

August 20, 2012

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
ENTERGY NUCLEAR OPERATIONS, INC.) Docket Nos. 50-247/286-LR
)
(Indian Point Nuclear Generating)
Units 2 and 3))

NRC STAFF'S STATEMENT OF POSITION ON STATE OF NEW YORK
AND RIVERKEEPER'S JOINT CONTENTION NYS-38/RK-TC-5

INTRODUCTION

Pursuant to 10 C.F.R. § 2.1207(a) and the Atomic Safety and Licensing Board's ("Board") Scheduling Order, as modified,¹ the Staff of the U.S. Nuclear Regulatory Commission ("Staff") submits its initial written statement of position and written testimony with supporting affidavits on the State of New York ("NYS") and Riverkeeper, Inc. ("RK") (together, "Intervenors") Joint Contention NYS-38/RK-TC-5. For the reasons set forth in the appended "NRC Staff Testimony of Allen Hiser, Ching Ng, and On Yee Regarding NYS-38/RK-TC-5" (NRC Exhibit ("Ex.") NRC000148), NRC Staff Testimony of Allen Hiser and Kenneth Karwoski Regarding NYS-38/RK-TC-5" (Ex. NRC000161), and associated Staff Exhibits (Exs. NRC000149 – NRC000160), the Staff submits that a careful evaluation of this contention demonstrates that its challenge to Entergy Nuclear Operations, Inc.'s ("Entergy" or "Applicant") application for renewal of the Indian Point Nuclear Generating Units 2 and 3 ("IP2" and "IP3") operating licenses cannot be sustained.

¹ Order (Scheduling Order) (July 1, 2010) (unpublished) (ADAMS Accession No. ML101820387); Order (Memorializing Items Discussed During the July 9, 2012, Status Conference), at 2 (July 12, 2012) (unpublished) (ADAMS Accession No. ML12194A538) (setting Aug. 20, 2012 filing date).

BACKGROUND

On April 23, 2007, Entergy filed a license renewal application ("LRA"), seeking to renew the operating licenses for Indian Point Nuclear Generating Units 2 and 3, for an additional period of 20 years beyond their current expiration dates of September 28, 2013 and December 12, 2015, for IP2 and IP3, respectively. The Staff reviewed the LRA for compliance with the safety requirements of 10 C.F.R. Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." On August 11, 2009, the Staff issued its "Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3" ("SER") (Ex. NYS000326A-F), which it published as NUREG-1930, Vols. 1 and 2, "Safety Evaluation Report Related to the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3" in November 2009. On August 30, 2011, the Staff issued SER Supplement 1 ("SSER") (Ex. NYS000160) to the SER. On September 30, 2011, New York and Riverkeeper filed Contention NYS-38/RK-TC-5² alleging that:

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 [sic] 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[.]

Contention at 1 (capitalization omitted). Specifically, Intervenors claim that Entergy's license renewal application is deficient for these reasons:

Basis 1: Entergy has deferred defining the methods used for determining the most limiting locations for metal fatigue calculations and the selection of

² The filing comprises a transmittal letter dated September 30, 2011 (ADAMS Accession No. ML11273A193), along with (1) "State Of New York And Riverkeeper's Joint Motion For Leave To File A New Contention Concerning Entergy's Failure To Demonstrate That It Has All Programs That Are Required To Effectively Manage The Effects Of Aging Of Critical Components Or Systems" ("Motion") (ADAMS Accession No. ML11273A195); (2) "State Of New York And Riverkeeper's New Joint Contention NYS-38/RK-TC-5" ("Contention") with Attachments (ADAMS Accession No. ML11273A196), (3) Declaration of Dr. Richard T. Lahey, Jr. (ADAMS Accession No. ML11273A192), (4) Declaration of Dr. Joram Hopenfeld with Attachment (ADAMS Accession No. ML11273A194), and (5) Certificate of Service (ADAMS Accession No. ML11273A191).

those locations;

- Basis 2: Entergy has not specified the criteria it will use and assumptions upon which it will rely for modifying the WESTEMS computer model for cumulative usage factors (CUF) which have been adjusted for the reactor environment (CUFen)³ calculations;
- Basis 3: Entergy has not adequately defined how it will manage primary water stress corrosion cracking (PWSCC), and
- Basis 4: Entergy does not adequately describe the contents of its Aging Management Program (AMP)⁴ for reactor vessel internals which is based on a revised version of the Materials Reliability Program 227 (MRP-227) guidance document.⁵

Contention NYS-38/RK-TC-5 at 1-3 (Sep. 30, 2011) (ADAMS Accession No. ML11273A196).

The Staff opposed admission of Contention NYS-38/RK-TC-5 because, *inter alia*, the proffered contention was impermissibly late, was not based upon new, materially different information, and failed to demonstrate a genuine dispute with the application.⁶ The Applicant also opposed admission of NYS-38/RK-TC-5, and noted that the contention erroneously alleges that Entergy relies on commitments to define, in the future, the AMPs and activities required by Part 54, when, in fact, Entergy had already defined the requisite AMPs and aging management activities.⁷ The State of New York and Riverkeeper filed timely replies.⁸

³ "CUF" is a means of quantifying the fatigue that a metal component experiences during plant operation; "CUFen" is a CUF which has been modified by an environmental adjustment factor (Fen) to account for the environmental conditions experienced by the metal inside the reactor. *Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-10-17, 72 NRC 1, 30 n.168 (2010). Metal Fatigue is further discussed in § II, *infra*.

