Dry sequence would be accompanied by reactor containment bypass via induced failure of steam generator tubes. For that step, Dr. Thompson relied on studies performed by Information Systems Laboratories (ISL) under NRC sponsorship, and published in 2006.<sup>102</sup> Those studies employed the SCDAP/RELAP5 code. *See* Thompson Report at 16. Although published in draft versions, the ISL studies represent the most recent available government-sponsored findings regarding the conditional probability that a High/Dry sequence would be accompanied by reactor containment bypass via induced failure of steam generator tubes. The ISL studies showed that the conditional probability would be 100 percent for a station-blackout sequence. Thompson Report at 16-17.

Entergy's response implies that the station-blackout sequence is an inappropriate choice when examining this containment bypass issue. Entergy Answer at 114. But, as Dr. Thompson has pointed out, the NRC and its contractor, ISL, have used station blackout as a representative sequence in modeling related to this containment bypass issue. Thompson Report at 16. As stated in the ISL draft report, *Base Case Calculation for the Station Blackout Uncertainty Study*:

Because the SBO [station-blackout] event represents a significant risk contributor among sequences that progress to core damage and poses a threat to SG [steam generator]

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dispute all of Entergy's assumptions in order to show that Entergy had significantly underestimated the PVCR of SAMAs to mitigate or avoid a containment bypass event.

<sup>102</sup> C.D. Fletcher and R.M. Beaton, *SCDAP/RELAP5 Base Case Calculation for the Station Blackout Uncertainty Study, DRAFT*, (Idaho Falls, Idaho, and Rockville, Maryland: Information Systems Laboratories, August 2006) (cited in Thompson Report at 16 n.36 as Fletcher and Beaton, 2006a); C.D. Fletcher and R.M. Beaton, *Evaluation of Uncertainties in SCDAP/RELAP5 Station Blackout Simulations, DRAFT*, (Idaho Falls, Idaho, and Rockville, Maryland: Information Systems Laboratories, August 2006) (cited in Thompson Report at page 16 n.37 as Fletcher and Beaton, 2006b).

integrity, that event has been the assumed accident initiator for all of the SCDAP/RELAP5 (Reference 1) analyses performed to date.

*Id.* at 1. As implied by that statement, the NRC Staff study NUREG-1570 assumed a station blackout sequence as a representative sequence for the purpose of investigating the potential for induced failure of steam generator tubes. NUREG-1570, *Risk Assessment of Severe Accident-Induced Steam Generator Tube Rupture* at 3-2 (1998).<sup>103</sup>

Entergy makes much of the fact that the ISL studies are drafts, not final reports. Entergy Answer at 115. But Dr. Thompson addressed this very issue in his report, stating that while these models do not provide a “final answer,” they are a “key source of guidance.” Thompson Report at 17. Thus, it is his expert opinion that the ISL studies provide the best available information regarding the conditional probability that a High/Dry sequence would be accompanied by reactor containment bypass via induced failure of steam generator tubes.

Consideration of the ISL draft report results is also required under NEPA, which requires the NRC to take a “hard look” at the environmental impacts of its actions. *Baltimore Gas and Electric Co. v. Natural Resources Defense Council, Inc.*, 462 U.S. 87, 97 (1983). Council on Environmental Quality (“CEQ”) regulations implementing NEPA also require the NRC to address the relevance of incomplete information to its determination regarding the significance of reasonably foreseeable but low-likelihood impacts. 40 C.F.R. § 1502.22. In the case of probabilistic risk assessment, where the technology is evolving and uncertainties are large, a discussion of incomplete information is especially important. Thus, although they are in draft form, the ISL reports must be considered because they constitute the most recent government-

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<sup>103</sup> Riverkeeper was unaware until now that NUREG-1570 is not available in the Public Document Room. But it is available from the U.S. Department of Energy at <http://www.osti.gov/bridge/>. To retrieve an electronic copy of the document from this site, type “NUREG-1570” in the box labeled “Search Information Bridge for:”.

sponsored studies to address the potential for induced failure of steam generator tubes. (The NRC Staff's previous study, NUREG-1570, was done ten years ago in 1998.) Moreover, given that the ISL reports use the same computer code (SCDAP/RELAP5) as did NUREG-1570, changes in results may reasonably be attributed to better technical understanding of the behavior of nuclear power plants under accident conditions. Thus, the ISL reports may not be disregarded merely because they constitute "draft" reports.

Entergy also argues that Riverkeeper "inappropriately focuses on the 'consequences' side of the risk equation at the expense of the 'probability' side." Entergy Answer at 115. But Entergy provides no specific criticism of Riverkeeper's method of re-calculating PVCR, which uses the same formulae and assumptions as Entergy does except that it corrects Entergy's estimates regarding the conditional probability of containment bypass.

Entergy also criticizes Riverkeeper for describing only one "specific SAMA," Phase II SAMA Candidate Number 019 for Unit 2 (Number 017 for Unit 3). Entergy Answer at 115. Riverkeeper provided an illustration, in SAMA Candidate Number 019 and 017, of a SAMA that would be cost-effective under a corrected analysis. It is Entergy, not Riverkeeper, that bears the burden of comprehensively revising its SAMA analysis to correct for its inadequate PVCR analysis. *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 338-39 (1997). In this context, Riverkeeper notes that Entergy has estimated the cost of SAMA Candidate Number 019 and 017 to be \$13 million for each IP reactor. If Entergy has described this option correctly, it would eliminate much of the potential for reactor containment bypass via induced failure of steam generator tubes. Its cost of \$13 million would be substantially below the break-even cost discussed above (\$47.3 million for the IP2 plant and

\$23.4 million for the IP3 plant) for a SAMA that would eliminate this bypass potential, providing a strong indication that this SAMA would be cost-effective.<sup>104</sup>

Finally, Entergy claims it is “significant” that the SAMA analyzed by Riverkeeper does not relate to aging of plant equipment. Entergy Answer at 116. But consideration of SAMAs under NEPA is required, whether or not it is related to aging. As the Commission recognized in *Florida Power and Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3 (2001), the NRC applies two separate statutory and regulatory schemes for re-licensing nuclear power plants. Under the Atomic Energy Act and its implementing regulations, the NRC examines the effects of aging on the safety of continued operation. 545 NRC at 7. Under NEPA and its implementing regulations, the NRC evaluates “the potential environmental consequences of operating a nuclear power plant for an additional 20 years,” without limitation to aging issues. *Id.* at 11. The Commission’s decision in *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-28, 56 NRC 373, 388 n.77 (2002), cited by Entergy at page 116, does not hold otherwise. In *McGuire*, the Commission ordered the ASLB to address the possibility that the NRC Staff’s SEIS -- which concluded that a proposed SAMA was, in fact, cost-effective -- mooted a contention seeking consideration of the SAMA. 56 NRC at 388. The Commission also found that since the SAMA did not relate to aging, implementation of the SAMA could not be imposed under 10 C.F.R. Part 54. *Id.* Finally, the Commission found that it could choose to impose the SAMA under the plant’s Part 50 current licensing basis. *Id.* Contrary to Entergy’s suggestion, the Commission did not find that NEPA review of SAMAs must be related to aging issues, or that implementation of SAMAs unrelated to aging may not be required by the NRC as a license condition.

