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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. October 22, 2010  
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STATE OF NEW YORK'S JOINT REPLY TO ENTERGY AND NRC STAFF'S  
SEPARATE ANSWERS TO THE STATE'S ADDITIONAL BASES FOR  
PREVIOUSLY-ADMITTED CONTENTION NYS-25

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## PRELIMINARY STATEMENT

The State of New York, as authorized by 10 C.F.R. § 2.309(h)(2), respectfully submits this joint reply to the two separate Answers filed by Entergy and NRC Staff to the State's Additional Bases For Previously-Admitted Contention NYS-25.

Although Entergy and NRC Staff present more than forty pages of argument opposing the State of New York's recent filing, they do not dispute a central point of the State's Additional Bases and Supporting Evidence, namely that Entergy's recently-submitted aging management program ("AMP") for reactor pressure vessel internals ("RPVIs") does not address the impacts a severe shock load event could have on embrittled and fatigued internal components. Notably, that basis has already been admitted as a basis in support of NYS-25. *Entergy Nuclear Operations, Inc.*, (Indian Point Units 2 and 3), Memorandum and Order (Ruling on Petitions to Intervene and Requests for Hearing), LBP 08-13, 68 N.R.C. 43, 131 (July 31, 2008)("Contention Admissibility Order"). Entergy and NRC Staff also do not dispute another central point of the State's filing, namely that Entergy's recently-submitted AMP does not address the synergistic effects of embrittlement and fatigue on RPVIs.

Instead of responding to or contesting these central points, both Entergy and NRC Staff present diversionary arguments that misstate or mischaracterize the State's submission and the admissibility standards. Since substantial portions of the Applicant's Answer to Amended Contention [sic] New York State 25 Concerning Aging Management of Embrittlement of Reactor Pressure Vessel Internals [sic] ("Entergy Answer") and NRC Staff's Answer to State of New York's Motion for Leave to File Additional Bases for Previously-Admitted Contention NYS-25 ("NRC Staff Answer") address issues that either mischaracterize or misstate the

standards applicable to admissibility of the proposed new bases in support of the State's Contention 25, it is necessary to re-examine the status of Contention NYS-25 and the relief the State seeks.

### **BACKGROUND AND PROCEEDINGS TO DATE**

Contention NYS-25, as admitted, without qualification, alleges:

Entergy's License Renewal Application Does Not Include an Adequate Plan to Monitor and Manage the Effects of Aging Due to Embrittlement of the Reactor Pressure Vessels ("RPVs") and the Associated Internals.

In admitting Contention NYS-25 the Board identified the scope of the contention, including its bases:

NYS submits that "embrittlement of the RPVs and their associated internals is one of the most important age-related phenomena . . . [and that] [f]ailure to carefully consider the effects of embrittlement could result in a meltdown of the core . . ." This claim is supported by the Declaration of Dr. Richard Lahey, a Professor of Engineering at Rensselaer Polytechnic Institute, who is of the opinion that components in the Indian Point reactors have serious embrittlement issues that are not adequately addressed in Entergy's LRA. Specifically, Dr. Lahey indicates that a "degradation in ductility" (embrittlement) will adversely affect the reactor's ability to withstand pressurized thermal shock transients and that Entergy's LRA only briefly, in Sections A.2.2 and A.3.2, mentions thermal shocks and does not demonstrate that the Applicant took embrittlement into account when addressing the effect of these transient loads. Dr. Lahey states that Entergy fails to document in its LRA "any experiments or analysis to justify that the embrittled RPV internal structures will not fail and that a coolable core geometry will be maintained[ed] subsequent to a [Design Basis Accident] LOCA." According to Dr. Lahey "[t]his is a serious and unacceptable omission by Entergy because embrittled structures are known not to tolerate shock loads well."

Whether an AMP is necessary to manage the cumulative effects of embrittlement of the RPVs and associated internals is within the scope of this proceeding. The Lahey Declaration focuses on

specific portions of Entergy's LRA that are, in Dr. Lahey's professional judgment, deficient. NYS has raised a genuine issue to be resolved at an evidentiary hearing. NYS-25 is admitted.

