

**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD**

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In re: Docket Nos. 50-247-LR; 50-286-LR

License Renewal Application Submitted by ASLBP No. 07-858-03-LR-BD01

Entergy Nuclear Indian Point 2, LLC, DPR-26, DPR-64
Entergy Nuclear Indian Point 3, LLC, and
Entergy Nuclear Operations, Inc. June 9, 2015
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**STATE OF NEW YORK AND RIVERKEEPER, INC.
REVISED STATEMENT OF POSITION
JOINT CONTENTION NYS-38/RK-TC-5**

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PRELIMINARY STATEMENT

In accordance with 10 C.F.R. § 2.107(a)(1) and the Atomic Safety and Licensing Board's ("Board") July 1, 2010 Scheduling Order,¹ the Board's December 9, 2014 Revised Scheduling Order,² and the Board's May 27, 2015 Order,³ the State of New York (the "State") and Riverkeeper, Inc. (collectively, "Intervenors") hereby submit their Revised Statement of Position on New York and Riverkeeper's admitted Joint Contention NYS-38/RK-TC-5 ("NYS-38/RK-TC-5").

In this proceeding, the State and Riverkeeper have satisfied the standards contained in 10 C.F.R. § 2.309 governing contention admissibility. The State and Riverkeeper now submit this statement of position and the accompanying testimony and exhibits to show that Entergy's license renewal application ("LRA") should be denied because in various respects the application does not contain (1) sufficient information, (2) adequate programs, and (3) enforceable, binding commitments concerning the aging of certain components to provide NRC with a record and a rational basis upon which it can determine whether to grant a renewed license in violation of 10 C.F.R. § 54.21, 42 U.S.C. §§ 2133 and 2232, and the Administrative Procedure Act.

SUMMARY OF ARGUMENT AND SUPPORTING EVIDENCE

As initially presented, Contention NYS-38/RK-TC-5 focused on the practice of Entergy and NRC Staff of allowing certain safety issues to be resolved between them *after* the NRC has

¹ *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), Scheduling Order (July 1, 2010) (unpublished) (ML101820387).

² *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), Revised Scheduling Order (December 9, 2014) (unpublished) (ML14343A757).

³ *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), Order (Granting New York's Motion for an Eight-Day Extension of the Filing Deadline) (May 27, 2015) (unpublished). The May 27, 2015 Order extended the deadline for the State and Riverkeeper to file their revised prefiled testimony, affidavits and exhibits from June 1, 2015 to June 9, 2015.

issued an operating license and *outside* the framework of an Atomic Energy Act § 189 proceeding. This practice, if allowed in this proceeding, would frustrate the right of the State of New York and Riverkeeper to, obtain discovery about such issues, participate in the resolution of such issues, and present evidence to the Atomic Safety Licensing Board and the NRC Commissioners concerning such issues. This practice was made clear by the issuance of the August 2011 Supplemental Safety Evaluation Report (SSER) and the interactive communications between Entergy and NRC Staff that led to that report. In a similar vein, in November 2014, after reviewing Entergy's iterative revised and amended proposal for reactor pressure vessel internals, NRC Staff issued a second Supplemental Safety Evaluation Report (SSER2). Once again, however, Entergy's proposal fails to provide important details and defers implementation of a number of critical aging management actions. Entergy's aging management plan thus lacks not only detail, but substance, as well. In other regards, it is inadequate for the task.

The State of New York's and Riverkeeper's Joint Contention NYS-38/RK-TC-5 states:

Entergy is not in compliance with the requirements of 10 C.F.R. §§ 54.21(a)(3) and (c)(1)(iii) and the requirements of 42 U.S.C. §§ 2133(b) and (d) and 2232(a) because Entergy does not demonstrate that it has a program that will manage the affects of aging of several critical components or systems and thus NRC does not have a record and a rational basis upon which it can determine whether to grant a renewed license to Entergy as required by the Administrative Procedure Act.

In February 2015, Intervenors supplemented Contentions NYS 25 and NYS38/RK-TC-5 to raise concerns about the adequacy of Entergy's revised approach to reactor pressure vessel internal components, as well as the continued deferral of various details regarding Entergy's plan for addressing the effects of aging in its reactor pressure vessels and associated internals. At this juncture in the proceeding, Entergy proposes an aging management approach – that relies in part

on unspecified actions to address aging degradation, including the future development of plans for implementation. Entergy's proposal includes, without limitation, the following:

- a. **Deferred identification of limiting locations.** Previously Entergy had claimed that it had identified the most limiting locations for metal fatigue calculations (Applicant's Answer to New and Amended Contention New York State 26B/Riverkeeper TC-1B (Metal Fatigue, dated October 4, 2010 at 12). It subsequently conceded that there may be more limiting locations, but that the identification of the detailed process to be used to determine the most limiting locations for which CUF_{en} calculations would be deferred until late in the license review process or after the facilities entered the period of extended operation (beyond their initial 40 year license term). SSER at 4-2;
- b. **Deferred disclosure of environmental assisted fatigue analyses using WESTEMS.** Previously Entergy had asserted that it would use WESTEMS, a proprietary computer program developed by Westinghouse for CUF_{en} calculations and that Westinghouse had actually run the program for the CUF_{en} calculations on which Entergy was relying in this proceeding. See Applicant's Answer to New and Amended Contention New York State 26B/Riverkeeper TC-1B (Metal Fatigue, dated October 4, 2010 at 11). Entergy has determined that it will make modifications in the WESTEMS computer model when it deems those modifications beneficial to it but that the criteria to be used and the assumptions to be relied upon in deciding when and how to have user interventions in the use of WESTEMS for conducting CUF_{en} calculations and the standards to be applied in deciding what will be adequate explanations and justifications for such deviations will not be disclosed until late in the license review process or after the facilities entered the period of extended operation (beyond their initial 40 year license term). SSER at 4-2 to 4-3;
- c. **Deferred inspections of steam generator divider plate assemblies for PWSCC and development of plans for management of tube-to-tubesheet welds.** Entergy has acknowledged a problem with primary water stress corrosion cracking ("PWSCC") for the nickel alloy or nickel-alloy clad steam generator ("SG") divider plates exposed to reactor coolant, a problem which could impact components directly relevant to plant safety. SSER at 3-18 to 3-19. Entergy

originally proposed, and the SER approved, the water chemistry program for managing that problem, but it now concedes that is not sufficiently effective to meet the aging management program objectives and requirements. *Id.* Entergy has not yet determined how to address that problem; rather, it intends to rely on the EPRI Steam Generator Management Program (“SGMP”) Engineering and Regulatory Technical Advisory Group analyses and reports. *Id.* Entergy and NRC Staff have also acknowledged a concern with the steam generator tubesheet cladding and the propagation of primary water stress corrosion cracking to the tube-to-tubesheet welds. SSER at 3-20 to 3-23. Entergy proposes to “develop a plan” to address this issue but the plan lacks detail and will not be developed until well into the period of extended operations. SSER at 3-22 to 3-23. Any inspections of the divider plate assemblies and tube-to-tubesheet welds that Entergy has already committed, or will in the future commit, to perform would not take place until after the facilities have entered the period of extended operations. Entergy has also proposed, and NRC has accepted, an alternative commitment option to revise the longstanding definition of reactor coolant pressure boundary with respect to the tube-to-tubesheet welds for IP2 and thereby avoid inspection of those locations altogether.

- d. **Deferred baffle former bolt inspections.** Entergy and NRC acknowledge that cracking of baffle former bolts is a potential problem aging management issue, yet Entergy has proposed to delay inspections of these bolts until well into the period of extended operations. Moreover, Entergy has yet to develop acceptance criteria for these components.
- e. **Deferred replacement or other appropriate corrective action for highly embrittled components.** Reactor vessel internals typically experience, by end of life, neutron irradiation at levels well beyond those known to cause significant reduction in ductility. This loss of fracture toughness may not be detectable using currently available non-destructive inspection techniques. Since Entergy’s aging management plan for reactor vessel internals is an inspection-based plan, highly embrittled components subject to brittle fracture may not be identified for timely replacement or corrective action until well after extended operations.

This Statement of Position and the underlying Contention are supported by the June 2015 revised testimony of Dr. David J. Duquette (“Duquette Revised PFT” [Exh. NYS00532]), the revised testimony of Dr. Richard T. Lahey, Jr. (“Lahey Revised PFT” [Exh. NYS000562]), the revised testimony and supplemental report of Dr. Joram Hopenfeld (“Hopenfeld Revised PFT” [Exh. RIV000143]; “Hopenfeld Supplemental Report” [Exh. RIV000144]), and the exhibits cited therein. In addition, the Contention is also supported by previous submissions by these three witnesses, including the June and November 2012 testimony and report of Dr. Duquette, the June and November 2012 testimony of Dr. Lahey, the June and November 2012 testimony of Dr. Hopenfeld, and the documents referenced therein. Before turning to the Intervenors’ submissions, the State and Riverkeeper provide the following brief overview of the systems and components discussed in the testimony and report.

Reactor Coolant System and Reactor Coolant Pressure Boundary

Indian Point Unit 2 and Unit 3 each employ a pressurized water reactor (“PWR”) design and a four loop nuclear steam supply system (“NSSS”) furnished by Westinghouse Electric Corporation. Entergy Indian Point License Renewal Application (“LRA”), at pages 1-6, 2.3-2, 2.3-6 (April 2007). The reactor coolant system (“RCS”) consists of four similar transfer loops connected in parallel to the reactor vessel. Each loop contains a reactor coolant pump and a steam generator. The system also includes a pressurizer, a pressurized relief tank, connecting piping, and instrumentation necessary for operational control. The reactor coolant pressure boundary (or “RCPB”) refers to a physical barrier or boundary between the reactor coolant system in the “primary loop” of nuclear steam supply system and the “secondary loop” of the nuclear steam supply system. NRC regulations include a definition of the reactor coolant

pressure boundary. 10 C.F.R. § 50.2. It is critical not to breach the reactor coolant pressure boundary and allow the reactor coolant to escape.

Indian Point Steam Generators

Steam generators are part of the nuclear steam supply system and reactor coolant system. Their intended functions include providing a heat transfer function and serving as part of the reactor coolant pressure boundary.

According to public documents on file with NRC, Indian Point Unit 2 and Unit 3 were initially constructed with Westinghouse Model 44 steam generators. In turn, those generators used components that were made of a nickel-based alloy known as Alloy 600 or its trade name, Inconel 600. Between 1975 and 2000, eight steam generators whose heat transfer tubes were made of Alloy 600 experienced tube ruptures. Steam Generator Tube Operational Experience, Exhibit NYS000377. Westinghouse steam generators experienced a large share of the ruptures. *Id.*⁴

⁴ Various courts issued decisions in several cases wherein utilities raised concerns about Alloy 600 material in Westinghouse steam generators. *See, e.g., Duquesne Light Co. v. Westinghouse Elec. Corp.*, 66 F.3d 604 (3d Cir. 1995) (claiming Inconel 600-made steam generators were defective and as the result of leaks needed to be replaced); *San Diego Gas & Elec. Co. v. Westinghouse Elec. Corp.*, 892 F.2d 83 (Table), 1989 WL 150599 (9th Cir. 1989) (regarding Westinghouse steam generators installed at SONGS Unit 1 plant being defective and leaking radioactive material); *Florida Power & Light Co. v. Westinghouse Elec. Corp.*, 785 F.2d 952 (11th Cir. 1986) (relating to leaks in six Westinghouse steam generators installed at Turkey Point in the 1960's); *N. States Power Co. v. Westinghouse Elec. Corp.*, 156 F.R.D. 168, 169 (D. Minn. 1994) (alleging that Westinghouse steam generators installed at Prairie Island were defective); *Portland Gen. Elec. Co. v. Westinghouse Elec. Corp.*, 842 F.Supp 161 (W.D. Pa. 1993) (regarding claims that defects in Westinghouse steam generators made with Inconel 600 rendered them "unsuitable for use" in Trojan nuclear plant); *S. Carolina Elec. & Gas Co. v. Westinghouse Elec. Corp.*, 826 F Supp 1549 (D.S.C. 1993) (alleging that Westinghouse knew of defects in steam generators made with Inconel 600 that lead to shortened system life); *Commonwealth Edison Co. v. Westinghouse Elec. Co.*, 759 F.Supp. 449, 451 (N.D. Ill. 1991) (regarding Westinghouse's admission that Inconel 600 tubing is susceptible to pure water stress corrosion cracking); *Consolidated Edison Co. v. Westinghouse Elec. Corp.*, 567 F.Supp. 358