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<sup>104</sup> The cost of this SAMA is substantially below the break-even cost. Thus, the SAMA does not

**2. Subpart 1(b) of Contention EC-2 is admissible.**

In Subpart 1(a) of Contention EC-2, Riverkeeper asserts that Entergy's SAMA analysis is deficient in that Entergy has failed to consider the contribution to severe accident costs by a fire in either of the spent-fuel pools at Indian Point Units 2 and 3. Riverkeeper acknowledges that the issues raised by Subpart 1(b) are related to the environmental impacts of spent fuel storage, which the NRC designates as "Category 1" impacts that may not be raised in an individual license renewal proceeding unless the regulations are suspended or revoked pursuant to 10 C.F.R. § 2.802 or waived pursuant to 10 C.F.R. § 2.335. But Riverkeeper also points out that the SAMA-related issues raised by the contention depend on the outcome of pending rulemaking petitions to revoke the Category 1 designation for spent fuel pool fires. Therefore, Riverkeeper requests the ASLB to admit the contention and hold it in abeyance pending the outcome of the rulemaking petition proceeding. Hearing Request at 62-63.

Entergy argues that the ASLB "cannot admit the contention and hold it 'in abeyance' indefinitely." Entergy Answer at 118. According to Entergy, this is because a contention that seeks to litigate a matter that is the subject or potential subject of a rulemaking is not admissible. Entergy Answer at 118, citing *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-00-01, 51 NRC 1, 5 (2000); *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-7, 47 NRC 288, *aff'd* on other grounds, CLI-98-13, 48 NRC 26 (1998). But the cases cited by Entergy relate to rulemakings on safety issues; they do not address the question of how the ASLB should handle a NEPA contention submitted in an individual license renewal case, when the issues raised by the contention happen to be shared by other nuclear power plants and therefore may be considered "generic" in nature.

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need to entirely eliminate the bypass potential in order to be cost-effective.

Riverkeeper respectfully submits that while the Commission may have the discretion, in holding a public hearing on a license renewal application, to choose between adjudication procedures and rulemaking procedures to address the issues raised in that licensing proceeding. The Commission has no discretion, however, to refuse to address a petitioner's claim, in the context of the individual proceeding, that NEPA has not been satisfied in that individual case. If a rulemaking proceeding is used to consider whether the petitioner has raised new and significant information regarding the environmental impacts of a proposed renewed license, then the results of that rulemaking must be "plugged in" to the individual license renewal decision. *Baltimore Gas and Electric Co.*, 462 U.S. at 101 (finding that the NRC "has the discretion to evaluate generically the environmental effects of the fuel cycle and require that these values be 'plugged into' individual licensing decisions.") As the D.C. Circuit held in the case below:

in the course of . . . a generic rulemaking . . . the agency must consider and disclose the actual environmental effects it has assessed in a manner that will ensure that the overall process, including both generic rulemaking and the individual proceedings, *brings those effects to bear on decisions to take particular actions* that significantly affect the environment.

*Natural Resources Defense Council v. NRC*, 685 F.2d 459, 482-83 (D.C. Cir. 1980), rev'd on other grounds, *Baltimore Gas and Electric Co. v. Natural Resources Defense Council, Inc.*, 462 U.S. 87 (1983) (emphasis added). Riverkeeper is entitled to insist that Entergy and the NRC comply with NEPA *in this license renewal proceeding*, by considering SAMAs to avoid or mitigate the environmental impacts of spent fuel pool fires, which new and significant information shows to be significant contributors to the potential for severe accidents at the Indian Point nuclear power plant. While the NRC may have the discretion to satisfy the hearing requirement of Section 189a of the Atomic Energy Act by using a rulemaking proceeding to examine whether new and significant information requires reconsideration of a previous NEPA

finding, it does not have the discretion to refuse to comply with NEPA in this individual license renewal case on the ground that the contention raises “generic” issues.

Riverkeeper recognizes that the Commission refused to hold a similar contention in abeyance in the Pilgrim and Vermont Yankee license renewal cases, pending the outcome of the pending rulemaking proceedings. *Entergy Nuclear Vermont Yankee L.L.C. and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station) and *Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-07-03, 65 NRC 13 (2007). Nevertheless, Riverkeeper respectfully submits that its NEPA claim must be admitted to this case in order to ensure that the results of the rulemaking petition will be “plugged in” to this individual license renewal decision.

**3. Subpart 1(c) of Contention EC-2 is admissible.**

In Subpart 1(c) of Contention EC-2, Riverkeeper asserts that Entergy’s SAMA analysis is deficient in that Entergy has failed to consider the contribution to severe accident costs by intentional attacks on the Indian Point Unit 2 or Unit 3 reactors or respective spent fuel pools. Entergy and the NRC Staff correctly point out that in all parts of the United States except for the Ninth Circuit of the U.S. Court of Appeals, the Commission has refused to follow the Ninth Circuit’s decision in *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), cert. denied, 127 S.Ct. 1124 (2007). Riverkeeper therefore requests that the ASLB refer this aspect of Contention EC-2 to the Commission.

**4. Subpart 2 of Contention EC-2 is admissible.**

In Subpart 2 of Contention EC-2, Riverkeeper argues that Entergy has significantly underestimated mean population doses and other off-site costs resulting from a severe accident at Indian Point, and has ignored uncertainties that could increase its consequence estimate by a

factor of ten or more. These underestimates are due in part to (a) Entergy's use of a source term that results in unusually low mean off-site accident consequences in comparison to results obtained with source terms vetted by independent experts and recommended for use by NRC; (b) Entergy's failure to adequately consider the uncertainties in its consequence calculations resulting from meteorological variations; and (c) Entergy's inappropriate use of the \$2,000/person-rem dose conversion factor. Hearing Request at 68.