Contention Admissibility Order, 68 N.R.C. at 131 (footnotes and emphasis omitted).

## ARGUMENTS IN REPLY

### I. THE STATE SATISFIED THE CONTENTION ADMISSIBILITY REGULATIONS

As this Board has stated, pursuant to 10 C.F.R. § 2.309(f), an admissible contention must:

(1) provide a specific statement of the legal or factual issue sought to be raised; (2) provide a brief explanation of the basis for the contention; (3) demonstrate that the issue raised is within the scope of the proceeding; (4) demonstrate that the issue raised is material to the findings the NRC must make to support the action that is involved in the proceeding; (5) provide a concise statement of the alleged facts or expert opinions, including references to specific sources and documents, that support the petitioner's position and upon which the petitioner intends to rely at hearing; and (6) provide sufficient information to show that a genuine dispute exists with regard to a material issue of law or fact, including references to specific portions of the application that the petitioner disputes, or in the case when the application is alleged to be deficient, the identification of such deficiencies and supporting reasons for this belief.

Contention Admissibility Order, 68 N.R.C. at 60-61. The State's new proposed bases meet the Board's standards, which require at the contention admissibility stage only that the petitioner provide an expert opinion or "some alleged fact, or facts, in support of its position." Contention Admissibility Order, 68 N.R.C. at 64, n.46, *citing* 54 Fed. Reg. at 33,170 ("This requirement does not call upon the intervenor to make its case at this stage of the proceeding, but rather to indicate what facts or expert opinions, be it one fact or opinion or many, of which it is aware at that point in time which provide the basis for its contention.").

The State of New York, both in its admitted contention and the original bases and its

proposed additional bases provides, as required by 10 C.F.R. § 2.309(f)(1)(ii), a brief explanation of the bases for the State's criticism of the adequacy of the AMP proposed by Entergy to address embrittlement of RPVIs.<sup>1</sup> Those brief bases reference the specific portions of the LRA and of the amendment to the LRA which are deficient and explain the reason for the deficiency. The bases are accompanied by sufficient information to demonstrate that there is a material dispute of fact – a dispute underscored by Entergy's wide-ranging attack against Dr. Lahey's carefully presented and well-supported opinions. Entergy wants to prove that it is right and the State of New York is wrong, and, of course it has every right to try to do that. However, that dispute is to be resolved at an evidentiary hearing, not now as part of the consideration of whether to admit the amended bases.

**II. ENTERGY MISCHARACTERIZES THE STATE'S ADDITIONAL BASES AND IGNORES THIS BOARD'S PREVIOUS LBP 10-13 RULING ADMITTING THE STATE'S EMBRITTLEMENT CONTENTION**

The State's proposed new bases, by their terms, refer only to the RPVIs and focus on Entergy's July 14, 2010 AMP for RPVIs in the form of Amendment 9 to the LRA presented in NL-10-063. The proposed bases do not mention the reactor pressure vessel ("RPV") nor do the paragraphs describing the supporting evidence for these bases.<sup>2</sup> Thus, all of Entergy and NRC

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<sup>1</sup> The original bases for NYS-25 also remain viable as the concerns raised therein still persist, even though Entergy has now offered an AMP with some specific provisions in it. Apparently Entergy and NRC Staff agree as they did not even choose to file a summary disposition motion with regard to NYS-25 after Entergy filed LRA Amendment 9.

<sup>2</sup> The State of New York's Motion for Leave to File Additional Bases notes, out of an abundance of caution, the undeniable fact that the new program offered by Entergy does not provide an AMP for the RPV. Since the original contention as admitted challenges this failure by Entergy, it was appropriate to mention that shortcoming in the motion. In any event, the issue before the Board is admissibility of the additional bases, not admissibility of statements contained in the Motion for Leave.

Staff's arguments regarding an alleged "misstep" (Entergy Answer at 2) are both wrong and irrelevant. If Entergy or NRC Staff believe that Dr. Lahey's valid criticisms of Entergy's plans for addressing aging of the RPV due to embrittlement are beyond the scope of the admitted contention, the place to make those arguments is in a motion *in limine* should either of them have a valid basis to believe that Dr. Lahey's Direct Testimony addresses issues that are outside the scope of NYS-25.