In 1989, Indian Point Unit 3 installed Westinghouse Model 44F steam generators. In January 2001, following a steam generator tube rupture, Indian Point Unit 2 installed Westinghouse Model 44F steam generators. LRA, at p. 2.3-21. The steam generators at the Indian Point reactors are constructed primarily of nickel-based alloy. The heat transfer tubes are Inconel: Alloy 600 for IP2, and Alloy 690 for IP3. The tubes were thermally treated after tube-forming operations. The April 2007 LRA stated that the interior surfaces of the channel heads and nozzles are clad with austenitic stainless steel, and the tube sheet surfaces in contact with reactor coolant are clad with “Inconel,” a generic term that did not specify the particular type of alloy.⁵ LRA, at p. 2.3-21. In 2011, Entergy informed NRC that at both Indian Point Unit 2 and Indian Point Unit 3 the steam generator divider plates are Inconel 600 (Alloy 600) and that it assumed that the weld material for the divider plate assemblies was Alloy 82/182 weld material.⁶

Testimony of Dr. Lahey

According to Dr. Lahey's pre-filed testimony submitted in 2012, the August 2011 Supplemental Safety Evaluation Report makes it clear that a number of important details and questions remain unresolved concerning the aging-induced degradation of various safety-related systems and components and the management of that process. This lack of detail extends to the steam generator divider plates, tubesheets, and welds, to the disclosure of the parameters for user intervention in the application of the WESTEMS computer code for fatigue analysis, and to the

(S.D.N.Y.1983) (claiming Westinghouse Model 44 installed at Indian Point 2 was defective and resulted in leaks); *Consolidated Edison Co. v. Westinghouse Elec. Corp.*, 594 F.Supp. 698 (S.D.N.Y. 1983).

⁵ The term “Inconel” is a trademark and refers to a family of different alloys.

⁶ Entergy NL-11-032 communication with NRC Staff, Response to Request for Additional Information (March 28, 2011) ML110960360, Attachment 1 at p. 20 of 27 (Exhibit NYS000151).

identification of additional limiting locations in the reactor coolant system and pressure boundary for the fatigue analysis. June 18, 2012 Lahey Initial PFT at 9-12 (Exh. NYS000374). Dr. Lahey also observed that virtually no details given on the future analyses and/or inspections that Entergy will apparently do. The absence of such details makes it difficult, if not impossible, to meaningfully evaluate the approach or program that Entergy proposes. In any event, the dates given for Entergy and the USNRC's anticipated resolution of these issues appear to be beyond the time frame for submission of testimony and the evidentiary hearings in this ASLB proceeding and thus will not allow for a testing of the adequacy of the proposed resolution of these issues in this proceeding.

With respect to primary water stress corrosion cracking in the steam generators, Dr. Lahey explained that primary water stress corrosion cracking of a divider plate or its weld could compromise the ability of the divider plate to direct fluid through the tubesheet into the heat transfer tubes and hence impede one of the intended functions of the tubes and the steam generator to transfer heat and thus to provide a heat sink for the heat generated in the core. Lahey Initial PFT at 20. In his opinion, the loss of that intended function to be a significant safety concern since shock-load-induced failures of the divider plate have apparently not been analyzed (e.g., the thermal/pressure shock loads experience during various postulated LOCA events), but such events may lead to gross failures of cracked divider plates. Lahey Initial PFT at 20. He also testifies that a crack in the lower steam generator assembly area could compromise the maintenance of the reactor coolant pressure boundary between the primary loop and the secondary loop in the nuclear steam supply system. Lahey Initial PFT at 20-21.

In his February 2015 declaration, Dr. Richard Lahey discusses the reasons why, contrary to the conclusions of the NRC Staff in the SSER2, Entergy's Amended and Revised RVI Plan

fails to adequately manage aging effects during IP2 and IP3's periods of extended operation as required by applicable statutes and regulations. Dr. Lahey observes that Entergy's Amended and Revised Plan continues to ignore the potentially synergistic effects of irradiation-induced embrittlement and other aging mechanisms on reactor vessel internals. February 2015 Lahey Decl., *passim*.(Exh. NYS000483) In this regard, Dr. Lahey notes the regulatory and scientific communities' growing recognition of the interactive nature of aging mechanisms in the reactor coolant environment, and the on-going efforts to better understand and resolve the range of issues posed by the synergism of degradation phenomena. *Id.*, ¶¶ 11-17. As an example, Dr. Lahey refers to U.S. Department of Energy's (DOE) Light Water Reactor Sustainability Program (*Id.*, ¶ 11), for which DOE has devoted considerable money in recent years. Indeed, DOE recently requested over \$30 million in funding as part of its Fiscal Year 2015 Congressional Budget Request (*see*, USDOE FY 2015 Congressional Budget Request, DOE/CF-0098, Vol. 3, March 2014, at 425-426, 430).

Dr. Lahey opines that Entergy's reliance on industry guidance and an inspection-based program for the management of aging effects is inadequate to address the uncertainties and technical challenges posed by RVI degradation, particularly given the known limitations of Entergy's proposed examination techniques and the possibility that a shock load can cause one or more embrittled components to fail prior to the detection of cracks or other visual signs of wear. *Id.*, ¶¶ 17-20. In addition, Dr. Lahey notes that Entergy has yet to develop inspection acceptance criteria for baffle former bolts, and that it may not do so until 2019 for IP2 and 2021 for IP3. *Id.*, ¶ 27.

With respect to Entergy's CUF_{en} analysis, Dr. Lahey calls into question the reliability of Entergy's fatigue analysis given Entergy's failure to perform an error-analysis. Lahey Decl., ¶

21. He nonetheless notes that a number of components exhibited CUF_{en} values extremely close to unity, and that Entergy had not considered the effect of design-basis accident shock loads (LOCA or SCRAM) on the integrity of such severely fatigue-weakened and highly-embrittled structures, nor the potential threat to core geometry posed by a reactor coolant system component failure. *Id.*, ¶¶ 21-22. Finally, Dr. Lahey discusses the need to preserve, rather than erode, safety margins for aging reactors and their components. *Id.*, ¶ 33. He recommends repair or replacement of aging parts prior to the end of a plant's design life as a means to restore safety margins and guard against accidents or unexpected non-conservatism in flawed safety evaluations. *Id.* For example, NRC and industry have recently recognized that Branch Technical Position 5-3 (NUREG-0800), widely relied upon by plants that received construction permits before 1973 to estimate initial reference temperatures (RT_{NDT}) for purposes of developing reactor vessel pressure/temperature (P/T) curves, may have produced non-conservative results. *Id.*; *see also*, AAG Kwong Decl., Attachments 1 - 3.

Dr. Lahey's June 2015 Testimony

Accompanying this Statement of Position, Dr. Lahey is submitting revised prefiled testimony in support of Contention NYS-38/RK-TC-5. June 2015 Revised Prefiled Written Testimony of Richard T. Lahey, Jr. (or "Lahey Revised PFT"), Exh. NYS000562. In that testimony Dr. Lahey sets forth his opinion that Entergy's application to renew the Indian Point operating licenses for an additional 20 years still lacks important details in certain areas and is inadequate in other respects. The June 2015 testimony references his previous testimony and reports, his February 2015 declaration in support of the intervenors' motion to supplement Contention NYS-38/RK-TC-5, and various documents. NYS000562 at 5-6, 9-10, 81-85, 102-103.

Embrittlement of Reactor Pressure Vessels and Their Internal Components

Dr. Lahey has previously stated that embrittlement of the RPVs and their associated internal components is one of the most important age-related phenomena, and that failure to carefully consider the effects of embrittlement could result in a meltdown of the core. Declaration of Dr. Richard T. Lahey, Jr., at ¶¶ 6-18 (Nov. 2007) (*included in* ML073400193) (Exh. NYS000298); *see also* NYS000562 at 27-32; 83-85. Dr. Lahey demonstrates the importance of RPVIs and explains how the failure of RPVIs during a design basis accident may result in the loss of a coolable geometry and thus core meltdown and a catastrophic release of radiation to the environment. Exh. NYS000562 at 13-18. Many of the RPVIs hold critical reactor components in place and their failure, during an accident, can cause those components, such as baffles, former plates, core support plates, thermal shields, control rods, guide tubes, plates and welds to either deform and/or create core blockages within the RPV pressure boundary. *See, e.g.*, Lahey Report, at ¶¶ 12-13, 16-28, 38-40 (NYS000296).

With respect to Entergy's current Revised and Amended RVI Plan, Dr. Lahey accompanying testimony notes that certain details are not now available concerning the acceptance criteria for baffle former bolts in either IP2 or IP3 and that Entergy has proposed to defer the development of such criteria until both plants are well into their extended operation terms. Exh. NYS000562 at 60. Dr. Lahey also expresses concern about Entergy's proposal for clevis bolts. *Id.*, at 60-63. According to Dr. Lahey, Entergy's evolving position continues to fail to address the problem of embrittlement of RPVIs and lacks analyses of some of the most important aspects of RPVI degradation, including the absence of an adequate assessment of the synergistic effects of embrittlement, metal fatigue, and stress corrosion cracking and the absence of specific criteria for acceptance, prevention and corrective actions. *Id.*, at 19-23, 51-66.

Entergy's inspection-based approach to RVI management fails to address the possibility that highly embrittled and fatigued RVI components, which do not show detectable signs of aging such as cracks, will fail when subjected to a sudden shock. Additionally, Entergy's assessment of environmental assisted fatigue values for various components is deeply flawed, as it fails to account for embrittlement, relies on a systematic removal of conservatisms, and fails to include any assessment of its potential error range. *Id.*

Moreover, Entergy intends to rely extensively on Visual (VT-3) Examination, NL-12-037, Attachment 2, at 37-51 (Exh. NYS000496); MRP-227-A, at 4-3 to 4-4 (Exh. NRC000114A-F); however, there is substantial evidence that this inspection methodology is often subjective and ineffectual. February 2015 Lahey Declaration, at ¶32 (Exh. NYS000483); *see also* Tregoning, R.L., "Reasons for Non-concurrence on Draft Safety Evaluation for the EPRI Topical Report (TR) Materials Reliability Program (MRP) Report 1016596 (MRP-227), Revision 0, Pressurized Water Reactor (PWR) Internals Inspection and Evaluation Guidelines" (March 22, 2011) (Exh. NYS000508); Case, Michael J., Comments for the Document Sponsor to Consider Pertaining to Non-concurrence on Draft Safety Evaluation for EPRI Topical Report (TR) Materials Reliability Program (MRP) Report 1016596 (MRP-227), Revision 0, Pressurized Water Reactor (PWR) Internals Inspection and Evaluation Guidelines, RES/DE (March 22, 2011) (Exh. NYS000509); *see also* Exh. NYS000562 at 66-67.

Metal Fatigue

Dr. Lahey has described his ongoing concerns with Entergy's reliance on the WESTEMS computer code and its analytical results to demonstrate that it has a legally adequate aging management program for metal fatigue. Lahey Revised PFT, at 67-72 (Exh. NYS000562); Lahey Report, ¶¶24-31 (Exh. NYS000296); Lahey Supp. Report (Exh. NYS000297). First, Dr.

Lahey describes how Westinghouse through an iterative process removes conservatism from CUF_{en} calculations. Second, Dr. Lahey has identified sources of non-conservatism in the calculation of CUF_{en}. Third, Dr. Lahey has noted that without an error analysis, it is inappropriate to rely on CUF_{en} values that are very close to 1.0. Fourth, Dr. Lahey has provided real-world examples of the limitations of CUF_{en} calculations. *Id.* at 67-78. The lack of an error analysis and criteria for modifications or user interventions impedes critical analysis, frustrates the State's ability to meaningfully participate in this proceeding, and precludes the development of a record for NRC to base a decision on Entergy's application for permission to operate the Indian Point facilities for 20 additional years. *Id.*, at 67-85.