Both Entergy and the Staff oppose admission of Subpart 2 of the contention. With respect to Riverkeeper's claim in subsection (a) that Entergy used an inappropriate source term, the Staff argues that the contention should be rejected because Riverkeeper failed to show that the source term used by Entergy is defective. NRC Staff Response at 111, citing *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), LBP-03-17, 58 NRC 221, 240 (2003). In *Duke*, the ASLB rejected a contention where the petitioners had shown only that an alternative model would achieve a different result, not that the one used by the applicant was defective. *Id.* That is not the case here, where Riverkeeper has shown that the model used by Entergy has not been vetted by the NRC<sup>105</sup>, is not publicly available, and uses source terms that are considerably lower than used in NRC studies; including NUREG-1465, *Accident Source Terms for Light-Water Nuclear Power Plants* (1995); ERI/NRC 02-202, *Accident Source Terms for Light-Water Nuclear Power Plants: High-Burnup and MOX Fuels* (2002), and the NRC's reference PRA study, NUREG-1150. Hearing Request at 69-71. The

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<sup>105</sup> While Entergy cites the Palisades license renewal Supplemental EIS in support of the proposition that the NRC "has reviewed SAMA analyses by numerous license applicants and approved their use of the MAAP code to identify appropriate source terms" (Entergy Answer at 131), the passage quoted by Entergy indicates only that the NRC approved the source term used by the applicant in that case, not that the Staff conducted a thorough review of MAAP, in that case or any other case.



notable discrepancy between Entergy's model and the models used in government studies provides the basis for an admissible contention.

Entergy asserts that "the *sole* basis for Petitioner's argument is a passage extracted from a 2002 report prepared by Brookhaven National Laboratory." Entergy Answer at 129. But in making this argument, Entergy ignores Riverkeeper's argument that there is an unexplained discrepancy between source terms obtained by MAAP and those obtained by NRC staff using NRC-validated software and codified in NUREG-1465. At a minimum, NEPA's requirement that Entergy must take a "hard look" at the environmental impacts of its actions requires that Entergy explore the sensitivity of its results to its assumed source term, unless it can conclusively demonstrate that the MAAP-derived source term is more accurate than NUREG-1465. Entergy should also be required to explain why it chooses to use the design-basis accident portion of NUREG-1465 in its FSAR Chapter 15 analyses but declines to use the complete, severe accident NUREG-1465 source term in its SAMA analyses.<sup>106</sup>

Moreover, contrary to Entergy's assertion at page 129, Dr. Lyman's reference to the Brookhaven report on ice condenser plants does not mean that he believes that Indian Point should have an ice condenser containment, nor would any reasonable person reading his report come to such an absurd conclusion. The reference was included to provide a specific instance where the significant difference between MAAP and STCP/MELCOR release fractions was

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<sup>106</sup> Recent results from the Phébus experiments have provided additional experimental validation for NUREG-1465. See Research Information Letter (RIL) 0702, *Findings and Use of Results From Phébus-FP Tests to Validate the NRC's MELCOR Severe Accident Code and Revised Accident Source Term (NUREG-1465)* [ML073520139], attached as Enclosure 1 to Memorandum from Farouk Eltawila, Office of Nuclear Reactor Regulation, to Frank P. Gillespie, Advisory Committee on Reactor Safeguards, re: Information for Briefing the ACRS on "Findings and Use of Results from Phébus -FP Tests to Validate the NRC's MELCOR Severe Accident Code and Revise Accident Source Term (December 19, 2007) [ML073520123].

documented. There is no reason to believe, *a priori*, that this discrepancy is limited to ice-condenser plants and would not also be observed for large, dry containments.

Entergy claims that even though its SAMA analysis takes into account CDF uncertainty in calculating the benefits of SAMA implementation, it is unnecessary to take into account other uncertainties in consequence estimates, such as the consequence uncertainties associated with the meteorological distribution, because the latter uncertainties would “tend to cancel out each other” when the severe accident cost with the SAMA implemented is subtracted from the severe accident cost associated with the base case. Entergy Answer at 134. Entergy’s argument demonstrates not only ignorance of high school statistics, but also a lack of understanding of its own SAMA methodology.

Entergy’s argument is incorrect in two respects. First, although Entergy is absolutely correct that the uncertainty associated with the difference of two uncertain quantities would not be equal to the uncertainty associated with either of them alone, the uncertainties would by no means “tend to cancel out.” The uncertainty associated with the difference of two uncorrelated quantities (as is the case here, as the meteorological uncertainty is associated with a random variation over a year) would be equal to the root sum of squares of the uncertainties associated with each quantity.<sup>107</sup>

Entergy’s argument would be incorrect even if one were to calculate the baseline cost and SAMA cost using the same meteorological conditions. According to Dr. Lyman’s report, the

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<sup>107</sup> This basic formula for propagation of uncertainty is taught in freshman college physics labs. See <http://www.physics.uc.edu/~bortner/labs/Physics%20Lab%20web%20site/Appendix%202/Appendix%202%20Error%20Propagation%20htm.htm>. For example, if the uncertainty in the base case B is denoted as  $\delta B$  and the uncertainty in the SAMA cost S is given by  $\delta S$ , the uncertainty associated with the difference (B-S) would be given by  $(\delta B^2 + \delta S^2)^{1/2}$ , which is greater than the uncertainty for either the base case cost or the SAMA cost (assuming they are both non-zero).

95<sup>th</sup> percentile population dose associated with a large, early release is about three times greater than the mean dose. A similar factor would also apply to the difference between the mean benefit (difference of the mean baseline cost and the mean SAMA cost) and the 95<sup>th</sup> percentile benefit (difference of the 95<sup>th</sup> percentile baseline cost and the 95<sup>th</sup> percentile SAMA cost). Therefore, the 95<sup>th</sup> percentile benefit would be about three times the mean benefit --- not almost the same as the mean benefit, as Entergy asserts.