Entergy also insists on mischaracterizing what the State of New York has filed. The State is not seeking to amend Contention NYS-25. That contention and all of its initial bases have already been admitted, and the time to challenge that admission – either by a motion for reconsideration or an appeal to the Commission – has passed. The State here seeks only to add additional bases based on changed circumstances.

Moreover, this Board has previously acknowledged and admitted NYS-25 which is based, in part, on one of the State's key concerns – the impact of shock load transients to RPVIs – and that ruling has been the law of the case for two years. Contention Admissibility Order, 68 N.R.C. at 131. Entergy's arguments are inconsistent with that ruling and should be rejected.

### **III. NEITHER ENTERGY NOR STAFF HAVE SHOWN THAT THE PROPOSED BASES ARE NOT ADMISSIBLE**

The regulation applicable to the requirements for addressing the impact of embrittlement on RPVIs during the period of extended operation is 10 C.F.R. § 54.21(a)(3) which provides that the applicant shall:

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

*Id.* Entergy agrees. Entergy Answer at 5. *See also* 10 C.F.R. § 54.21(c)(1)(iii) (“The applicant shall demonstrate that . . . (iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation”). Contention NYS-25 alleges that the plan proposed by Entergy to meet those requirements is inadequate.

The proposed new bases, like the original admitted bases, identify specific failures in Entergy’s AMP for management of the embrittlement of RPVIs and now, with a specific plan proposed, focus on the deficiencies in that plan.<sup>3</sup> The original bases essentially challenged Entergy’s AMP because it was no more than a plan to create a plan and ignored fundamental aspects of RPV and RPVI potential shock loads. Petition at 223-27. Those bases remain valid as the concerns expressed are not addressed in the AMP offered by Entergy. On July 15, 2010, Entergy offered a program to address embrittlement of RPVIs. Amendment 9 to License Renewal Application: Reactor Vessel Internals Program (NL-10-063) (“NL-10-063”). Unfortunately, it did not address the concerns raised by NYS-25, and, with a proposed program now available, New York, for the first time, had an opportunity to challenge specific deficiencies in the AMP. The new plan incorporates by reference a yet to be approved report prepared by EPRI (Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-Rev. 0) (“MRP-227”). The proposed new bases arise out of that plan and its shortcomings and identify the following deficiencies in

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<sup>3</sup> Contrary to Entergy’s repeated assertions, this is not a contention of omission. Entergy has offered an AMP for RPVIs. The State has challenged that AMP on the merits as being inadequate. If every challenge to the inadequacy of an AMP for failing to address a particular issue or for addressing it inadequately were a contention of omission, then all contentions would be contentions of omission and much of the language in 10 C.F.R. §§ 2.309(f)(i)-(vi) would be surplusage.

Entergy's plan:

1. It fails to consider the synergistic impact of metal fatigue and embrittlement when addressing the impact of embrittlement on RPVIs and, as noted in the already admitted contention and bases, these phenomena must be addressed in order to assure that there is a coolable geometry when there are serious shock load stresses which can lead to RPVI failures;
2. While accepting the need for "baseline" examinations, it fails to provide criteria to determine when a meaningful and precise deadline for these examinations will occur prior to extended operation;
3. It fails to provide any criteria to determine when and how compromised RPVIs will be replaced and/or repaired;
4. It rejects any measures to prevent or reduce the effects of embrittlement;
5. Without adequate justification, it relies on less effective means of surveillance and monitoring of RPVI embrittlement when more effective means are available; and
6. It relies on commitments to take various actions in the future although there is substantial evidence that Entergy has a history of not fulfilling its commitments to take corrective actions when they are called for.