Age Related Degradation of Steam Generators

In his accompanying Revised Prefiled Testimony, Dr. Lahey also sets out his concerns over Entergy's proposal regarding the age related degradation of various components in the lower assemblies of the eight Indian Point steam generators. Revised Lahey PFT, at 85-103 (Exh. NYS000562). He describes steam generators, their components, their function, and the reactor coolant pressure boundary. *Id.*, at 85-89. Dr. Lahey goes on to describe primary water stress corrosion cracking and the challenge it has posed, and continues to pose, to nickel base alloy components used in steam generators – such as those at Indian Point. *Id.*, at 89-91. Although the steam generators at IP2 and IP3 have some differences in constituent materials, both sets of generators are Westinghouse Model 44F generators and contain materials or welds that could be susceptible to primary water stress corrosion cracking and other age-related degradation mechanisms. *Id.*, at 89-91. With respect to the steam generators' divider plates and tube-to-tubesheet welds, it is Dr. Lahey's opinion that Entergy's proposal lacks important details. *Id.*, at 93-98. Dr. Lahey also notes that shock-load-induced failure of a divider plate and/or its

welds, which have been subjected to thermal fatigue and primary water stress corrosion cracking, could compromise the ability of the divider plate to direct fluid through the U-tubes and hence impede one of the intended functions of the tubes and the steam generator, namely, to provide a heat sink for the heat generated in the core. *Id.*, at 92-93. Dr. Lahey is concerned that Entergy and the industry have not considered the degradation due the synergistic effects of the primary water stress corrosion cracking-induced embrittlement and thermal fatigue that the divider plates have been subjected to, or carefully evaluated the severe shock loads that the degraded divider plates may experience due to various postulated accidents. *Id.*, at 102-103. Moreover, if Entergy seeks to rely on a WESTEMS-based fatigue evaluation, Dr. Lahey states that such an analysis would not be sufficient for the reasons that he has previously expressed with respect to that approach. *Id.*, at 102-103; *accord id.*, at 17.

Testimony & Report of Dr. Duquette

In his 2012 report and testimony Dr. Duquette discusses the phenomenon of primary water stress corrosion cracking, reports of primary water stress corrosion in steam generators, the challenges in examining susceptible components, and the uncertainties in the approach that Entergy's proposed to NRC Staff in 2011 in response to the issue. According to Dr. Duquette, based on the results of a review of documents provided by Entergy and NRC Staff to date as well as industry and engineering literature, a serious concern exists about potential cracking in the channel head assembly of the Westinghouse steam generators at Indian Point. Duquette Rpt. at 3-4 (Exhibit NYS000373).

Recent experience in similar steam generators in Europe has uncovered primary water stress corrosion cracking in Alloy 600 divider plates and in the Alloy 82/182 welds connecting the divider plates to the tubesheets. *Id.* A similar concern exists with respect to the tubesheet

cladding. If cracks in the divider plates or in the divider plate welds propagate into the Alloy 600 cladding of the tubesheets it is likely that they will propagate into the tube-to-tubesheet welds and accordingly compromise the pressure boundary, resulting in contamination of the secondary water with primary water. *Id.* Dr. Duquette notes that there is presently no qualified inspection procedure to determine the extent of cracking in the divider plates or associated channel assemblies, and that European inspection procedures can result in high radiation doses for plant workers/inspectors. Duquette Rpt. at 3; NEI Presentation to NRC Staff at 20 (Exhibit NYS000387); EPRI, Aging Management of Alloy 600 and Alloy 82/182 in Steam Generator Channel Head Assembly, (Exhibit NYS000393). Indian Point has not proposed a specific inspection procedure, except to say that it will be guided by industry standards. Industry standards, however, have not yet been established. Dr. Duquette acknowledges that EPRI has begun a program to determine the susceptibility of divider plates and related structures and assemblies to PWSCC, but that the results of that research are not scheduled to be available until 2016, well into the period of extended operation of IP2 and IP3 at Indian Point. It is his opinion that there is inadequate knowledge to indicate that the problem can be managed at all. Until the successful development of such a program, Entergy's Aging Management Program for the Westinghouse steam generators at Indian Point is critically flawed. Duquette Rpt. at 3-4, 16-18, 19-22.

According to Dr. Duquette, Entergy's proposed plan for steam generator divider plate assemblies, tubesheets, and welds contains several unknowns. Entergy's proposal provides no detail about the inspection methods or technique (visual, volumetric, or surface inspection), acceptance criteria, monitoring and trending protocols, or corrective action responses that it might employ. The absence of such details prevents meaningful evaluation of the proposed

approach. At present, Indian Point (and NRC) have not demonstrated that the age related degradation of divider plate assemblies, tubesheets, and welds resulting from primary water stress corrosion cracking can be adequately managed. Duquette PFT at 28; Duquette Rpt. at 3-4. While Entergy advanced a proposal, it is not an Aging Management Program. There is nothing in the proposal at all to determine what Entergy is committing to do. It is wholly deficient. Dr.Duquette opined that Entergy's approach seemed more like a "wait and see" placeholder proposal while EPRI works on the question. Duquette PFT at 28-29.

Dr. Duquette's June 2015 Testimony

In his pre-filed supplemental testimony that accompanies this Statement of Position, Dr. Duquette updates his prior testimony and report with a discussion of the importance of performing detailed inspections of the channel head and divider plate assemblies and tube-to-tubesheet welds of the eight steam generators at Indian Point prior to entering the period of extended operations. June 2015 Supplemental Prefiled Written Testimony of Dr. David J. Duquette (June 8, 2015) (NYS000532), His testimony also addresses [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Indeed, it is Dr.

Duquette's opinion that inspections of these locations should be performed as soon as possible

since it is undisputed that IP2 steam generators contain Alloy 600TT components which are known to be susceptible to primary water stress corrosion cracking, and the IP3 steam generators have already been in service 26 years. NYS000532 at 5, 28.

According to Dr. Duquette, in order to adequately address aging degradation in the Indian Point steam generators, Entergy must unequivocally establish and implement a sufficiently detailed aging management program that includes baseline and follow-up inspections of the steam generator channel head and divider plate assemblies, including the tube-to-tubesheet welds. Inspections should be conducted before Indian Point Unit 3 begins its period of extended operation, and inspections should be conducted promptly at Indian Point Unit 2, since they have not yet been conducted at that facility. To avoid delay pending development of a qualified inspection technique, Entergy should conduct the necessary inspections using techniques available now for detecting and evaluating cracks in the divider plate and channel head assembly, such as Westinghouse's remote-ultrasonic inspection technique cited in Entergy's testimony (ENT000526), or some other similarly effective technique.

Dr. Duquette opines that the need for Entergy to inspect and monitor for primary water stress corrosion cracking and fatigue cracking in the steam generator channel head and divider plate assemblies is underscored by a 2012 Westinghouse Nuclear Safety Advisory Letter (NYS000549) and 2013 NRC Information Notice (NYS000538) [REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Dr. Duquette explained that this
operating experience further supports the need for detailed inspections of aging steam generators.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] In addition,

potential differences between French and American operating conditions, such as Entergy's practice of tube-plugging instead of derating when flaws are identified, could account for increased PWSCC susceptibility in American-run steam generators such as those at Indian Point. Exh. NYS000532 at 17-18. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. Regular inspections provide licensees and the NRC an opportunity to gather baseline data for benchmarking objective evidence of degradation and are a critical part of ensuring that systems operate safely. Recent NRC Information Notices confirm the importance of detailed inspections and the value of periodic comparative visual assessments. NYS000538 and NYS000551. From an engineering perspective, it would be irresponsible to rely exclusively on mathematical modeling data, particularly since the NRC and industry have seen, in both the fracture toughness context (i.e., recently identified non-

conservatism of BTP-5-3)(NYS000518-NYS000519) and the San Onofre steam generator tube rupture context (NRC Review of Lessons Learned at San Onofre, March 2014)(NYS000552), that models can be non-conservative, unreliable or just plain wrong. In Dr. Duquette's opinion, [REDACTED] the operating experiences at Wolf Creek and Surry referenced in the NRC's Information Notice 13-20 (NYS000538) suggest that failure of corrosion-resistant cladding in steam generators like those in use at Indian Point is a potential problem requiring detailed inspection and monitoring. Dr. Duquette also expressed concern that Indian Point steam generators have experienced age-related degradation as a result of wear associated with steam generator tube vibration, and that a number of tubes have been plugged and taken out of service as a result. (IP2 Steam Generator Examination Program Results 2014 Refueling Outage (2R21)(September 8, 2014)(NYS000543). Also noted were the foreign objects identified during tube inspections and their potential to cause denting and resulting damage to the tubes.

Dr. Duquette identified what he understood to be Entergy's commitments with respect to divider plate assembly and tube to tubesheet weld inspections. By way of Commitment 41, Entergy had committed to perform future inspections of the divider plate assemblies. By way of Commitment 42, Entergy committed to conduct future analytical evaluations or inspections of the tube to tube sheet welds. It is now apparently Entergy's position, that its recent 2014 license amendment for IP2 redefining the reactor coolant pressure boundary to exclude tube to tubesheet welds satisfies its obligation under Commitment 42. According to Dr. Duquette, NRC staff's approval of that license amendment was premature, as primary water stress corrosion cracking continues to be a concern and focus of federally-funded research. Moreover, it is unclear what impact EPRI's 2014 report will have on Entergy's remaining open commitments.

[REDACTED]

[REDACTED]

[REDACTED] To the extent that Entergy remains committed to performing a one-time inspection after license renewal, and potentially well into the plants' periods of extended operation, even that provides inadequate assurance for managing aging steam generators at Indian Point since crack growth can accelerate exponentially in fatigued or cyclically stressed materials. Rather, Entergy should affirmatively and clearly commit to performing inspections as soon as possible for IP2, and certainly before the period of extended operation for IP3. Additionally, Entergy must identify the inspection techniques it intends to use, develop acceptance criteria, and provide a detailed plan for addressing any flaws or indications that it may encounter. In light of the Alloy 600TT construction of IP2 steam generator components and assemblies and the age of the IP3 steam generators, Dr. Duquette recommends that Entergy conduct follow-up inspections at least every 10 years, Exh. NYS000532 at 27.

From Dr. Duquette's perspective, in 2011 and 2012 there was substantial uncertainty about what pathway Entergy would pursue with respect to steam generators; moreover, essential details were lacking in the various optional pathways Entergy identified. [REDACTED]

[REDACTED]

[REDACTED]

Testimony of Dr. Hopenfeld

As set out in his 2012 pre-filed testimony, in Dr. Hopenfeld's expert opinion, Entergy's failure to identify the most limiting locations that will be subject to refined CUF_{en} calculations or detail the process to be used to determine such locations, within the context of the license

renewal review process, renders Entergy's AMP for metal fatigue inadequate to comply with applicable law and standards. Hopenfeld PFT at 11-12 (Exhibit RIV000102).

Dr. Hopenfeld explains that Entergy must determine the most limiting locations during the relicensing review process, and not simply rely upon a vague commitment to do so in the future, at some point before the expiration of the current Unit 2 and Unit 3 operating licenses. Hopenfeld PFT at 11-12. In particular, in light of Entergy's initial findings, as memorialized in the April 2007 License Renewal Application, that the CUF_{en} of several risk-significant reactor components would exceed the regulatory threshold of 1.0 during the proposed periods of extended operation, it became necessary for Entergy to expand the scope of its fatigue analysis to identify other components whose CUF_{en} may be greater than 1.0. Hopenfeld PFT at 8-9.

This obligation is clearly dictated by industry guidance document MRP-47 (Electric Power Research Institute, *Materials Reliability Program: Guidelines for Addressing Fatigue Environmental Effects in a License Renewal Application* (2005)), as well as NRC's *Generic Aging Lessons Learned (GALL) Report* ("GALL Report"), Revision 1.⁷ Hopenfeld PFT at 8-9. In addition, Dr. Hopenfeld points to Revision 2 of NRC's *GALL Report*, which also specifies that fatigue calculations considering the effects of the reactor water environment, "should include the locations identified in NUREG/CR-6260 and additional plant-specific component locations in the reactor coolant pressure boundary if they may be more limiting than those considered in

⁷ MRP-47, Revision 1, Electric Power Research Institute, *Materials Reliability Program: Guidelines for Addressing Fatigue Environmental Effects in a License Renewal Application* (2005) (Exhibit NYS000350 at 3-4 (emphasis added)); NUREG-1801, *GALL Report*, Rev. 1, § X.M1, Metal Fatigue of Reactor Coolant Pressure Boundary, ¶¶ 5, 7 (emphasis added) (Exhibit NYS00146A-146C).