Second, although this procedure for propagating errors would be the correct approach to deriving the uncertainty for the “baseline benefit,” Entergy does not even use this approach in accounting for the CDF uncertainty in its own analysis. In Entergy’s SAMA analysis, the CDF uncertainty is taken into account by multiplying the “baseline benefit” – that is, the difference discussed in the previous paragraph – with a factor derived from the ratio of the 95<sup>th</sup> percentile CDF to the mean CDF. This is clear from the Environmental Report, which states that “‘baseline benefit with uncertainty’ values are estimated using this multiplier on the benefit estimates for internal events.” (ER at 4-67). If Entergy had correctly propagated the uncertainties in the baseline benefit as it described in its Reply, it would have calculated the root sum of squares of the CDF uncertainty in the base case and the CDF uncertainty in the SAMA case. Entergy is simply incorrect in asserting that the uncertainties in the consequence calculation should be treated any differently than the uncertainties in the CDF, as can be seen from the structure of the benefit equation.

With respect to subsection (c) of Contention EC-2, Entergy argues that Riverkeeper may not challenge the NRC’s use of a \$2,000 per person-rem factor because it is “firmly embedded in longstanding NRC regulatory practice and guidance.” Entergy Answer at 138. As discussed above at page 8, however, regulatory practice and guidance are subject to challenge in NRC

hearings; only regulations are insulated from attack. The NRC Staff argues that Riverkeeper's challenge to the \$2,000 per person-rem factor must fail because Riverkeeper does not give any reasons why it is inadequate, but merely offers a different calculation. NRC Response at 112. It appears that the Staff did not read the contention, which provides two pages of detailed technical explanation regarding the inaccurate assumptions underlying the \$2,000/person-rem factor which result in a distortion of the true cost of exposure to radiation. See Hearing Request at 71-73.

### **CONTENTION EC-3: FAILURE TO ADEQUATELY ANALYZE IMPACTS OF SPENT FUEL POOL LEAKS**

Contention EC-3 asserts that:

Entergy's ER fails to satisfy the requirements of NEPA, 42 U.S.C. §4332 *et seq.*, and NRC regulations implementing NEPA, including 10 C.F.R. §51.45(c), and (e), because the ER does not adequately assess new and significant information regarding the environmental impacts of the radioactive water leaks from the Indian Point 1 and Indian Point 2 spent fuel pools on the groundwater and the Hudson River ecosystem.

1. Entergy's claim that the Indian Point 2 ("IP2") spent fuel pool is no longer leaking is unsupported by the facts. Entergy and the NRC have failed to visually inspect nearly half the surface of the pool liner, due to the density of fuel in the pool and the minimal amount of clearance between the fuel racks and the bottom and lower sides of the liner. As a result, Entergy cannot say with reasonable certainty that the remaining, uninspected portions of the pool liner do not contain one or more pinhole leaks that may be contributing to the groundwater contamination. In addition, groundwater sample results indicate that significant tritium contamination of the groundwater in the vicinity of Indian Point 2 occurred between 2000 and 2005, thereby negating Entergy's claim that the current contamination is merely a remnant of historic leakage. Determining the status and duration of the IP2 leak is critical to developing an accurate assessment of the current and future onsite and offsite impacts of the IP2 groundwater contamination.
2. Entergy's claim that only "low concentrations" of certain radionuclides have been detected in onsite groundwater samples is flatly contradicted by the facts. Strontium-90 and cesium-137 have been detected in the groundwater at concentrations many times the maximum contaminant level allowed by the Environmental Protection Agency ("EPA") in drinking water. In fact, Entergy's own internal status reports indicate the presence of at least two groundwater plumes containing highly contaminated water underlying the site, one of tritium, primarily from IP2, and the other of strontium-90 and cesium-137 from Indian

Point 1 ("IP1"). An accurate description of the degree of onsite groundwater contamination is critical to determining both the environmental impacts and the future costs of remediation required for decommissioning Indian Point. Entergy has failed to provide sufficient accurate information regarding the degree of groundwater contamination in the ER.

3. Entergy failed to include any assessment of either current or future impacts of the groundwater contamination on Hudson River fish and shellfish in the ER, despite recent sample results showing elevated levels of strontium-90 in several fish samples collected by Entergy from the Hudson River. Entergy only began analyzing fish samples for strontium-90 in 2006, and has publicly released the results of only a single set of fish samples, collected in 2006. Based on the lack of such an assessment in the ER, Entergy cannot say with reasonable certainty that the migration of contaminated groundwater to the Hudson River has not caused an increase in the level of radionuclides such as strontium-90 and cesium-137 in Hudson River fish, shellfish and vegetation.

For the foregoing reasons, the conclusions contained in the ER regarding the significance of the groundwater contamination are misleading, incomplete and legally insufficient for purposes of satisfying the basic tenets of NEPA and NRC regulations. As a result, Entergy's LRA is incomplete and must be rejected.

Both the NRC Staff and Entergy oppose the admission of Contention EC-3 in its entirety. NRC Staff Response at 112. Entergy Answer at 140.

**1. The Board should disregard Entergy's Final Report on the Indian Point leaks.**

In responding to Contention EC-3, Entergy argues that the issues raised by the contention are addressed in the 137-page "Hydrogeological Site Investigation Report" attached to Entergy's Answer as Exhibit M. Entergy Answer at 144-47, 148.<sup>108</sup> Just as Riverkeeper was required to rely on the LRA and Environmental Report (ER) in submitting its contentions, so Entergy should be restricted to the contents of the LRA in contesting the admissibility of the contention. It would be patently unfair to allow the applicant the opportunity to try and cure the deficiencies of its original application by introducing new factual information in its answer to an intervention petition. If Entergy seeks to avoid a hearing based on the new information, it should be required

to file a motion to dismiss the admitted contention, or a motion for summary disposition of the admitted contention, at a future point in this proceeding, just as Riverkeeper has the opportunity to file new or amended contentions based on new information submitted by Entergy under 10 C.F.R. §2.309(f)(2).

Therefore, Riverkeeper requests that the Board disregard that portion of Entergy's answer opposing Contention EC-3 that relies on information contained in the Investigation Report. Riverkeeper reserves the right to file a motion for leave to file a new or amended contention based on the information contained in the Investigation Report, within a reasonable time of January 30, 2008, the date upon which Riverkeeper counsel received service of the Report. In any event, as discussed in section 3 below, the information submitted by Entergy in Exhibit M does not justify the exclusion of Contention EC-3.