**A: Entergy And Staff Are Incorrect in Asserting That Compliance With GALL or Other Guidance Documents Equates With Regulatory Compliance**

Both Entergy and NRC Staff appear to believe that the only way the State of New York can offer valid bases to support the admitted contention is to provide citation to specific regulatory provisions that require Entergy to have a specific kind of AMP program for RPVIs. That argument is particularly indefensible in the face of the absence of any regulatory provision, or even NRC guidance documents, identifying any specific AMP obligations regarding RPVIs. Rather, the Standard Review Plan for License Renewal ("SRP-LR"), while being careful to say that compliance with GALL is not required and that additional measures not included in GALL may be appropriate (*see* NUREG-1800, Rev. 1 at 3.0-2) directs attention to GALL which merely says:

No further aging management review is necessary if the applicant provides a commitment in the FSAR supplement to (1) participate in the industry programs for investigating and managing aging effects on reactor internals; (2) evaluate and implement the results of the industry programs as applicable to the reactor internals; and (3) upon completion of these programs, but not less than 24 months before entering the period of extended operation, submit an inspection plan for reactor internals to the NRC for review and approval.

NUREG-1801, Vol. 2, Rev. 1 at IV B2-4. That is the commitment that Entergy included in its original LRA, which formed the basis for admission of NYS-25. Now Entergy has found it necessary to file a real AMP for addressing embrittlement of RPVIs. However, the proposed AMP does not come from an NRC regulation or NRC guidance document but comes instead from a report prepared by an industry sponsored organization, EPRI, which report has yet to be accepted even by NRC Staff and is certainly not a regulatory requirement. See MRP-227 at 7-2. As the Commission recently observed in a different context, even if GALL did include an AMP like that which Entergy proposes here, that would not immunize the AMP from challenge for its insufficiency in a license renewal proceeding. *Entergy Nuclear Vermont Yankee, L.L.C.* (Vermont Yankee Nuclear Power Station), CLI-10-17 at 45 and 47 (July 8, 2010).<sup>4</sup>

**1. Compliance with GALL Does Not Equate with Regulatory Compliance**

Entergy's answer to these deficiencies identified by the State and its expert is primarily to assert that because they are not regulatory requirements and do not appear in GALL or Staff's

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<sup>4</sup> In its Answer, NRC Staff goes so far as to criticize the new bases because they rely upon Dr. Lahey's professional opinion that the currently-proposed AMP is inadequate, claiming it is unacceptable to rely on the opinion of an expert and not on a specific regulatory requirement. NRC Staff Answer at 8 ("these claims constitute New York's (or its expert's) personal view of what should be required in an AMP for reactor vessel internals"). There is no legal basis for such criticism.

SRP-LR they are irrelevant. But neither GALL nor the SRP-LR is a regulation, and proof of compliance with those reports does not foreclose a contention based upon the failure of the report or the LRA to meet regulatory standards. As the Commission recognized 36 years ago:

At the outset, we observe that the Appeal Board correctly required the Regulatory Staff to bear the burden of supporting Safety Guide 7, once its validity was called into question. Safety Guides (and the newer Regulatory Guides) merely set forth methods acceptable to the regulatory staff of implementing specific parts of Commission regulations. While they are entitled to considerable prima facie weight because of the important day-to-day responsibilities of the Regulatory Staff in effectuating Commission policy, these guides do not themselves have the force of regulations.

*Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), CLI-74-40, 8 AEC 809, 811 (1974); accord *Duke Energy Corp.* (*McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2*), LBP-03-17, 58 N.R.C. 221, 240-41 (2003). NRC NUREGs, Regulatory Guides, Standard Review Plan, and other guidance documents are routine agency policy pronouncements that do not carry the binding effect of regulations. *State of New Jersey v. NRC*, 526 F.3d 98, 102 (3d Cir. 2008); *International Uranium (USA) Corp.*, CLI-00-1, 51 N.R.C. 9, 19 (2000). In this contested proceeding on this contested issue, the regulatory sufficiency of Entergy's AMP must be demonstrated with the same reasoning and evidence that would have been employed if the GALL Report had never been issued. *Pacific Gas & Electric Co. v. Federal Power Com'n*, 506 F. 2d 33, 38-39 (D.C. Cir. 1974); see also *Guardian Federal Savings & Loan Association v. Federal Savings & Loan Insurance Corp.*, 589 F.2d 658, 666 (D.C. Cir. 1978) (an agency must be prepared to defend its position and "cannot claim that the matter is foreclosed by the prior policy statement."). Entergy's assertion that its recently proposed RPVI AMP satisfies the GALL Report does not allow the NRC or Entergy to escape

the responsibility of proving that Entergy has proposed a specific program that will meet the requirements of 10 C.F.R. §54.21(a)(1) by effectively managing the effects of aging throughout the additional twenty years of the license renewal period.