NUREG/CR-6260.”⁸ Hopenfled PFT at 9. Since Entergy’s environmentally assisted fatigue analyses performed to date, which only concern the sample locations prescribed in NUREG/CR-6260,⁹ demonstrate that the CUF_{en} of numerous components analyzed will likely exceed unity,¹⁰ such components are not necessarily the most limiting locations and bounding for the entire Indian Point plant. Hopenfled PFT at 9.

Dr. Hopenfled further explains NRC Staff’s recognition that the components analyzed by Entergy to date are likely not the most limiting locations for the plant, as memorialized in a Request for Additional information dated February 10, 2011.¹¹ Hopenfled PFT at 9-10. However, NRC later accepted from Entergy a mere commitment to determine whether there are more limiting locations at Indian Point, for which refined CUF_{en} calculations must be performed, at some point prior to the expiration of the IP2 and IP3 current operating licenses, and not as part of the license renewal review process.¹² Hopenfled PFT at 10. Dr. Hopenfled provides his

⁸ NUREG-1801, *Gall Report*, Rev. 2 § X.M1, Fatigue Monitoring, ¶ 1 (emphasis added) (Exhibit NYS00147A-147D).

⁹ NUREG/CR-6260 “Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components” (Exhibit NYS000355).

¹⁰ As Dr. Hopenfled points out, his previously submitted testimony in support of Riverkeeper Contention RK-TC-1B in this proceeding, explains how Entergy’s June 2010 “refined” metal fatigue analyses employed a flawed methodology that failed to account for all relevant plant parameters, and which resulted in underestimated fatigue predictions that may, in actuality exceed unity. *See* RIV000034 at pp. 6-20; RIV000035 at pp. 4-21.

¹¹ U.S. NRC Request for Additional Information for the Review of the Indian Point Nuclear Generating Unit Numbers 2 and 3, License Renewal Application (February 10, 2011), at 13 (Exhibit RIV000057).

¹² *See* Entergy Response to Request for Additional Information (RAI), Aging Management Programs Indian Point Nuclear Generating Unit Nos. 2 & 3, Docket Nos. 50-247 and 50-286, License Nos. DPR-26 and DPR-64 (March 28, 2011), at p. 26 of 27 (Exhibit RIV000058); Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3, Docket Nos. 50-247 and 50-286, NUREG-1930, Supplement 1 (August 2011), at 4-2 (Exhibit NYS000160).

expert opinion that Entergy's commitment to take future action apart from the license renewal review process fails comply with relevant standards, which require that Entergy *demonstrate* an adequate AMP for metal fatigue. Hopenfled PFT at 11-12. Dr. Hopenfled explains that Entergy cannot affirmatively demonstrate that the aging effects of metal fatigue will be sufficiently managed over the proposed license renewal terms, without first identifying what the most limiting locations are at Indian Point, as well as the methodology to be employed to select the most limiting locations. Hopenfled PFT at 11-12. Without these details, it is simply impossible to assess whether Entergy's AMP for metal fatigue is adequate and consistent with regulatory guidance. Hopenfled PFT at 12.

Dr. Hopenfled describes the complexity involved in determining the most limiting locations. Hopenfled PFT at 12-13. In particular, Dr. Hopenfled explains that such an analysis would require assessing experience at Indian Point, as well as at other pressurized water reactor ("PWR") plants, identifying all components that are susceptible to thermal fatigue, and screening and ranking such components in light of the numerous parameters which are known to effect fatigue life (including the ratios of the local heat transfer coefficient the local material conductivity, wall thickness, fluid temperature, delta T, dissolved oxygen levels, flow velocities, number of transients, magnitude and cycling frequency of surface temperatures and loads (thermal striping in stratified flows), and surface discontinuities). Hopenfled PFT at 12-13. Dr. Hopenfled also explains that Entergy's assessment of the most limiting locations must also consider the synergistic effects of primary water stress corrosion cracking and thermal fatigue. Hopenfled PFT at 13. Due to the numerous variables and relevant considerations, it is critical to understand Entergy's intended approach for determining the most limiting locations at Indian

Point. Entergy's failure to do makes it impossible to conclude that Entergy's AMP is sufficient to address metal fatigue at the plant, or that it complies with applicable regulatory guidance. *Id.*

Dr. Hopenfeld further provides a list of components as a sample of what Entergy must consider, in his professional opinion, in order to determine locations which are bounding for metal fatigue at Indian Point, and whether the plant can operate safely during the proposed license extension periods. Hopenfeld PFT at 13-15.

In addition, Dr. Hopenfeld provides his expert opinion that Entergy's vague commitment to explain and justify any user modifications of the WESTEMS™ computer model, which is used in performing CUF_{en} calculations at Indian Point, at some point in the future, but, again, not within the context of the license renewal review process, is unacceptable. Dr. Hopenfeld opines that because the criteria and assumptions Entergy intends to rely on to change the WESTEMS™ computer model will necessarily affect the validity and robustness of the CUF_{en} analysis, such details must be disclosed *now* in the license renewal review proceeding, and not at some point in the future before the Indian Point Unit 2 and 3 current operating licenses expire. Such information is critical in order to assess the adequacy of Entergy's AMP for metal fatigue. Based on his review of relevant documentation and understanding of relevant regulatory obligations, Dr. Hopenfeld concludes that Entergy's vague commitments to perform necessary metal fatigue investigations, analyses, and justifications, in the future, fail to demonstrate that the aging effects of metal fatigue will be sufficiently managed during the proposed license renewal terms for Indian Point Units 2 and 3. Hopenfeld PFT at 15-16.

Entergy has provided certain statements about what it may do in the future concerning its approach to certain steam generator components and other aspects of the reactor coolant pressure boundary in light of aging degradation caused by primary water stress corrosion cracking and

fatigue however the State and Riverkeeper have concerns over the binding nature of such proposals and statements. Hopenfeld PFT at 16.

Dr. Hopenfeld has previously submitted prefiled testimony describing deficiencies in Entergy's AMP for metal fatigue resulting from, inter alia, Entergy's failure to expand the scope of analysis to a broader range of components, and due to Entergy's vague commitment related to determining the most limiting, bounding locations relating to metal fatigue for IP2 and IP3. See Hopenfeld Testimony (June 19, 2012) (Exh. RIV000102). [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Dr. Hopenfeld's June 2015 Testimony and Report

Dr. Hopenfeld has now submitted a Supplemental Report and Revised Prefiled Testimony that describe the inadequacies in Entergy's efforts to determine the most limiting locations for Indian Point and the ongoing deficiencies in the subsequent, related, most recent round of CUFen calculations. Hopenfeld Supplemental Report (Exh. RIV000144) (June 2015); Hopenfeld Revised PFT in Support of Consolidated Contention NYS-38/RK-TC-5 (Exh. RIV000143) (June 2015). Dr. Hopenfeld has accordingly assessed these evaluations, and provided an analysis which demonstrates that Entergy's screening analysis and CUFen calculations (1) failed to adequately consider the impact of dissolved oxygen on fatigue life, Hopenfeld Supplemental Report at § 2 (Exh. RIV000144) (2) failed to consider synergistic aging

effects of radiation, thermal embrittlement, and stress corrosion cracking on fatigue life, Hopenfled Supplemental Report at § 3 (Exh. RIV000144) and (3) improperly relied on CUF values of record without adequately accounting for changes in geometry, surface finish, heat transfer, strain rate, and radiation. Hopenfled Supplemental Report at § 4 (Exh. RIV000144). Based on such a flawed proposal and approach, Dr. Hopenfled explains and concludes that Entergy's efforts to expand the scope of its fatigue assessment was inadequate and incomplete, and how Entergy has continued to fail to conduct an appropriately expanded, bounding analysis of the most limiting locations at the Indian Point facilities.

In addition, Dr. Hopenfled has provided analysis with respect to the recently admitted additional bases to Contention NYS-38/RK-TC5 related to Entergy's AMP for RVI components. In particular, Dr. Hopenfled addresses the supplemental basis of Contention NYS-38/RK-TC-5 contending that Entergy's commitment to recalculate the CUF values of RVI components to include reactor coolant environment effects involved a flawed methodology that failed to accurately and fully account for environmental effects, and, thus, assure that fatigue of such components will be adequately managed during the period of extended operation. Dr. Hopenfled assessed Entergy's refined fatigue evaluations relating to RVI components, and points to and discusses the same flaws (as described above) that are present in Entergy's refined fatigue analysis for other components. See *id.* generally; Hopenfled Supplemental Testimony Regarding NYS-38/RK-TC-5 at 6-7 (Exh. RIV000143).

Based on Dr. Hopenfled's review of Entergy's most recent fatigue analyses, he concludes that Entergy has continued to fail to demonstrate that the effects of metal fatigue on RVI components will be adequately managed at Indian Point during the proposed period of extended operation. In his June 2015 revised prefiled testimony and report, Dr. Hopenfled again expresses

concern over Entergy's approach to the age-related degradation of the Indian point steam generators. Dr. Hopenfled continues to maintain that Entergy has failed to properly expand the scope of its fatigue analysis to include steam generator components. Hopenfled Supplemental Report at § 5 (Exh. RIV000144). Dr. Hopenfled explains how Entergy's screening analysis methodology was flawed, which resulted in a failure to consider the environment on fatigue for components on the secondary side of the steam generators. *Id.* Dr. Hopenfled specifically discusses how Entergy improperly ignored steam generator tube and secondary side components,

[REDACTED]

[REDACTED] *Id.* § 5.2. This failure to conduct further analysis related to steam generator components has led Dr. Hopenfled to conclude that Entergy's program for managing metal fatigue at IP2 and IP3 is inadequate. *Id.*

PROPOSED FINDINGS OF FACT

This Statement of Position and its supporting evidence merit a finding by the Board of the following facts regarding NYS-38/RK-TC-5:

1. Entergy is required by 10 C.F.R. §§ 54.21(a)(3) and (c)(1)(iii) to "demonstrate" that it has a program that will manage the affects of aging on critical components.
2. Among the components for which such programs are required are components that make up the reactor coolant system (RCS) and reactor coolant pressure boundary (RCPB) and nickel alloy or nickel-alloy clad steam generator components including divider plates and assemblies, tubesheets, and tube-to-tubesheet welds.
3. With respect to the aging management programs for these components Entergy has not demonstrated that:
 - a. Its Amended and Revised RVI Plan has specific, substantive acceptance

criteria for use when evaluating inspection results for certain reactor pressure vessel internal components. For example, Entergy has merely committed to develop acceptance criteria for baffle former bolts sometime prior to 2019 for IP2 and 2021 for IP3. Response to RAI 5, Attachment 1 to NL-12-089, at 11. NRC Staff has approved this approach, SSER2, at 3-20, even though cracking of baffle former bolts has been observed at European pressurized water reactors (PWRs) and Entergy acknowledges “cracking of baffle former bolts is recognized as a potential issue for the IPEC units.” Attachment 1 to NL-12-037, at 8. In the Revised Plan, Entergy also acknowledges various “material degradation concerns” for reactors operating beyond 40 years. NL-12-037, Attachment 1, Revised Reactor Vessel Internals Program, at 8. “Other confirmed or suspected material degradation concerns that the industry has identified for PWR components are wear in thimble tubes, potential wear in control rod guide tube guide plates, and cracking in some high-strength bolting.” *Id.*;

b. Its Amended and Revised RVI Plan is adequate to address the synergistic effects of embrittlement, fatigue, and other age related degradation mechanisms on reactor vessel internals. Rather, Entergy has considered aging effects independently of each other, without accounting for the reality of the harsh conditions within the reactor vessel. Furthermore, Entergy has reaffirmed that it will not take preventative actions in managing aging effects on RVIs, but instead will depend on periodic inspections to detect cracks or other signs of wear. NL-12-037, Attachment 1, p. 5 (“The Reactor Vessel Internals Program is a condition monitoring program that does not include preventive actions.”). This inspection-based plan fails to address the possibility that a shock load will cause highly fatigued and degraded RVI components to fail entirely prior to the appearance of cracks or other detectable signs of wear. Moreover, the Amended and Revised RVI Plan is also inadequate because it:

(i) does not specify with any meaningful precision when the replacement or repair of embrittled or otherwise degraded reactor vessel internal components will take place (NL-13-052, Attachment 1, p. 9 (Commitment 49); NL-13-122, Attachment 2, p. 20 (Commitment 49));

(ii) relies on less reliable remote-control VT-3 examinations, instead of the more reliable volumetric ultrasonic testing (UT), to examine various components such as, for example and without limitation, baffle former assembly plates and edge bolts, control rod guide tube assembly guide plates, thermal shield assembly flexures, and core barrel flanges (NL-12-037, Attachment 2, Table 5-2, Table 5-3, Table 5-4, Table 5-5); and

(iii) has not generated, and has not agreed to provide, an error analysis of the CUF_{en} analysis or outputs;

c. The most limiting locations for application of CUF_{en} calculations have been

identified as required by GALL and MRP-47, both of which standards Entergy has committed to meet;

d. The deviations from the prescribed standards for use of WESTEMS for the CUF_{en} calculations will meet NRC safety standards because no criteria have been proposed for when and under what circumstances such deviations will be allowed;

e. It has a specific, substantive program to address primary water stress corrosion cracking for the nickel alloy and nickel-alloy clad steam generator divider plates, welds, and assemblies, tubesheets, and tube-to- tubesheet welds;

f. It has a reliable, safe and technically adequate methodology for inspecting nickel alloy and nickel-alloy clad steam generator divider plates prior to the implementation of a specific program to address primary water stress corrosion cracking in those divider plates, welds, and assemblies, tubesheets, and tube-to-tubesheet welds.

PROCEDURAL HISTORY OF CONTENTION NYS-38/RK-TC-5

Contention Admission

On September 30, 2011, the State of New York and Riverkeeper submitted proposed Joint Contention NYS38 / RK-TC-5. This contention alleged that Entergy's Aging Management Programs (AMP) are not in compliance with 10 C.F.R. §§ 54.21(a)(3) and (c)(1)(iii), as well as 42 U.S.C. §§ 2133(b,d) and 2232(a), because they fail to provide detailed plans as to the company's various AMPs at Indian Point, instead promising details in the future. This lack of detail, it was alleged, should result in a denial of the requested licenses because the lack of that information threatens the "health and safety of the public," and does not provide the NRC with a sufficient record upon which to make a decision regarding plant safety. *State of New York and Riverkeeper's New Joint Contention NYS-38/RK-TC-5*, ¶ 19 (Sept. 30, 2011) (ML11273A196). Intervenor argued that, "because Entergy has, at most, promised to provide a demonstration in the future that it will meet the requirements of 10 C.F.R. §§ 54.21(a)(3) and (c)(1)(iii), but it not making that demonstration at this time, it has failed to meet the requirements of 10 C.F.R. §

54.29(a) and its application for a renewed license for Indian Point Units 2 and 3 should be denied.” *Id.* at 5. Contention NYS-38/RK-TC-5 alleged deficiency with four primary areas of Entergy’s relicensing application:

1. Limited identification of limiting locations for metal fatigue analysis;
2. Lack of disclosed assumptions concerning the use of WESTEMS for metal fatigue analysis;
3. Use of an unspecified inspection program for steam generators susceptible to primary water stress corrosion cracking (PWSCC);
4. Future commitment to provide detailed reactor internal inspection plans.

In addition to the contention itself, New York and Riverkeeper submitted the declaration of Dr. Richard Lahey, who stated that Entergy’s submitted AMPs lacked the detail necessary for the NRC and New York State to conduct a proper analysis. In addition, he stated that as a result of Entergy’s plans to wait until at least 2013 to finalize AMPs for its steam generators (based on EPRI’s Steam Generator Management Program), critical tube-to-tubesheet welds in IP-2’s steam generators would not be inspected until between March 2020 and March 2024 for IP-2 and March 2016 to March 2017 for IP-3. *Declaration of Dr. Richard T. Lahey*, ¶ 6 (Sept. 30, 2011) (ML11273A192). He also stated that Entergy’s assumptions regarding metal fatigue analysis were unknown and will remain so until immediately before relicensing would take effect. According to Dr. Lahey, “[t]here is a difference between stating that one will develop a program...and actually disclosing the details, judgments, assumptions and user interventions that underlay the program and the analyses.” *Id.*, ¶ 11.

New York and Riverkeeper also submitted the declaration of Dr. Joram Hopenfelf, in which he stated that Entergy had made only a “vague commitment to perform necessary metal fatigue investigation and analysis in the future,” meaning it had not met it’s burden under 10

C.F.R. § 54.21(c). *Declaration of Dr. Joram Hopenfeld*, LB 07-858-03, ¶ 14 (Sept. 30, 2011) (ML11273A194). Dr. Hopenfeld also stated that Entergy has failed to provide the Commission with enough detail to confirm that metal fatigue will be “adequately managed” at Indian Point and that NRC’s acceptance of Entergy’s vague plans “is not warranted or acceptable.” *Id.* ¶ 13.

On October 25, 2011 Entergy and NRC Staff submitted separate answers to proposed Joint Contention NYS38 / RK-TC-5. Entergy contended that the State of New York and Riverkeeper had mischaracterized its AMPs with regard to being based solely on future commitments, arguing that the AMPs were in compliance with 10 C.F.R. Part 54 and established NRC review procedures. *Applicant’s Opposition to New York State’s and Riverkeeper’s Joint Motion To Admit New Contention NYS-38/RK-TC-5* at 27 (Oct. 25, 2011) (ML11298A380). It also argued that Contention 38 was not timely under 10 C.F.R. § 2.309(f)(2) and should not be admitted. *Id.* at 1. Finally, Entergy claimed that the State of New York and Riverkeeper’s contentions regarding its metal fatigue analysis plans were erroneous because a cracked divider plate in the Model 44F SG steam generator is “*not* a safety concern” and therefore not subject to the type of analysis suggested by New York State and Riverkeeper. *Id.* at 23 (emphasis in original).

NRC Staff’s answer largely mirrored that of Entergy and suggested that Contention 38 be disallowed as untimely and because it mischaracterized Entergy’s AMP commitments as vague. Specifically, NRC Staff argued that Contention NYS-38/RK-TC-5, “is not premised upon any new information in the SSER or association RAIs, but instead in premised on the *absence* of information and *omission* of details.” *NRC Staff’s Answer to State of New York and Riverkeeper’s Joint Motion To File a New Contention and New Joint Contention NYS-38/RK-TC-5*, at 7 (Oct. 25, 2011) (emphasis in original) (ML11298A379). Staff also argued that New

York State and Riverkeeper should have raised objections to Entergy's AMPs when the relicensing application was filed in 2007 because the lack of information existed at that stage of the proceedings. NRC Staff also argued that all Entergy was required to do for its AMPs to comply with the Generic Aging Lessons Learned (GALL) report was to state that they would comply and demonstrate this commitment in the future, and that this was in keeping with NRC precedent. *Id.* at 19.

On November 1, 2011, the State of New York and Riverkeeper submitted a joint reply to Entergy and NRC Staff's opposition to the admittance of Joint Contention 38 NYS38 / RK-TC-5. The reply underscored that Entergy's failure to disclose crucial details of its proposed approach went against Commission precedent requiring that definitive findings of safety be made before relicensing and that the Commission has required more than promises to comply in previous relicensing proceedings. *State of New York and Riverkeeper's Joint Reply in Support of Admission of Proposed Contention NYS-38/RK-TC-5*, at 6 (Nov. 1, 2011) (ML11305A269). According to the reply, the thrust of the contention is that, "future actions to be taken are not detailed sufficiently to assess their adequacy and thus Entergy does not — and cannot — 'demonstrate' that what it promises to do will actually result in an adequate AMP." *Id.* at 3. The State of New York and Riverkeeper also contended that the submission of Contention 38 was timely because Entergy's AMPs had evolved in the previous four years and the vagueness of the current plans was only revealed in the SSER, meaning the information on which the Contention is based is new information. They also asserted that the question of whether Entergy's recently-proposed approach was sufficient to meet NRC requirements is a factual question, necessitating acceptance of the complaint and review by the Board. *Id.* at 4-5.

On November 10, 2011, the Atomic Safety and Licensing Board issued an opinion admitting Joint Contention NYS38 / RK-TC-5. The ASLB found the State of New York and Riverkeeper's Contention to be timely and reasoned that, based on New York State and Riverkeeper's arguments there were adequate grounds to conduct an evidentiary hearing on the issue. According to the Board, Contention NYS38/RK-TC-5 is "premised upon information that is materially different from information that was previously available, i.e. the changed AMP commitments...[and]...is timely under Section 2.309(f)(2)(i)-(iii)." *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Memorandum and Order (Admitting New Contention NYS-38/RK-TC-5), slip op. at 10 (Nov. 10, 2011) (ML113114A211). The Board concluded that New York State and Riverkeeper had "sufficiently raised a genuine dispute as to whether Entergy's revised AMPs demonstrate the ability to manage aging," *id.* at 12, and that contrary to Entergy and NRC Staff assertions, "a commitment by the Applicant to modify AMPs in the future does not constitute implementation of the plan." *Id.* at n. 51.

Motion for Clarification

On November 21, 2011, Entergy filed a motion for clarification concerning the ASLB's decision to admit Contention NYS-38/RK-TC-5. Entergy specifically requested clarification on the scope of the contention and the schedule for filing evidence related to the contention. The company requested that the contention be limited to Entergy proposed Commitment 41 and its adequacy related to the AMP for detecting PWSCC in steam generator divider plate assemblies, arguing that New York State and Riverkeeper's Contention did not allege deficiencies in any other Entergy commitment. *Applicant's Motion for Clarification of Licensing Board*

Memorandum and Order Admitting Contention NYS-38/RK-TC-5, at 3 (Nov. 21, 2011) (ML11325A433).

On December 1, 2011, the State and Riverkeeper submitted a response to Entergy's clarification motion, arguing that the scope of the contention was not limited to Commitment 41, but in fact covers the general question of whether Entergy demonstrated compliance with AMP requirements by promising to develop a detailed program at a future date. *State of New York and Riverkeeper's Joint Response to Entergy's Motion for Clarification About Contention NYS-38/RK-TC-5*, at 2-3 (Dec. 1, 2011) (ML11335A363).

On December 5, 2011 the Atomic Safety and Licensing Board granted Entergy's motion for clarification, but denied the substantive relief that Entergy sought, that of limiting the scope of the contention. The Board agreed with the State of New York and Riverkeeper that Contention NYS-38/RK-TC-5 was "broad" in scope and reasserted its position in admitting the contention that Intervenors had raised "multiple bases" for their claims, which should be subject to further evidentiary proceedings. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Order (Granting Entergy's Motion for Clarification of Licensing Board Memorandum and Order Admitting Contention NYS-38/RK-TC-5), slip op. at 3 (Dec. 6, 2011) (ML11340A088).

Motion to Compel NRC to Comply with Discovery Obligations

On January 30, 2012, the State of New York and Riverkeeper filed a joint motion to compel NRC Staff to comply with discovery obligations related to Contention NYS38 / RK-TC-5. *State of New York and Riverkeeper Motion to Compel Compliance with Disclosure Obligations by NRC Staff* (Jan. 30, 2012) (ML12030A272). The State and Riverkeeper argued that NRC Staff had not complied with requests to search for and disclose documents relevant to

Contention NYS-38 / RK-TC-5 and documents regarding discussions among industry representatives and NRC Staff about issues that are germane to the contention. The motion was needed to resolve a conflict in the interplay between 10 C.F.R. §§ 2.366, 2.1202 and 2.1203. Intervenor understood NRC Staff to be taking a position that even though NRC is a part to the IP relicensing proceeding, it need not disclose documents related to admitted contentions other than those “supporting Staff’s review of the application itself,” including those generated by Staff in reviewing the application or contentions related to it. *Id.* at 1. New York State and Riverkeeper argued that because NRC had chosen to become a party to Contention NYS-38/RK-TC-5, it was required to disclose all documents in its possession relevant to the contention.