**2. Entergy and the NRC Staff have both failed to show that Contention EC-3 is inadmissible.**

The NRC Staff argues that Contention "raises issues beyond the scope of this proceeding, constitutes an impermissible challenge to Commission regulations, lacks basis, is unsupported by facts, and does not demonstrate the existence of a genuine issue for adjudication in this proceeding." NRC Staff Response at 114-115. Entergy claims the contention raises issues outside the scope of license renewal, lacks adequate factual or expert support, and fails to establish a genuine dispute on a material issue of law or fact. Entergy Answer at 140. Their arguments are without merit.

**a. Entergy and the NRC fail to show that EC-3 is outside the scope of this proceeding, or constitutes an attack on NRC regulations.**

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<sup>108</sup> *Hydrogeological Site Investigation Report, Indian Point Energy Center, Buchanan, New York*, January 11, 2008 ("Investigation Report"). See Entergy Answer at 145, fn 618.

Entergy and NRC Staff both allege that Contention EC-3 is outside the scope of license renewal, in contravention of 2.309(f)(1)(iii). NRC Staff Response at 112-113. Entergy Answer at 140. Both Entergy and the NRC Staff's arguments are without merit and should be rejected by the Board. Riverkeeper's challenge to the adequacy of Entergy's assessment of spent fuel pool leaks in Section 5.1 of the ER is within the scope of this proceeding, and does not represent an attack on Commission regulations. Riverkeeper's argument is simple: Entergy has failed to conduct an adequate assessment of "new and significant information" regarding the impacts of the spent fuel pool leaks, as required by 10 CFR §51.53(c)(3)(iv). Riverkeeper's argument is within the scope of this proceeding, because EC-3 does not claim the leaks are new information regarding a Category 1 issue, as the NRC Staff erroneously suggests in its response. NRC Staff Response at 113. Rather, the leaks represent a previously unanticipated type of environmental impact, neither Category 1 nor Category 2, that must be assessed under the broad rubric of NEPA and §51.53(c)(3)(iv).

Constraining the required NEPA review of Indian Point's license renewal to only Category 1 and Category 2 issues, as those are defined in the GEIS and Part 51 of the NRC regulations, would fail to provide any mechanism for addressing previously unanalyzed impacts, thus violating the NEPA requirement to take a "hard look" at all actual and potential impacts of a proposed action. NEPA also requires that an agency's environmental decisions must contain an evaluation of those aspects of a proposed action that will affect the quality of the human environment "in a significant manner or to a significant extent not already considered." *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 374 (1989).

Entergy also makes several other arguments to the effect that the contention is outside the scope of the regulations. For example, Entergy claims that because IP1 is outside the scope of

license renewal, the IP1 leak is beyond the scope of the license renewal proceeding. Entergy Answer at 148-149. This assertion is incorrect, because it mischaracterizes Riverkeeper's contention as merely challenging Entergy's current management of the IP1 pool, and suggests that the IP1 leaks are occurring in a vacuum. In reality, the continued operation of IP2 and IP3 effectively allows Entergy to avoid decommissioning IP1 until all three reactors are permanently shut down. The combined environmental impacts that have already occurred, e.g. the spent fuel pool leaks, whatever their source, must be assessed in the NEPA review for license renewal.

Contention EC-3 is entirely focused on challenging Entergy's assessment of the current and future impacts of these leaks on the groundwater and the Hudson River. The strontium-90, cesium-137 and other radionuclides that have leaked from IP1 are now in the groundwater, and will continue to slowly leach into the Hudson River or remain in the groundwater until Entergy conducts remediation, either during decommissioning or sooner. Riverkeeper is concerned that continuing leaks from the IP2 pool and likely future leaks from IP3 or other plant systems during the proposed renewal period will add to the groundwater contamination already in existence. Clearly, an accurate assessment of the impacts of the IP1 plume cannot very well be bifurcated from an assessment of likely future leaks from IP2 or other plant systems. This is precisely the type of cumulative impact that must be accurately assessed by Entergy, and subsequently by the NRC in its SEIS, before Indian Point can be relicensed.<sup>109</sup> As such it falls well within the scope of license renewal.

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<sup>109</sup> Entergy makes vague reference to its plans to empty the IP1 pool in Section 5.1 of the ER, and more clearly in the Investigation Report. Entergy Answer at 146. However, Entergy fails to assess the additional contamination caused by the continuing leakage from the IP1 pool, estimated to have begun in the mid 1990s, and currently leaking seventy gallons a day. *Id.* at 146, Entergy Final Investigation Report at 102. Thus, accepting Entergy's commitment to emptying the IP1 pool by the end of 2008, we can assume that the IP1 pool will continue leaking radioactive water into the environment for approximately ten months from today, equaling



Entergy also claims that the portion of EC-3 addressing Entergy's failure to include any assessment of radionuclide bioaccumulation in fish and shellfish constitutes an assertion that is "clearly contrary to the Commission's and EPA's regulations."<sup>110</sup> Entergy Answer at 150.

Entergy fails to indicate which NRC or EPA regulations it is referring to in the answer.

Assuming Entergy is disputing Riverkeeper's assertion that such an assessment is required, this would constitute a genuine dispute on a material issue of fact and law, namely the question of whether Entergy's omission of this assessment complies with NEPA and the NRC implementing regulations of 10 CFR Part 51. Contention EC-3 satisfies the requirement of §2.309(f)(1)(vi) in this regard, as explained below in Section 2(c).

Entergy also attempts to link its inadequate assessment of spent fuel pool leak impacts to Section 4.8.2 of the GEIS. Entergy Answer at 144. However, Section 4.8.2 is entirely focused on the possible adverse effects of *groundwater withdrawals* by plant operators to support normal plant operations. A single mention of low levels of tritium contamination at the Prairie Island station in this section of the GEIS does not equate to a complete assessment of the impacts of radioactive water leaks from plant systems, such as those occurring at Indian Point. Such an assessment is nowhere to be found in the GEIS, for the simple reason that, except for the SAMA analysis, the GEIS focuses entirely on the known impacts of normal plant operations. The Introduction to the final rule amending Part 51 to include the GEIS states

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approximately 21,000 additional gallons of polluted water into the groundwater and eventually the Hudson River. It is unclear whether this additional leakage has been factored into Entergy's conclusions in either the ER or the Investigation Report.