At most, the failure of GALL or the SRP-LR to address the shortcomings raised by New York's amended bases provides support for Entergy's position. Thus, a material dispute exists between what Entergy believes it should do and what the State and its expert believe should be done. In fact, neither GALL nor the SRP-LR actually have any detailed requirements for addressing embrittlement of RPVIs during extended operation, a fact Entergy readily acknowledges. *See* NL-10-063 at 84 ("Revision 1 of NUREG-1801 [GALL] includes no aging management program description for PWR reactor vessel internals"). Those documents merely reference each other or reference industry efforts to develop a plan for embrittlement of RPVIs.

## **2. Compliance with MRP-227 Does Not Equate with Regulatory Compliance**

The industry effort to come up with its own plan is contained in MRP-227, upon which Entergy relies for its recently-proposed AMP to address the degradation of RPVIs from various aging mechanisms including embrittlement and fatigue. NL-10-063 at 8. The State of New York's bases explicitly identify the shortcomings in that document.

Not only is the industry draft document not a regulation, it has not even been approved by NRC Staff as an acceptable guidance document.<sup>5</sup> Entergy treats the unofficial, unapproved

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<sup>5</sup> Entergy acknowledges that NRC Staff review of MRP-227 is "ongoing." Entergy Answer at 8. Recently, NRC Staff raised questions about MRP-227. *See* Request for Additional Information No. 4 re MRP-227 (Aug. 30, 2010), ML102310552. Indeed, just last week, industry representatives spent two days (October 13 & 14, 2010) meeting with NRC Staffers to discuss several open questions about EPRI's MRP-227. *See* NRC Staff memorandum re stakeholder meeting to discuss EPRI response to request for additional information re MRP-227 – Rev. 0

EPRI document, upon which Entergy relies on as the basis for its proposed program, as if it were a code that had been formally adopted by the Commissioners through an Administrative Procedure Act-vetted and approved regulatory amendment to 10 C.F.R. § 50.55a. MRP-227, however, has no such status and represents, at best, an opinion which is directly contradicted by the State and its expert, Dr. Lahey.

Entergy asserts that “a meaningful analysis of the RVI Program and MRP-227 clearly demonstrates that NYS’s claim that the RVI Program is deficient lacks factual support” and that, for instance, MRP-227’s Table 4-3 lays out the timeframe in which baseline inspections of certain RPI components will be done. But by Entergy’s own admission, MRP-227 does not suggest baseline inspections to take place until after license renewal. Translating MRP-227’s proposed timeline (which is phrased in Effective Full-Power Years (“EFPY”)) into calendar years, Entergy does not commit to complete some baseline inspections until approximately 20% of the way into the period of extended operation.<sup>6</sup> Entergy Answer at 16-17; MRP-227, Table 4-3 (baseline examination should be performed within 20-40 EFPY, varying by component). It is the State’s position that these inspections, which Entergy has now agreed to do at some point, should be done prior to license renewal to minimize, to the greatest extent possible, the risk of failure of these critical components and the safety risks that would accompany that failure. *See* Lahey Sept. 15, 2010 Decl., ¶ 19. Entergy has offered no sound reason why that cannot or should not be done.<sup>7</sup>

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(Oct. 1, 2010), ML102740510.

<sup>6</sup> Based on Entergy’s statement that the end of the 20 year period of extended operation (*i.e.*, 60 calendar years) is equal to 48 EFPY.