In response to a question from the Board, NRC Staff informed the Board and the parties that “the Staff has determined that it intends to participate as party in this adjudicatory proceeding with respect to all admitted contentions.” *NRC Staff’s Statement in Response to the Atomic Safety and Licensing Board’s Order of February 3, 2012*, at 1 (Feb 8, 2012) (ML12039A298).

NRC Staff submitted an Answer to Intervenor’s Motion to Compel on February 9, 2012. *NRC Staff’s Answer to “State of New York and Riverkeeper Motion to Compel Compliance with Disclosure Obligations by NRC Staff”* (Feb. 9, 2012) (ML12040A386). Staff argued that it had complied with its discovery obligations and that Intervenor’s motion should be denied. Specifically, NRC Staff argued that New York State and Riverkeeper had mischaracterized its position relative to discovery and that it was obligated only to disclose documents that “support the NRC Staff’s review of the application (including documents that provide support for, or opposition to, the application or proposed action)” under § 2.366(b). *Id.* at 15.

On March 16, 2012, the ASLB issued an order that partially granted the motion to compel. The ASLB held that discovery obligations for NRC Staff are broad in scope and that in the context of this proceeding, NRC Staff “must disclose documents related to admitted contentions, even if these documents were not examined as part of the NRC Staff’s review of the application itself, but which have been used, reviewed, or generated as part of the NRC Staff’s response to the admitted contentions in this proceeding.” *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Order (Granting in Part and Denying in Part State of New York and Riverkeeper’s Motion to Compel), slip op. at 7 (Mar. 16, 2012) (ML12076A156) (emphasis in original). In addition, the Board held that NRC Staff must disclose any expert reports in its possession that provide support for or opposition to the relicensing of IP-2 and IP-3. The Board required that any documents fitting this description that were in possession of NRC Staff but had not yet been disclosed “promptly be provided to Intervenors.” *Id.* at 11.¹³

In the same order, the Board also set out a schedule for the filing of evidentiary submissions on Contention NYS-38/RK-TC-5. *Id.* at 12.

Subsequent Scheduling Order

On January 27, 2012, NRC Staff informed the Atomic Safety and Licensing Board about a recent development that would affect the litigation of Contention NYS-25 (Reactor Pressure Vessel and Internal Components). *NRC Staff Letter to ASLB* (Jan. 27, 2012) (ML12027A115). The letter stated that Staff and Entergy had convened a meeting to discuss Entergy’s proposal concerning an inspection plan for reactor pressure vessel internal components and the Electric

¹³ Since the date of that ruling NRC Staff has not disclosed documents that pertain to Contention NYS-38/RK-TC-5.

Power Research Institute's revised Materials Reliability Program 227-A (MRP-227-A) and that Entergy would submit additional information concerning the Reactor Pressure Vessel Internals Aging Management Program by February 17, 2012.

The Staff currently expects that it may need to issue requests for additional information ("RAIs") to the Applicant following the Staff's receipt of the Applicant's February 17 submittal, and that the Staff's review of this matter may be the subject of a Supplement to the Safety Evaluation Report for the Indian Point license renewal application. In addition, the Staff may find it necessary to request leave to defer filing its testimony and statement of position on Contention NYS-25 until these issues have been resolved.

Id., at 1-2. In a subsequent February 8, 2012, letter NRC Staff provided similar information.

NRC Staff Letter to ASLB, at 2 (Feb. 8, 2012) (ML12039A298).

On February 16, 2012 the ASLB issued an order that, among other things, placed Contention NYS-25 on the second hearing track that already included NYS-38/RK-TC-5 and RK-EC-8. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Order (Granting NRC Staff's Unopposed Time Extension Motion and Directing Filing of Status Updates) (Feb. 16, 2012) (ML12047A308).

Following the ASLB March 16, 2012 Order partially granting the State's motion to compel, on March 22, 2012, NRC Staff filed a Motion for Partial Reconsideration and/or Clarification of the ASLB order limited to scheduling issues. *NRC Staff's Motion for Partial Reconsideration and/or Clarification of the Board's Order of March 16, 2012* (March 22, 2012) (ML12082A272). Specifically, Staff questioned whether the Board intended to establish a schedule for litigation of all portions of Contention NYS-38/RK-TC-5 or intended to exclude the portions that relate to Contention NYS-25. Intervenor filed a cross-motion on April 2, 2012, seeking the "placement of Contention NYS-26[B]/RK-TC-1[B] and the remainder of

Contention NYS-38/RK-TC-5 on to the second hearing track that exists for Contention NYS-25.” *State of New York’s and Riverkeeper’s Response and Cross-Motion to NRC Staff’s Motion for Partial Reconsideration of the Board’s March 16, 2012 Order*, at 1 (April 2, 2012) (ML12093A511). The State and Riverkeeper discussed the interrelationship among Contentions NYS-25, NYS-26/RK-TC-1, and NYS-38/RK-TC-5 and Dr. Lahey’s testimony concerning the synergistic effects among the age related degradation processes and requested that those contentions be presented and taken up together at the evidentiary hearing. *Id.*, at 4-5.

On April 23, 2012, the ASLB denied the Staff’s motion for clarification and the State and Riverkeeper’s cross-motion. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Order (Denying NRC Staff’s Motion for Partial Reconsideration and State of New York/Riverkeeper’s Cross-Motion to NRC Staff’s Motion for Reconsideration) (April 23, 2012) (ML12114A248). The Board directed that NYS-38/RK-TC-5 shall move forward at this time inasmuch as it addresses those issues unrelated to NYS-25, and those aspects of NYS-38/RK-TC-5 that pertain to RVIs shall be addressed in the same hearing schedule as NYS-25. *Id.* at 5.

On Friday, June 8, 2012, the Board issued an order setting forth the sequence in which it takes up the various contentions at the evidentiary hearing. Contention NYS-38/RK-TC-5 was not on the schedule for those contentions for which hearings would begin on October 15, 2012. The Board recognized this fact and said it would schedule hearings for Contention 38/5 at a later date. *Notice of Hearing (Application for License Renewal)*, at n. 14 (June 8, 2012) (ML12160A093).¹⁴

¹⁴ This intent to schedule a hearing for Contentions 38 and 26 at a later date was confirmed by a subsequent e-mail from ASLB Law Clerk Anne J. Siarnacki to the parties involved in those

In November 2014, after ongoing bilateral and iterative communications with Entergy, NRC Staff issued a second Supplemental Safety Evaluation Report (SSER2) concerning Entergy's Amended and Revised RVI Plan. On February 13, 2015, the State moved to supplement Contention NYS-38/RK-TC-5 in response to Entergy's Amended and Revised RVI Program and NRC Staff's SSER2. State of New York's Motion to Supplement Previously-Admitted Contention NYS-38-TC-5 (February 13, 2015) (ML15044A500); New York State February 2015 Supplement to Previously-Admitted Contention NYS-38-TC-5 (February 13, 2015) (ML15044A498). The State contended that Entergy's plan for managing aging of RVI set forth in the Amended and Revised RVI Program was inadequate. The Motion to Supplement was supported by a Declaration from Dr. Lahey describing his continuing concerns with Entergy's Revised and Amended RVI Program, and providing references to a variety of recently published documents supporting his position. Declaration of Richard T. Lahey (February 13, 2015) (ML15044A499 [redacted version]) (Exh. NYS000483). The Motion was also supported by the Declaration of Joram Hopenfeld (February 13, 2015 (ML----)). The Board admitted the State's February 2015 supplement to Contention NYS-38/RK-TC-5 in its entirety, rejecting Entergy's and NRC Staff's arguments to the contrary. Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Units 2 and 3), Memorandum and Order (Granting Motions for Leave to File Amendments to Contentions NYS-25 and NYS-38/RK-TC-5) (March 31, 2015) (unpublished) (ML15090A771 [redacted version]).

contentions dated June 11, 2012. Ms. Siarnacki also noted that the "Board does not presuppose any remaining contentions will (or will not) be heard together and will announce our plans for these contentions at a later date.

LEGAL STANDARDS

The NRC's license renewal regulations require Entergy to "demonstrate that ... [t]he effects of aging on the intended function(s) will be adequately managed for the period of extended operation."¹⁵ Systems, structures, and components ("SSCs") requiring an aging management review perform an intended function, as described in § 54.4:

(1) Safety-related systems, structures, and components which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49 (b)(1)) to ensure the following functions--

- (i) The integrity of the reactor coolant pressure boundary;
- (ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or
- (iii) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in § 50.34(a)(1), § 50.67(b)(2), or § 100.11 of this chapter, as applicable.

(2) All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section.

(3) All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).¹⁶

¹⁵ 10 C.F.R. § 54.21.

¹⁶ 10 C.F.R. §§ 54.4(1)-(3); *see also* Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc. (Pilgrim Nuclear Power Station), CLI 10-14, Docket No. 50-293-LR (June 17, 2010) slip op. at 5-8.

Therefore, the nuclear steam supply system and the components that make up the reactor coolant pressure boundary, such as, for example, the steam generators, are appropriately the subject of an aging management program in license renewal.

The ultimate burden of proof in any adjudicatory proceeding remains with the applicant, here Entergy, throughout the proceeding.¹⁷

Regulatory Commitments

Part of such demonstration must include an analysis of whether the applicants' proposals to address age related degradation are actually binding and enforceable or merely a voluntary suggestion that the applicant could subsequently revise or omit. On one end of the spectrum, conditions incorporated in a NRC-issued operating license reflect a legally binding and enforceable commitment that can be changed only through a formal license amendment process. On the other side of the spectrum, statements made in a variety of other contexts may lack the quality of enforceability and can be changed without formal NRC Commissioner or Staff approval or public participation.

As noted in Contention NYS-38/RK-TC-5 (¶ 20), the NRC Inspector General recently summarized the effect of licensee "commitments."

One way NRC provides oversight of licensees is through the management of regulatory commitments (commitments), which are non-legally binding actions that the licensee agrees or volunteers to take. Licensees are responsible for creating, tracking, and handling all commitments made to NRC. Within NRC, the

¹⁷ See, e.g., *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 N.R.C. 1041, 1048 (1983), citing *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-283, 2 N.R.C. 11, 17 (1975); *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-09-07, 69 N.R.C. 235, 263 (2009) (the applicant must demonstrate that it satisfies the "reasonable assurance standard" by a preponderance of the evidence); *Virginia Electric & Power Company* (North Anna Power station, Units 1, 2, 3 & 4), ALAB-256, 1 N.R.C. 10, 17, n.18 (1975).

primary responsibility for managing commitments lies with Division of Operating Reactor Licensing (DORL) project managers in the Office of Nuclear Reactor Regulation (NRR).

Commitments are neither legally binding nor obligations of a license; however, a commitment may be escalated into a legally binding obligation only if NRC staff deems that the commitment is essential for ensuring public health and safety.

Licensees are responsible for creating, tracking, and handling all commitments made to NRC. The licensee is entirely responsible for tracking the commitments, and this includes any changes to the commitments and notification to NRC about such changes. NRC expects licensees to honor commitments in good faith.

NRC Inspector General, Audit of NRC's Management of Licensee Commitments, OIG-A-17 (Sept. 19, 2011)(Exh. NYS000181).

NRC GUIDANCE

The Generic Aging Lessons Learned Report

As the Board is aware, NRC Staff has prepared a guidance document entitled Generic Aging Lessons Learned. The GALL Report is merely a guidance document and consistency with GALL does not foreclose a challenge to the adequacy of an AMP. *Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-10-17, __ N.R.C. __, __ (July 8, 2010) slip op. at 46-47; *Curators of University of Missouri*, CLI-95-1, 41 NRC 71, 98, 100 (1995)(it is well established that NUREGs and Regulatory Guides, by their very nature, serve merely as guidance and cannot prescribe requirements); *see also Duke Energy Corp.* (Catawba Nuclear Station, Units 1 and 2), CLI-04-29, 60 NRC 417, 424 (2004), *reconsid. denied*, CLI-04-37, 60 NRC 646 (2004) ("Guidance documents are, by nature, only advisory. They need not apply in all situations and do not themselves impose legal requirements on licensees.").