<sup>110</sup> Entergy also relies on alleged results of fish sampling from 2007 that have not been made public. Entergy Answer at 143, fn 612. The sufficiency of Contention EC-3's factual basis should be judged only on the information available at the time Riverkeeper filed its petition, in accordance with §2.309(f)(2).

The Commission's initial decision to undertake a generic assessment of the environmental impacts associated with the renewal of a nuclear power plant operating license was motivated by its belief that:

- (1) License renewal will involve nuclear power plants for which the environmental impacts of operation are well understood as a result of data evaluated from operating experience to date;
- (2) Activities associated with license renewal are expected to be within this range of operating experience, thus environmental impacts can be reasonably predicted;

61 FR28467, 28468. The Indian Point leaks, on the other hand, are indicative of the deterioration of plant systems containing radioactive liquids that results in unmonitored, unpermitted discharges of radioactive waste into the environment, resulting in long-term environmental impacts that must be accurately assessed by the applicant and the NRC prior to license renewal. *See* Task Force Report, Executive Summary at ii, cited in Hearing Request at 84, fn 125.

Finally, Entergy appears to argue that EC-3's basis regarding Entergy's failure to assess radioactive contamination of fish and shellfish somehow constitutes an impermissible attack on Entergy's aging management program. Entergy Answer at 150. This is patently absurd, given the fact that EC-3 is founded upon Riverkeeper's challenge to the adequacy of Section 5.1 of the ER, and repeatedly cites NEPA and Part 51 of NRC regulations as support for this contention. Nowhere in EC-3 does Riverkeeper attempt to cast the spent fuel pool leaks as an age-related degradation issue, as Entergy so blithely suggests. The Board should reject this baseless argument outright.

The NRC Staff claims that EC-3 challenges an issue about which the Commission has made generic findings, thereby constituting "an impermissible challenge to the Commission regulations at 10 C.F.R. §51.53(c)(3) that embody those findings..." NRC Staff Response at 112. The Staff continues in this vein, claiming "Riverkeeper has not shown that the information

provided by the Applicant invalidates the conclusions of the GEIS, such that a waiver of the Commission's regulations is warranted." NRC Staff Response at 113.

The NRC Staff Response completely mischaracterizes the core argument of EC-3 by attempting to recast Riverkeeper's position as challenging Entergy's assessment of a Category 1 issue. As a practical matter, Contention EC-3 does not assert that the spent fuel pool leaks are new and significant information regarding a Category 1 impact generically assessed in the GEIS. On the contrary, these leaks represent a new type of environmental impact that was not addressed by the NRC in the GEIS. Therefore, the impact of the leaks is neither Category 1 nor Category 2. Contention EC-3 does not challenge the generic findings of the GEIS, and as a result is within the scope of the proceeding, satisfying 2.309(f)(1)(iii).

Riverkeeper's challenge to Entergy's assessment of the spent fuel pool leaks is grounded in the NRC's regulatory requirement that "[T]he environmental report must include an assessment of *any* new and significant information regarding environmental impacts of license renewal of which the applicant is aware." 10 CFR §51.53(c)(3)(iv). The plain language of this regulation does not limit this assessment to Category 1 issues already analyzed in the GEIS for license renewal. Indeed, nowhere in the NRC regulations is there specific language limiting the treatment of new and significant information to only generic Category 1 issues. For example, Appendix B to Subpart A, which codifies the findings of the GEIS for license renewal, states

Table B-1, subject to an evaluation of those issues identified in Category 2 as requiring further analysis *and possible significant new information*, represents the analysis of the environmental impacts associated with renewal of any operating license and is to be used in accordance with §51.95(c).

Appendix B to Subpart A of Part 51- Environmental Effect of Renewing the Operating License of a Nuclear Power Plant. (emphasis added). Appendix B contains no language limiting the analysis of new and significant information to Category 1 issues. This is consistent with the final rule establishing the requirements regarding the use of the GEIS and the division of impacts into different categories. *RIN 3150-AD63, Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 61 FR 28467, June 5, 1996.* In the Introduction to the rule, the NRC emphasizes the importance of conducting a site-specific EIS that encompasses new and significant information.

The NRC will delay any conclusions regarding the acceptability of the overall impacts of the license renewal until completion of the site-specific review...The NRC will also review and consider *any new and significant information presented during the review of individual license renewal applications.*

*61 FR 28467, 28468.* (emphasis added). Section B of the rule addresses procedural concerns raised by EPA and CEQ in previous rulemakings regarding the NRC's ability to respond to new information or "different environmental issues not listed in the proposed rule." *Id.* at 28470.

This section of the rule focuses almost entirely on the amended procedures for addressing new and significant information introduced during the notice and comment period following the publication of the draft, site-specific SEIS.<sup>111</sup> The rule states that "the NRC will review comments on the draft SEIS and *determine whether such comments introduce new and significant information not considered in the GEIS analysis.* *Id.* (emphasis added). The rule is silent on what remedies are available to a petitioner seeking to challenge an applicant's lack of compliance with the requirement of §51.53(c)(3)(iv) in a license renewal application. However,

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<sup>111</sup> A commenter who disagrees with the NRC's determination regarding generic issues would have the opportunity to file a §2.802 rulemaking petition challenging the agency's determination that the generic analysis of a Category 1 issue was still correct. *61 FR 28467, 28470.*

the language cited above indicates that the NRC clearly recognized the need to provide flexibility in the regulations for assessing information that was not encompassed in the GEIS.<sup>112</sup>

The Staff also argues “[a]n applicant’s submission of “new and significant” information in an environmental report does not automatically open the door to a challenge that would otherwise be barred as out of scope.” Entergy Answer at 113. The Staff relies on the *Carolina Power and Light Co.* and *Pilgrim* cases as support for this proposition. However, the facts in those cases are materially different from the instant case. Entergy’s incorrect use of NRC case precedent should be rejected by the Board, insofar as it is not relevant to the issue of whether EC-3 is outside the scope of this proceeding.