<sup>7</sup> Contrary to Entergy’s argument (at 17), the State does not seek to re-litigate NYS 23. However, since *Entergy* recently introduced a baseline inspection for RPVIs into this LRA

**B. Entergy's AMP for RPVIs Omits Consideration of Synergistic Effects**

Entergy and NRC Staff purport to not understand what Dr. Lahey means when he says that the AMP for RPVIs fails to consider the synergistic effect of embrittlement and other factors operating on the RPVIs. In fact, they mistakenly assume that because several programs address potential problems with RPVIs the current programs already address synergy. However, merely listing programs that, independently of each other, may address aspects of RPVI degradation during an extended operating period misses the entire point of Dr. Lahey's concern with synergism. NRC case law illustrates that "synergy" does not merely refer to several individual activities acting independently of each other but refers to, as does Dr. Lahey, consideration of the cumulative effect of several phenomena. *See, e.g., System Energy Resources, Inc.* (Early Site Permit for Grand Gulf Site), Docket No. 52-009-ESP (October 3, 2006) Attachment A (Question 61) ("How is cumulative impact being defined. Is it the sum construction/operations/decommissioning of the proposed ESP plant(s), the sum of synergy from several different impacts, or the sum of the impacts from the existing plant and the proposed ESP plant(s)"); *Virginia Electric and Power Co.* (Surry Power Station, Units 1 and 2), DD-79-19, 10 N.R.C. 625, 1979 NRC LEXIS 20 at 33, n. 12 (1979). The existence of several independent programs that look at an aspect of RPVI degradation without requiring consideration of the cumulative, or synergistic, impact of these degradation mechanisms is a key point that Dr. Lahey has made in his September 15, 2010 Declaration now that Entergy has produced an AMP for RPVI embrittlement which does not require consideration of the synergistic impacts of all the degradation mechanisms. *See* Lahey Sept. 15, 2010 Decl., ¶ 13 (where Dr. Lahey makes this

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proceeding, the State should be free to present a contention on the adequacy of Entergy's recent proposal.

point and provides a brief discussion of the scientific reasoning that supports his position).

**C. NRC Staff's Cross Reference to Other Programs is a Red Herring**

NRC points to LRA § 3.1.2.1.2 in opposition to the State's filing. NRC Staff Answer at 10. But none of the aging management programs identified in that section address the fatigue mechanisms that Dr. Lahey's September 15, 2010 declaration and the proposed bases focus on, and there is no indication whatsoever that the age-related degradation effects of embrittlement and fatigue on RPVIs are to be examined synergistically. Moreover, just as with the initial 2007 LRA, none of the aging management programs identified in LRA § 3.1.2.1.2 as amended by LRA Amendment No. 9 examine the possible failure of the in-vessel components and structures that have been subjected to age-related degradation since the reactor commenced operation during a transient pressure or thermal shock event, such as those due to a LOCA or ATWS. As noted in Dr. Lahey's September 15, 2010 declaration (§ 14), the failure of the RPVIs can lead to an uncoolable core geometry and thus core melting may occur. Consistent with this Board's LBP-08-13 ruling, the omission – which existed in the initial LRA and continues in LRA Amendment 9 – alone justifies the admission of the State's additional bases. Contention Admissibility Order, 68 N.R.C. at 131 (State's criticism that LRA failed to take account of impact of pressure/thermal shock transients on RPV components supported admissibility of proposed contention).

NRC Staff (at 10) argues that the State's concerns are addressed and fully dispositioned by three other Aging Management Programs: (1) Inservice Inspection, (2) Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel, and (3) Water Chemistry and Control. However, the LRA's description of these three programs refutes Staff's argument:

- Inservice Inspection. The Inservice Inspection Aging Management Program proposed by Entergy does not address the State's concerns about RPV Internals because, by its terms, it does not examine or evaluate the synergistic effects of embrittlement and fatigue leading to component failures and compromised core cooling during a transient shock event, such as those due to a LOCA or ATWS. Entergy LRA, Appendix B, p. B-63 - B-68, § B.1.18.
- Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel. The Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel Aging Management Program proposed by Entergy does not address the State's concerns because, by its terms, it does not examine or evaluate the synergistic effects of embrittlement and fatigue leading to component failures and compromised core cooling during a transient shock event, such those due to as a LOCA or ATWS. Entergy LRA, Appendix B, p. B-127 - B-128, § B.1.38. Moreover, the State's concerns extend to many RPV internals that are not composed of cast austenitic stainless steel (CASS).
- Water Chemistry Control – Primary and Secondary Program. The Water Chemistry and Control – Primary and Secondary Aging Management Program does not address the State's concerns because, by its terms, it does not examine or evaluate the synergistic effects of embrittlement and fatigue leading to component failures and compromised core cooling during a transient shock event, such as those due to a LOCA or ATWS. Entergy LRA, Appendix B, p. B-137 - B-139, § B.1.41.