Moreover, an applicant's assertion that it will comply with GALL does not fulfill its duty to "demonstrate" that it has an adequate or effective aging management program in place.

Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Vermont Yankee Nuclear Power Station), CLI-10-17, __ N.R.C. __, __ (July 8, 2010) slip op. at 45 ("We do not simply take the applicant at its word."). In this proceeding, the Atomic Safety and Licensing Board stated that "we do not comprehend how a commitment to develop a program can demonstrate that the effects of aging will be adequately managed." (Emphasis in original). *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), LBP-08-13, 68 N.R.C. 43 (July 31, 2008) slip op. at 41 (ML082130436).

GALL describes ten components that any *bona fide* aging management program must contain for Staff to determine that the AMP is effective and consistent with GALL. Those descriptions identify components of inspection, monitoring and corrective actions that must be included in an aging management program. Merely asserting that the undeveloped or undisclosed "approach," "plan," or "program" will have those components in the future does not demonstrate consistency with GALL but, at most, reflects a proposal to develop a plan that the applicant hopes will be found to be consistent with GALL sometime in the future. But, the issuance of a new operating license requires a finding on what is in the record now, not what might be presented in the future, and Entergy, which has the burden of proof must provide the evidence to support the required finding now.

In addition, a question has arisen as to which version – Revision 1 or Revision 2 – of GALL applies to this proceeding and to Entergy's 2011 proposed approach to the aging degradation of the steam generators and the reactor coolant system and reactor coolant pressure boundary. This report was originally issued in 2001 and was revised in 2005 ("GALL Report,

Revision One”). NRC Staff issued GALL, Revision 2 in December 2010 (“GALL Report, Revision Two”). NUREG-1801, Rev. 2, Generic Aging Lessons Learned (GALL) Report, Final Report (Dec. 2010) (ML103490041) Exh. NYS000147. During a June 6, 2011 Pre-Hearing Conference, NRC Staff informed the Board and the parties that: “We are informed by GALL Rev 2, but we are not directly applying it to Indian Point.” Transcript of June 6, 2011 Conference, at 978 (ML11160A030). NRC Staff’s position has left open the question as to which guidance document Entergy, NRC Staff, and the parties should refer in examining Entergy’s 2011 proposals concerning steam generators and the reactor coolant system and pressure boundary. Dr. Duquette has provided his opinion that good engineering practice would apply the more recent guidance document to Entergy’s proposals and programs. Duquette June 2012 Rpt. at 17-18.

ARGUMENT

POINT I

ENTERGY HAS NOT CARRIED ITS BURDEN OF DEMONSTRATING THAT IT WILL EFFECTIVELY MANAGE AGING DEGRADATION OF CERTAIN COMPONENTS OF THE REACTOR COOLANT PRESSURE BOUNDARIES AT INDIAN POINT UNITS 2 AND 3

For a number of the aging management programs (“AMPs”) that Entergy concedes it must have in place for the two Indian Point power reactors to obtain renewed operating licenses, Entergy commits to develop a full aging management program, but does not present the details of those programs for review by the Board and the parties. What Entergy and the Supplemental Safety Evaluation Report, NUREG 1930, Supplement 1, August 2011 (“SSER”) refer to as an “implementation” step is, in reality, the development and provision of the details which may serve as the basis of a future proposed AMP and which details are essential to determine whether

the AMP meets NRC regulatory requirements or NRC Staff guidance like the Generic Aging Lessons Learned, NUREG 1801, Rev. 1 or Rev. 2 guidance document. Entergy impermissibly assumes that a commitment to develop a program in the future whose goal it is to meet the requirements of the regulations and to follow the guidance in GALL is legally sufficient to meet its obligations to “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.” The Commission has confirmed that more is required than a bare commitment to comply with GALL and that an applicant must actually produce an AMP from which it can be demonstrated that what the applicant intends to do will comply with GALL.

Industry experience as accumulated by EPRI and others has confirmed that water chemistry control is insufficient to prevent cracking in divider plates for steam generator tubes and that some of these divider plates are attached to components of the reactor that are critical for safety and that may be adversely affected by such cracking. SSER at 3-18. NRC Staff has directed Entergy to “describe an inspection program (examination technique and frequency) to ensure that there are no cracks propagating into other items which are part of the reactor coolant pressure boundary (e.g., tubesheet and channel head) that could challenge the integrity of those adjacent items.” *Id.* Rather than describe the inspection program, Entergy has chosen instead to postpone any such description of an inspection program until industry guidelines for such inspections have been developed and thus not to produce the inspection program until sometime prior to the completion of the first 10 years of extended operation for IP3 and at the time of the first refueling outage after license extension for IP 2. *Id.* at 3-19. Even the interim inspection program to be used by Entergy pending development of industry guidance has not been disclosed

but consists merely of a general commitment to engage in some inspection program whose goal would be to find cracks in divider plates. *Id*

In the 1995 amendments to the license renewal rules, the Commission emphasized that all safety issues that might be relevant to license renewal were divided into two groups - those which were ongoing safety issues that are dealt with by ongoing Staff review and thus outside the scope of the license renewal and those involving the detrimental effects of aging during the license renewal term, the 20-year period of extended operations beyond the initial 40-year term provided by an initial operating license. *See* 1995 Statement of Considerations, 60 Fed. Reg. 22461, 22463 (May 8, 1995) (“A new § 54.30 has been added to distinguish between those issues identified during the license renewal process that *require resolution during the license renewal process* and those issues that require resolution during the current license term” (emphasis added)).

The objective of a license renewal review is to determine whether the detrimental effects of aging, which could adversely affect the functionality of systems, structures, and components that the Commission determines require review for the period of extended operation, are adequately managed. *The license renewal review is intended to identify any additional actions that will be needed to maintain the functionality of the systems, structures, and components in the period of extended operation. ... [A]ll systems, structures, and components evaluated based on time-limited aging analyses would be subject to a license renewal evaluation.*

1995 Statement of Considerations, 60 Fed. Reg. at 22464 (emphasis added). If the Commission intended that even issues related to “the detrimental effects of aging” could be dealt with solely by Staff/applicant interaction after the license renewal had been issued and without public or licensing board review, the distinctions in § 54.30 and the SOC would be meaningless. The pre-filed testimony of Drs. Lahey, Hopfenfeld, and Duquette from 2012 and today provides support for the State and Riverkeeper’s position that as to the approaches identified in this contention the

missing information is critical to making a determination as to whether the approach constitutes an effective aging management program or is consistent with GALL.

Staff and Entergy do not propose to eliminate a full review of the safety analyses that Entergy has now promised to do, but only to eliminate the role of the public and this Board in that review. This proposed extra-hearing resolution of important safety questions ignores the important role the public can and does play in helping to identify and resolve important environmental and safety issues.¹⁸ The public participation role is particularly to be preserved and encouraged where a sovereign state, such as the States of New York or Connecticut are involved, because of the federal government's solicitude of state interests and because states possess special rights and status in all licensing hearings which were protected by Congress in the Atomic Energy Act. 42 U.S.C. § 2021(l); *see Massachusetts v. U.S. Env't'l Protection Agency*, 549 U.S. 497, 520 (2007).

Long-standing NRC precedent confirms that key safety issues must be resolved in the hearing itself, not post-hearing by Staff. *Waterford Steam Electric Station*, Unit 3, ALAB-732, 17 N.R.C. 1076, 1103 (1983), *citing Consolidated Edison Co.* (Indian Point Station, Unit No. 2), CLI-74-23, 7 A.E.C. 947, 951 n.8, 952 (1974); *accord, Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 & 2), ALAB-298, 2 N.R.C. 730, 736-37 (1975); *Washington*

¹⁸ *See, e.g., Gulf States Utilities Company* (River Bend Station, Units 1 and 2), ALAB-183, Docket Nos. 50-458 and 50-459, 7 A.E.C. 222, 227-28 (Mar. 12, 1974); *Shaw Areva Mox Services* (Mixed Oxide Fuel Fabrication Facility), LB-08-11, Docket No. 70-3098-MLA, at 49 (June 27, 2008) (Farrar, J., concurring); Dale E. Klein, Chairman, U.S. Nuclear Regulatory Comm'n, Presentation to the Convention on Nuclear Safety: The U.S. National Report, at Slides 3 and 11 (Apr. 15, 2008), <http://www.nrc.gov/reading-rm/doc-collections/commission/>; Gregory B. Jaczko, Comm'r, U.S. Nuclear Regulatory Comm'n, Remarks to the OECD's Nuclear Energy Agency Workshop on the Transparency of Nuclear Regulatory Activities: Openness and Transparency-The Road to Public Confidence (May 22, 2007), <http://www.nrc.gov/readingrm/doc-collections/commission/>.

Public Power Supply System (Hanford No. 2 Nuclear Power Plant), ALAB-I13, 6 A.E.C. 251, 252 (1973); *Commonwealth Edison Co.* (Byron Nuclear Power Station, Units 1 & 2), LBP-84-2, 19 N.R.C. 36, 210 (1984), *rev'd on other grounds*, ALAB-793, 20 N.R.C. 1591, 1627 (1984); *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 & 2), ALAB-836, 23 N.R.C. 479, 494 (1986); *Public Service Co. of Indiana, Inc.* (Marble Hill Nuclear Generating Station, Units 1 & 2), ALAB-461, 7 N.R.C. 313, 318 (1978)(Board delayed issuance of a construction permit so it, and not a post-hearing Staff review, could resolve a safety issue); *accord* 1957 Congressional Record 4093-94 (March 21, 1957) (Statement of Senator Clinton Anderson).

The United States Supreme Court recognized that, pursuant to section 182(a) of the Atomic Energy Act (42 U.S.C. § 2232(a)), although definitive safety findings may not be required before issuance of a construction permit, such definitive findings must be made before issuance of an operating license. *Power Reactor Development Co. v. International Union of Elec., Radio and Mach. Workers, AFL-CIO*, 367 U.S. 396, 397 (1961)(“It is clear from this provision that before licensing the operation of PRDC’s reactor, the AEC will have to make a positive finding that operation of the facility will ‘provide adequate protection to the health and safety of the public.’”); *see also Union of Concerned Scientists v. NRC*, 735 F.2d 1437, 1451 (D.C. Cir.1984), *cert. denied*, 469 U.S. 1132 (1985) (holding that material licensing issues may not be excluded from a licensing hearing). Thus, in this operating license proceeding the Board is required to resolve all properly presented safety issues and cannot defer their resolution to Staff/applicant interaction after the license renewal decision has been made.

42 U.S.C. § 2133(b) makes it incumbent on NRC to find that a proposed operating license be issued only if NRC receives sufficient information from the applicant to demonstrate that issuance of the license will “protect the health and safety of the public” and 42 U.S.C. §

2133(d) provides that “no license may be issued to any person within the United States if, in the opinion of the Commission, the issuance of a license to such person would be inimical to the common defense and security or to the health and safety of the public.”

Entergy’s promise to provide the necessary information to support its assertion that the three identified AMPs will provide adequate protection for the “health and safety of the public” falls far short of the record evidence required to make defensible favorable findings on those issues. Furthermore, the Administrative Procedure Act (5 U.S.C. §§ 701 *et seq.*) and controlling Supreme Court precedent confirm the need for a rational basis to support an NRC decision to accept an AMP as adequate, including sufficient facts to sustain any legal conclusion. *See, e.g. Bowman Transp., Inc. v. Arkansas-Best Freight System, Inc.* 419 U.S. 281, 285-86 (1974), *quoting Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962)(the “agency must articulate a ‘rational connection between the facts found and the choice made’”); *Motor Vehicle Mfrs. Ass’n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 57 (1983); *see also Shieldalloy Metallurgical Corp. v. Nuclear Regulatory Commission*, 624 F.3d 489, 492-93 (D.C. Cir. 2010)(“we must ensure that the agency has ‘examine[d] the relevant data and articulate[d] a satisfactory explanation for its action including a “rational connection between the facts found and the choice made.”’ Encompassed in the latter duty, of course, is the obligation of an agency to explain any important changes of policy or legal interpretation. And agencies must evaluate parties’ proposals of ‘significant and viable’ alternatives.”) (internal citations omitted). As to the three AMPs identified in this contention, that necessary factual record is missing because Entergy is not providing any of the details required to determine whether what Entergy will do in the future constitutes an effective aging management program or is consistent with the GALL guidance.