In *Carolina Power*, petitioners challenged the applicant’s failure to assess the impacts of aircraft attacks, and to consider SAMAs based on aircraft attack scenarios that had not been previously considered for the Shearon Harris plant. *Carolina Power and Light Co.* (Shearon Harris Nuclear Power Plant, Unit 1), LBP-07-11, 65 NRC 41, 63-64 (2007). The Board rejected this contention, ruling that issues related to the storage of spent fuel were generically assessed in the GEIS, and therefore outside the scope of the license renewal adjudication. *Id.*

In *Pilgrim*, petitioners challenged the adequacy of the applicant’s SAMA analysis for failing to address the risk of spent fuel pool accidents. *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), LBP-06-23, 64 NRC 257 (2006). The Board denied the contention, based on its interpretation of Commission precedent

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<sup>112</sup> Further support for this approach can be found in *Supplement 1 to Regulatory Guide 4.2, Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses*, U.S. Nuclear Regulatory Commission, September 2000. Page 4.2-S-4 clearly states “New and significant information is (1) information that identifies a significant environmental issue that was not considered in NUREG-1437 and, consequently, not codified in Appendix B to Subpart A of 10 CFR Part 51, or (2) information that was not considered in the analyses summarized in NUREG-1437 and that leads to an impact finding different from that

suggesting that “severe accidents” only included reactor accidents and did not apply to spent fuel pools. *Id.* at 288. The Board ruled that spent fuel pool accidents fall within the analysis of onsite storage of spent fuel, a Category 1 issue. *Id.* In the instant case, Riverkeeper has not alleged that the impacts of the spent fuel pool leaks are new information regarding a Category 1 issue that was generically analyzed in the GEIS, but simply an impact whose significance must be assessed pursuant to the broad requirement of §51.53(c)(3)(iv).<sup>113</sup> Hearing Request at 77.

The factual dispute that forms the basis for EC-3 is starkly different than the issues raised by petitioners in *Pilgrim* and *Carolina Power*. The GEIS specifically addresses onsite storage of spent fuel during the renewal term, but fails to assess the environmental impact of radioactive water leaks from deteriorating plant systems such as the Indian Point fuel pools.<sup>114</sup> See GEIS, Section 6.4.6.7, and Table B-1 of Appendix B to Subpart A of Part 51.

**b. Riverkeeper has supplied adequate factual support for Contention EC-3**

The NRC staff claims that Riverkeeper has put forward no data in contravention of Entergy’s claim that only low concentrations of radionuclide contamination have been detected in groundwater at Indian Point. NRC Staff Response at 113. Neither the Staff nor Entergy define “low levels.” In contrast, Riverkeeper relies on maximum contaminant levels established by EPA to measure the level of contaminants in groundwater. Hearing Request at 82. The EPA drinking water standards were used to provide a recognized, and highly conservative, benchmark for comparison purposes. In fact, the same EPA standards are commonly cited by Entergy and

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codified in 10 CFR Part 51.”

<sup>113</sup> While Riverkeeper disagrees with the Boards’ respective determinations in the *Pilgrim* and *Carolina Power* cases regarding a petitioner’s ability to base contentions on new and significant information relating to a Category 1 issue, that disagreement has no bearing on whether EC-3 is within the scope of this proceeding, and thereby admissible. Nonetheless, should the Board in this proceeding make a determination that the Indian Point leaks are indeed a Category 1 issue, Riverkeeper reserves the right to file a waiver petition pursuant to 10 CFR §2.335 in response.

NRC in their own analyses of the spent fuel pool leaks.<sup>115</sup> Entergy cites EPA standards on pgs. 5-3 and 5-4 of the ER, citing Section 4.8.2 of the NRC GEIS for license renewal. Entergy's own "Investigation Report" applies EPA drinking water limits to determine the level of radionuclides in the Tritium plume even though there are no drinking water wells on the site. "Investigation Report" at 90, FN 64. *See also* Fig. 8.1. The NRC's Task Force Report also relies almost exclusively on the same EPA standards in its description of radioactive leaks at fifteen different plants, including Indian Point. Task Force Report at 3-10. It is astonishing that both NRC and Entergy can then argue that the use of such standards is incorrect and inapplicable to an assessment of the significance of the Indian Point leaks. Indeed, neither Entergy nor the NRC posits any alternative method of measuring groundwater contamination.

Riverkeeper has provided supporting data in EC-3 that tritium, strontium-90 and cesium-137 have been detected in the groundwater at high levels. Hearing Request at 82-83.<sup>116</sup> Riverkeeper's determination of what constitutes "high levels" is based upon the exceedance of EPA drinking water limits at a number of monitoring wells around the Indian Point site. *Id.* The sampling data cited in EC-3 provides adequate factual support that extremely high levels of toxic radionuclides are present in the groundwater at Indian Point, as a result of leakage from the IP1 and IP2 pools. *Id.*

Entergy also argues that Contention EC-3 lacks adequate factual and/or expert support alleging that Riverkeeper provides no data in contradiction to Entergy's statement in the ER that "EPA drinking water limits are not applicable" to site area groundwater. Entergy Answer at 142

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<sup>115</sup> *See* Footnote 114 citing *Indian Point Nuclear Generating Unit 2-Special Investigation Report No. 05000247/2005011* (March 16, 2006), ADAMS Accession No. ML060750842.

*citing* ER at 5-6. Again, Riverkeeper used the standards to provide a benchmark comparison. The high concentration of radionuclides found in the groundwater cannot be dismissed simply because the water is not currently being utilized as drinking water. If one accepts this line of reasoning, any amount of radioactive contamination in the groundwater at Indian Point would be permissible, as long as the groundwater was not utilized for drinking water purposes. This bizarre logic flies in the face of the basic requirement of NEPA that all significant impacts be assessed before a project is approved. Here, the fact remains that Riverkeeper has put forth adequate factual support that high levels of radionuclides were found in the site groundwater and this groundwater flows towards the Hudson River. Hearing Request at 81-83.

Furthermore, Entergy argues that because no drinking water is immediately being impacted, the EPA drinking water limits are not applicable and therefore Riverkeeper has failed to provide a basis for the claim that Entergy failed to adequately assess the “significance” of groundwater contamination at the site. Entergy Answer at 143. This is a complete mischaracterization of Contention EC-3. The significance of groundwater contamination impacts must be assessed according to NEPA and CEQ regulations, not just according to NRC regulations relating to drinking water impacts. 40 C.F.R. § 1508.27. Entergy has failed to provide sufficient evidence to support its conclusion that the impacts of the spent fuel pool leaks are not significant.