NRC Staff also refers to the Reactor Vessel Head Penetration Inspection Program (at 10, n. 24). The Reactor Vessel Head Penetration Inspection Program is concerned with primary water stress corrosion cracking (PWSCC) of nickel-based alloy reactor vessel head penetrations and their associated seal welds, which are exposed to borated water, to ensure that the pressure boundary function is maintained. This program was developed in response to NRC Order EA-03-009 and the initial (*i.e.*, 2002) Davis Besse reactor head corrosion incident. *See* Entergy LRA, Appendix B, p. B-109, § B.1.31.<sup>8</sup>

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<sup>8</sup>As noted in the State's September 15, 2010 submission, Davis Besse reported degradation of the reactor vessel's control rod drive mechanism and welds in 2010 thereby underscoring the persistence and materiality of such materials/component degradation. *See* Lahey Sept. 15, 2010, Decl., ¶ 17.

- Reactor Vessel Head Penetration Inspection. The Reactor Vessel Head Penetration Inspection Aging Management Program does not address the State's concerns because, by its terms, it does not examine or evaluate the effect of a transient thermal shock such as a LOCA or ATWS on the control rod cluster assemblies and the control rod penetrations and their seal welds, which may be weakened by primary water stress corrosion cracking. Entergy LRA, Appendix B, p. B-109 - B-110, § B.1.31. These seal welds are *inside* the RPV, and hence are a RPV internal component. If these compromised welds fail due to accident-induced shock loads, reactivity (and reactor power) excursions due to control rod ejection might occur, leading to core melting. Moreover, the control rod cluster assemblies are in, or are very near the core, and are thus subject to extensive embrittlement and fatigue, which, in turn, can compromise their integrity during transient shock load events, and their failure and relocation could lead to compromised core cooling.

NRC Staff (at 9) and Entergy (at 12) make similar arguments that the State's concerns about control rod components are out of scope. Entergy argues that control rods are not subject to aging management review (and presumably Part 54) because they are moving parts and change configuration. Those arguments appear inconsistent with GALL's recognition that at least portions of the rod control cluster assemblies fall within the RPV *internals* category. GALL, Rev. 1, IV B2-1, IV B2-20 – B2-23. Furthermore, MRP-227 recognizes control rod components and their associated welds as RPV internals. MRP-227 at 4-24, Table 4-3 (“Westinghouse plants Primary components”) (including CRGTA guide plates and lower flange welds within scope of program); *id.*, at 3-23, Table 3-3 (“Final disposition of category B and C Westinghouse internals”) (discussing various CRGTA components).

**D. Entergy's Proposed RPVI AMP Lacks Enforceable Requirements and Relies on Visual Examinations that are not Adequate**

Entergy argues that MRP-227 does provide guidance regarding the timing of inspections (at 16-17), but MRP-227 (and by extension the proposed AMP contained in NL-10-063) simply provide too much flexibility extending over many years to be meaningful or enforceable. For example, in some instances the offending component need not be replaced for up to two refueling

outages after the of extended operations (*i.e.*, four years at the Indian Point reactors which have a two year refueling cycle). MRP-227, Table 4-3 (“Examination Method/Frequency” column).

The State properly presented a basis criticizing NL-10-063 for vague commitments to some undefined action in the future. MRP-227 is replete with phrases such as “should,” “could,” “may,” and “assumed.” These terms render MRP-227, which is itself only a guideline, unenforceable. *See, e.g.*, MRP-227 at 6-9; *id.*, at 6-1 (“various options ... are available for the disposition of conditions detected during examinations ... that are unable to satisfy the examination acceptance criteria”).

Notably, MRP-227 also contains text that raises question about how Entergy will inspect for and manage RPVI embrittlement. While MRP-227 and NL-10-063 seem to imply that a licensee will examine RPVIs for signs of embrittlement, footnote 1 to MRP-227 Table 3-3 states as follows:

The significance of thermal and irradiation embrittlement is directly related to the probability of a flaw existing in the component. *There are no recommendations for inspection to determine embrittlement level because these mechanisms cannot be directly observed.* However, potential embrittlement must be considered in flaw tolerance evaluations.