The essence of Entergy's position, which NRC Staff accepts in the SSER and the SSER2, is that as long as Entergy provides a commitment to develop, in the future, plans and programs for an AMP that will be consistent with GALL or will meet regulatory requirements it has done all that is required for license renewal approval. As noted above this conflicts with well-established precedents, both by courts and the NRC, that a definitive finding of safety must be made prior to approval of any operating license and that finding must be based on minimum of relevant facts. That finding depends upon knowing the details of the AMP in order to be able to assess whether it will be consistent with GALL or regulatory requirements. A mere promise to provide the details cannot meet the standard.

POINT II

MANY OF ENTERGY'S PROPOSED APPROACHES FOR AGING COMPONENTS ARE NOT ENFORCEABLE BY THE FEDERAL GOVERNMENT, STATES, OR CITIZENS AND, THEREFORE, CANNOT SUPPORT THE REQUIRED REGULATORY AND STATUTORY FINDINGS

The State of New York and Riverkeeper have substantial concerns over whether Entergy's proposals memorialized in its 2011 regulatory communications with NRC and in NRC Staff's August 2011 Supplemental Safety Evaluation Report are enforceable in an NRC administrative enforcement proceeding or in a federal court action. Recent correspondence from NRC's Director of the Division of Reactor Safety reflects NRC Commission policy on this issue that is at odds with the position that Entergy has expressed in this proceeding.

A. Entergy and NRC Staff Offer Differing Accounts of What Is, and Is Not, Enforceable

Although Entergy represents that statements in the NRC Staff's SER bind Entergy's future actions, the SER is not binding and cannot be the source of a binding commitment. *See In the Matter of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.*

(Vermont Yankee Nuclear Power Station), Hearing Transcript at 1214:14-21 (July 23, 2008)

(“JUDGE KARLIN: The fact that there is something state[d] in the SER does not make it legally binding. It is not a legal commitment. It’s not a commitment. It’s not a licensed condition. It’s a statement. In fact, Judge Ferrar [sic], just recently had a case where the staff specifically took the position because it’s in the FSER does not make it binding at all.”).

Three years ago, NRC Staff clarified, in a the context of a relicensing issue at another Entergy plant, “how regulatory commitments fit into the overall hierarchical structure of licensing basis information for a nuclear power plant.” Letter, Christopher G. Miller to Sarah Hofmann, Vermont Department of Public Service, Regarding Response to Question in State of Vermont Letter of December 23, 2011 (Mar. 20, 2012), ML12103A1581 (“Vermont Yankee Letter”) (Exhibit NYS000396).¹⁹ In that formal communication to an agreement state, the NRC Director of the Division of Reactor Safety explained to Vermont that Regulatory Commitments, which are “explicit statements to take a specific action agreed to, or volunteered by, a licensee and submitted in writing on the docket to the NRC” . . . “are only appropriate for matters in which the staff has a significant interest but which do not warrant either a legally binding requirement or inclusion in the Updated Final Safety Analysis Report (‘UFSAR’) or a program subject to a formal regulatory change control mechanism.” *Id.*, enclosure at 1. As such, this letter from NRC Staff indicates that the regulatory commitments Entergy references do *not* become part of the UFSAR and are *not* legally binding.

¹⁹ This information is consistent with a Regulatory Issue Summary (“RIS”) promulgated in 2000 describing the NRC’s regulatory hierarchy. NRC Regulatory Issue Summary 2000-17, Managing Regulatory Commitments Made By Power Reactor Licensees To The NRC Staff (Sept. 21, 2000) ML003741774.

In the enclosure to the March 2012 letter, the Director of the Division of Reactor Safety distinguishes between: (1) legally binding obligations placed on a licensee (also known as regulatory requirements); (2) mandated licensing basis documents such as UFSAR, the quality assurance program, the security plan, and the emergency plan; and (3) commitments, which are the least enforceable. In addition, the Director indicated that:

[f]or commitments that have not been elevated into obligations or a licensing basis document licensees may change the commitments using the guidance described in Nuclear Energy Institute (NEI) document NEI 99-04, 'Managing NRC Commitment Changes,' July 1999 (ADAMS Accession No. ML003680088), or similar licensee-specific administrative controls. Some commitment changes require prior NRC approval and some changes may be made without NRC prior approval.

Id., enclosure at 2. In other words, the Applicant has the power to change any commitments that NRC Staff does not include in licensing basis documents, some without notice even to the NRC.²⁰ If the Applicant, at its own discretion, decides to provide notice to the NRC, there is still no opportunity for public notice or for the public and the State to participate in an Atomic Energy Act § 189 proceeding concerning the decision over whether to allow the change. Moreover, Staff points out that NEI 99-04, as an industry guidance document, is “not considered a regulatory requirement and is therefore not binding on licensees.” Vermont Yankee Letter, enclosure at 2. Consequently, neither the NRC nor the public (or the State) may even be aware when Entergy relaxes certain “commitments” it made during license renewal, and there is, apparently, little that NRC Staff can do about that.

The Director’s Letter also states that:

[t]he escalation of commitments into license conditions (*i.e.*, obligations), requiring prior NRC approval of subsequent changes, is reserved for matters that satisfy the criteria for inclusion in technical specifications by 10 CFR 50.36 or

²⁰ Depending on the dictates of NEI 99-04, an industry-promulgated document.

inclusion in the license as a license condition to address a significant safety issue or actions that the NRC staff has relied on to make a finding of reasonable assurance.

Id., enclosure at 1. The Director goes on to say that “If the NRC staff determines that it must rely on certain commitments as part of its approval for the license renewal application, those commitments can be elevated into obligations (*i.e.*, license conditions) or subsequently incorporated into a mandated licensing basis document.” *Id.* Thus, it would appear that commitments Entergy made in docketed licensing correspondence do not necessarily become binding unless Staff decides they should, and as Staff has not yet made any such determination, Staff will not even be notified if Entergy changed these commitments. This is unacceptable to the State of New York, and marks Entergy’s proposed approaches to aging management of steam generator components and reactor coolant pressure boundaries as insufficient.

One of the State’s objectives in this proceeding is to ensure that any future deviation by Entergy from any of the statements relied upon by the Board can only occur by the filing of a licensing amendment and following all the relevant procedures for such amendment in 10 C.F.R. §§ 50.59 and 50.90, 50.91 and 50.92. The State also seeks to ensure that any such deviation cannot be ignored by Staff or excused by Staff through the application of the exemption provision of 10 C.F.R. § 50.12 or similar exceptions provisions. Recent pronouncements from NRC Staff describing the enforceability or lack thereof of many types of “commitments” raise doubts about the binding and enforceable nature of many of the elements of Entergy’s proposed approach to aging management issues and actual aging management programs.

B. The State's Concern is Supported by a 2011 NRC Inspector General Report Finding that NRC Staff Routinely Fails to Monitor Licensee Commitments

To whatever extent a statement made either by Entergy or NRC Staff (whether called a “commitment,” an “obligation,” or some other term) regarding actions to be taken to manage age related degradation at Indian Point is relied upon by the Board to resolve an issue or make a decision on any matter in this proceeding, that statement must be enforceable in the future by NRC Staff and by the public through operation of 10 C.F.R. §§ 50.100, 2.206, or other means available under NRC regulations or applicable statutes. This is of particular concern to the State because in 2011 the NRC Inspector General (“OIG”) issued an Audit of NRC’s Licensee Commitments that found that NRC Staff routinely fail to monitor licensee commitments. *See* NRC Office of the Inspector General Audit of NRC’s Management of Licensee Commitments, OAG-A-17 (Sept. 19, 2011), ML112620529 (“OIG Report”) (Exhibit NYS000171). According to the OIG, “[t]he audit objective was to assess the extent to which NRC appropriately and consistently utilizes and manages regulatory commitments for power reactor licensees.” OIG Report at ii.

As an initial matter, the OIG Report differentiates between “commitments” and “regulatory commitments”, defining commitments as “docketed, written statements describing a specific action that the licensee has agreed or volunteered to take [which] often result from a licensing action such as a license amendment, including power uprates, or from a generic communication, such as generic letters and bulletins” and notes that “[c]ommitments are neither legally binding nor obligations of a license; however, a commitment may be escalated into a legally binding obligation only if NRC staff deems that the commitment is essential for ensuring public health and safety.” OIG Report at ii. It then notes that “[a]lthough the term ‘regulatory

commitment’ is not defined in NRC’s regulations, commitments are used in the context of interactions between NRC and licensees for commercial nuclear reactors. The license renewal rule—Title 10, Code of Federal Regulations, Section 54.3 (10 CFR § 54.3)—references commitments in the definition of a ‘current licensing basis.’” OIG Report at 1.²¹ The OIG also observed that the NRC endorsed the Nuclear Energy Institute (NEI) guidance document NEI-99-04, *Guidelines for Managing NRC Commitment Changes*, which the agency found to be an acceptable method for licensees to follow for managing and changing their commitments to NRC.²²

The OIG Report concluded that: (1) the NRC inconsistently implements the audits of licensee commitment management programs; (2) the definition and use of commitments is not consistently understood throughout the agency, which occurs because NRC training on commitments is insufficient; and (3) the NRC does not systematically track commitments because the agency lacks an adequate tool for tracking them, in part, because the agency has not identified a need for such a tool and that as a result, the NRC cannot completely ensure oversight of commitments, which has implications for the agency’s continuing awareness of significant commitments. OIG Report at iii. The OIG Report also makes clear that “[l]icensees are responsible for creating, tracking, and handling all commitments made to NRC.” OIG Report at 1. Thus, it appears to the State that many of the “commitments” Entergy has made during the 2011 dialogue that led to the issuance of the Supplemental Safety Evaluation Report are not only

²¹ It is not clear how the OIG’s definitions of “commitment” and “regulatory commitment” square with the definition offered in the Vermont Yankee Letter, which seems to use the terms “commitment” and “regulatory commitment” interchangeably.

²² NRC Staff points out that NEI 99-04, as an industry guidance document, is “not considered a regulatory requirement and is therefore not binding on the licensees.” Vermont Yankee Letter, enclosure at 2.

not binding or enforceable, but are not even tracked by the NRC Staff. In the State's view, this falls far short of the evidence necessary to support a "reasonable assurance" finding.

The OIG Report notes that "NRC management asserts that once a commitment is escalated into a requirement, it is no longer a commitment, but rather it becomes a legal obligation and must be converted to an NRC enforceable requirement, such as a condition of the facility operating license." OIG Report at 2. Not only must an Entergy commitment be accepted by Entergy and Staff as "requirement" and a "legal obligation" but it must also be clear that any change to that commitment will obligate Entergy to seek an amendment to the license in order to alter any commitment made by Entergy upon which the Board relies in reaching its final decision. Without these explicit obligations attaching to Entergy's statements, the Board will not have a basis to make a reasonable assurance finding. There cannot be reasonable assurance that operation of the Indian Point reactors for the next twenty years will not be inimical to the public health and safety if Entergy's assertions in support of such a finding are not enforceable and can be changed without going through a process which provides an opportunity for public participation.

CONCLUSION

In this proceeding, the State of New York and other intervenor parties have satisfied the standards contained in 10 C.F.R. § 2.309 governing contention admissibility – standards that NRC and Entergy have described as “strict by design.” The State and Riverkeeper now submit this Statement of Position and accompanying testimony and exhibits to show that Entergy has not met its burden; that is, Entergy has not demonstrated that the effects of aging on the intended function(s) of steam generator components and other components in the reactor coolant system and reactor coolant pressure boundary will be adequately managed for the period of extended operation. For the above reasons Entergy’s application to renew the operating licenses for Indian Point Unit 2 and Unit 3 should be denied.

Respectfully submitted,

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