The NRC Staff argues that “Riverkeeper’s claim that Entergy failed to assess the impact of spent fuel pool contamination on Hudson River fish and shellfish, lacks a necessary factual predicate and is, thus, unsupported.” NRC Staff Response at 113. In fact, Contention EC-3 relies

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<sup>116</sup> See Footnote 120, E-mail from James Noggle, NRC to Timothy Rice, DEC with attached NRC Data from Indian Point Split Monitoring Well Samples (August 23, 2007), included in Riverkeeper’s Petition as Exhibit 4.



on fish samples taken in 2006 that show slightly elevated levels of radionuclides, raising concerns of bioaccumulation in the Hudson, as well as internal Entergy memoranda suggesting that further studies are required to fully assess the potential for radionuclide contamination of fish. Hearing Request at 75, 85-86. Riverkeeper also provided ample factual support that in assessing the “significance” of the groundwater contamination in the ER, Entergy should consider the ten factors laid out in the CEQ regulations defining “significantly” at 40 C.F.R. § 1508.27(b). Riverkeeper Petition at 77-78. Riverkeeper has supplied adequate factual and/or expert support in accordance with 10 C.F.R. § 2.309(f)(1)(v) and the contention should be admitted.

**c. Riverkeeper has established that genuine issues of material fact are in dispute**

Entergy argues that in the third basis in Contention EC-3, Riverkeeper has chosen to ignore the fact that Entergy has evaluated potential exposure pathways due to groundwater contamination including aquatic foods. Entergy Answer at 149. Entergy has misconstrued the material fact in dispute. The fact in dispute is Entergy’s claim that the impacts of the spent fuel pool leaks are not significant for purposes of NEPA review. Entergy Answer at 144, *citing* ER at 5-6. Entergy concedes that it relies on the CEQ definition of “significantly” for its analysis. ER at 5-1.

When considering the context of a site-specific action, the CEQ regulations state that: “significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short term and long term effects are relevant.” 40 C.F.R. § 1508.27(a). Analysis of intensity focuses on the severity of the impacts, and the regulation lists ten factors to be assessed in determining significance. 10 C.F.R. § 1508.27(b)(1)-(10). Entergy is required to consider all ten factors in evaluating the intensity of the impacts of the spent fuel pool leaks.

NEPA requires that the unique characteristics of the geographic area, such as proximity to historic or cultural resources, wild and scenic rivers, or ecologically critical areas be a factor considered by NRC in determining the intensity of impacts. 10 C.F.R. § 1508.27(b)(3).

Haverstraw Bay, just south of the Indian Point site, is a designated Significant Coastal Fish and Wildlife Habitat by the State of New York.<sup>117</sup> According to the designation document Haverstraw Bay is a major nursery and feeding area for certain marine species, most notably bay anchovy, Atlantic menhaden, and blue claw crab.<sup>118</sup> Depending on location of the salt front, a majority of the spawning and wintering populations of Atlantic sturgeon in the Hudson may reside in Haverstraw Bay.<sup>119</sup> In addition, the endangered Short-nose sturgeon usually winter in this area as well.<sup>120</sup>

The degree to which the action may adversely affect an endangered or threatened species or its habitat determined to be critical under the Endangered Species Act of 1973 must also be evaluated by NRC in evaluating the intensity of the impacts of the spent fuel leaks.<sup>121</sup> Entergy states that the Indian Point 1 and 2 pools are leaking and also concede that “some contaminated groundwater has likely migrated to the Hudson River.”<sup>122</sup> However, the ER at no point considers the potential effects of this toxic contamination on the River’s federally listed species. In fact, it does not consider its effects on any part of the natural environment of the Hudson River.

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<sup>117</sup> See NYS, Significant Coastal Fish and Wildlife Habitat Program, Designated Habitat Haverstraw Bay, available at [http://nyswaterfronts.com/downloads/pdfs/sig\\_hab/hudsonriver/Haverstraw\\_Bay.pdf](http://nyswaterfronts.com/downloads/pdfs/sig_hab/hudsonriver/Haverstraw_Bay.pdf), last accessed February 15, 2008.

<sup>118</sup> *Id.*

<sup>119</sup> *Id.*

<sup>120</sup> *Id.*

<sup>121</sup> 10 C.F.R. § 1508.27(b)(9).

<sup>122</sup> ER at 5-4.

The NRC and/or Entergy may not rely on Entergy's alleged compliance with NRC standards for protection of human health to support their conclusion that impacts to the environment are small. NEPA requires a broader assessment of environmental impacts which goes beyond public health risk. Entergy's claim that groundwater contamination from the Unit 1 and Unit 2 spent fuels is low is based only on the short-term lack of drinking water impacts and public health risks.

Finally, both CEQ and NRC regulations require cumulative impacts to be evaluated. 40 C.F.R. § 1508.27(b)(7). 61 FR 28467, 28470. *See also* NRC Supp. 1 to Reg. Guide 4.2, at 4.2-S-6, 4.2-S-11. Cumulative impact is further defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." 40 C.F.R. § 1508.7. Entergy does not assess whether the impacts of these leaks, as they are currently understood, would add to the cumulative impact of Indian Point's operation that must be assessed by Entergy and the NRC prior to license renewal. In particular, the long-term effects of the contaminated groundwater plumes from IP1 and IP2 have not been adequately analyzed in the ER, as stated in EC-3. Hearing request at 74, 84.

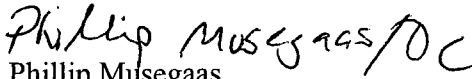
Entergy has failed to show that the impact of the Indian Point leaks is "not significant" as it claims in its ER. ER at 5-6. Contention EC-3 is supported by adequate factual information to show that a genuine dispute exists between Riverkeeper and Entergy on an issue of material fact or law, in compliance with §2.309(f)(1)(vi). The contention is based upon Riverkeeper's dispute of the accuracy of specific factual information regarding the degree of contamination and the

status of the leaks, as well as the failure by Entergy to include any assessment of the leaks' impacts on Hudson River biota. This issue is material to the findings the NRC must make regarding the environmental impacts of Indian Point, pursuant to §51.95(c). As such, Contention EC-3 should be admitted for adjudication by the Board.

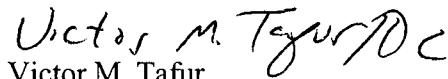
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February 15, 2008

### CERTIFICATE OF SERVICE

I certify that on February 15, 2008, copies of the foregoing RIVERKEEPER, INC.'S REPLY TO ENTERGY'S AND NRC STAFF'S RESPONSES TO HEARING REQUEST AND PETITION TO INTERVENE were served on the following by e-mail and first-class mail:

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