MRP-227, p. 3-23 – 3-24, Table 3-3, “Final Disposition of Category B and C Westinghouse internals,” note 1 (emphasis added). The recognition that embrittlement mechanisms “cannot be directly observed” further supports the State’s previously-expressed concerns about the effectiveness of visual exams.

Entergy and Staff seek to avoid that portion of the State’s new bases regarding the inadequacy of visual examinations by arguing that the State did not provide an expert statement on this point. While the State readily acknowledges that it did not tender an expert statement on

this topic, Entergy and Staff do not come to grips with fact that there was no obligation or need for the State to do so at this juncture. Indeed, the State's basis on this point is supported by statements in MRP-227 that on their face acknowledge the weaknesses associated with conducting so-called VT-3 visual examinations of a component via remote control cameras. MRP-227, at 4-4 (recognizing that VT-1 and EVT-1 examinations have "a greater degree of detection capability" than VT-3 examination), *id.* at 4-5 (recognizing that visual or surface examination may be unable to detect the effect of age related degradation for some RPVIs), *id.* (recognizing UT analysis has been "selected" for bolting and as an "alternative" or "supplement" to visual exam for plates and welds). NRC Staff's attempt (at 12) to side step the State's concern over the relative inadequacy of visual inspection programs and technology is inconsistent with the Staff's recognition elsewhere that visual examinations can have limitations and can miss subsurface flaws and some cracking in components, NUREG/CR-6860, *An Assessment of Visual Testing*, PNNL (Nov. 2004), ML043630040. In light of these statements, there simply is no legitimate ground for Staff and Entergy to oppose the State on this point. In any event, there was no need for an expert statement on this issue at this juncture since reports prepared by industry groups, national laboratories, and NRC Staff have identified limitations in remote visual examination systems used for visual examinations.

**E. The Proposed Bases Are Timely**

Both Entergy and NRC Staff object to the proposed new bases because, they assert, they are not timely. This charge is without merit. First, the new bases flow directly from the AMP submitted by Entergy on July 15, 2010. Prior to that date there was no AMP for RPVI embrittlement. Thus, it was not possible to allege that the non-existent program failed to include

the elements identified in the proposed new bases such as a lack of criteria for a specific time table for when baseline examinations will occur, the lack of criteria for a specific time table for when repairs or replacements will occur and the lack of a justification for using second best monitoring and surveillance techniques. The State acknowledges that Contention 25 as submitted in November 2007 did not identify the failure to account for fatigue-embrittlement synergy as a deficiency in Entergy's April 2007 LRA. This fact is of no moment because at that time Entergy had not proposed an AMP to manage the age related degradation of RPVIs. Thus, there was no AMP on the table for the State to examine and form an opinion about. Second, the initial bases addressed some of the core issues that are now pressed in the amended bases. Thus, as noted above, the Board recognized and accepted as a valid basis for NYS-25 that an AMP program must address the impact on RPVIs of pressurized thermal shock transients such as can occur with a LOCA. See Contention Admissibility Order, 68 N.R.C. at 131.

### CONCLUSION

For the foregoing reasons, the State respectfully requests that the Board admit the State's proposed additional bases concerning embrittlement.

  
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October 22, 2010

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

-----X  
In re:

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

License Renewal Application Submitted by

ASLBP No. 07-858-03-LR-BD01

Entergy Nuclear Indian Point 2, LLC,  
Entergy Nuclear Indian Point 3, LLC, and  
Entergy Nuclear Operations, Inc.

DPR-26, DPR-64

October 22, 2010  
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CERTIFICATE OF SERVICE

I hereby certify that on October 22, 2010, copies of the State of New York's Joint Reply to Entergy and NRC Staff's Separate Answers to the State's Additional Bases for Previously-Admitted Contention NYS-25 were served upon the following persons via U.S. Mail and e-mail at the following addresses:

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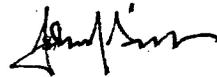
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