⁴ An AMP is a program intended to manage the effects of aging on a particular component. *Vermont Yankee*, CLI-10-17, 72 NRC at 12 n.44.

⁵ Basis 4, the reactor vessel internals program, is delayed pending the Staff's completion of its review on this issue. See 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), (Apr. 23, 2012) (unpublished) (ADAMS Accession No. ML12114A248).

⁶ See 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 1 (Oct. 25, 2011) (ADAMS Accession No. ML11298A379).

⁷ See Applicant's Opposition to New York State's and Riverkeeper's Joint Motion to Admit New Contention NYS-38/RK-TC-5, at 2 (Oct. 25, 2011) (ADAMS Accession No. ML11298A380).

On November 10, 2011, the Board admitted the contention.⁹ The Applicant moved to clarify the Board's Order.¹⁰ Intervenors opposed the motion for clarification.¹¹ On December 6, 2011, the Board granted, in part, Entergy's motion for clarification.¹²

On April 23, 2012, the Board confirmed that those aspects of NYS-38/RK-TC-5 that pertain to RVIs (*i.e.* the fourth basis for NYS-38/RK-TC-5 which concerns the use of a modified inspection plan for RVIs, to which Entergy has committed) shall be addressed separately and on the same hearing schedule as Contention NYS-25.¹³

On June 19, 2012, NYS submitted the Intervenors' initial evidentiary materials on this contention, comprising (a) Intervenors Initial Statement of Position in support of Contention NYS-38/RK-TC-5 (Ex. NYS000371) (ADAMS Accession No. ML12172A018) ("SOP"), (b) the Pre-filed Testimony of Dr. David J. Duquette (Ex. NYS000372) ("Duquette PFT"), (c) the Report of Dr. David J. Duquette (Ex. NYS000373) ("Duquette Rpt."), (d) the Pre-filed Testimony of Dr. Richard T. Lahey (Ex. NYS000374) ("Lahey PFT"), and (e) Exs. NYS000375 through NYS000397. In addition, RK filed the Pre-filed Testimony of Joram Hopfenfeld in Support of

⁸ See State of New York and Riverkeeper's Joint Reply in Support of Admission of Proposed Contention NYS-38/RK/TC-5 (Nov. 1, 2011) (ADAMS Accession No. ML11305A269) & Declaration of Dr. Richard T. Lahey (Nov. 1, 2011) (ADAMS Accession No. ML11305A266) (responding to Entergy NL-11-107).

⁹ Memorandum and Order (Admitting New Contention NYS-38/RK-TC-5) (Nov. 10, 2011), at 10-11 n.47 (unpublished) (ADAMS Accession No. ML11314A211).

¹⁰ See Applicant's Motion for Clarification of Licensing Board Memorandum and Order Admitting Contention NYS-38/RK-TC-5 (Nov. 21, 2011) (ADAMS Accession No. ML11325A433).

¹¹ See State of New York and Riverkeeper's Joint Response to Entergy's Motion for Clarification About Contention NYS-38/RK-TC-5 (Dec. 1, 2011) (ADAMS Accession No. ML11335A363).

¹² See Order (Granting Entergy's Motion for Clarification of Licensing Board Memorandum and Order Admitting Contention NYS-38/RK-TC-5), (Dec. 6, 2011) (unpublished) (ADAMS Accession No. ML11340A088).

¹³ 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), (Apr. 23, 2012) (unpublished) (ADAMS Accession No. ML12114A248).

RK-TC-5 (Ex. RIV000102) (“Hopenfeld PFT”), along with exhibits RIV000103 to RIV000106.¹⁴

On July 6, 2012, the NRC Staff filed an unopposed motion for an extension of time to file its initial and rebuttal statement of position, testimony, and exhibits.¹⁵ The Board granted the Staff’s request.¹⁶

On July 6, 2012, Entergy moved to strike portions of Intervenor’s filing.¹⁷ On July 16, 2012, the Intervenor’s opposed Entergy’s motion.¹⁸ In its Order of August 16, 2012, the Board agreed with New York and Riverkeeper that “NYS-38 is a broad challenge to Entergy’s Commitments – delineated in the SSER – and thus is not limited [to] specific commitments.”¹⁹ Further, the Board cited its ruling of December 6, 2011, in which it clarified that Contention NYS-38/RK-TC-5 is not limited “solely” to Commitment 41, stating: “Rather, in finding [NYS-38] admissible, we admitted the Intervenor’s ‘broad’ contention, which relied on ‘multiple bases’ including the ‘claim that there is insufficient information in Entergy’s recent commitments’ that were addressed in the SSER.”²⁰ In summarizing its ruling, the Board observed as follows:

¹⁴ As noted by NYS and Riverkeeper, the procedural background of NYS-38/RK-TC-5 is complex and includes a now-resolved discovery dispute. See SOP at 14-24.

¹⁵ See NRC Staff’s Unopposed Motion for Extension of Time for the Filing of Testimony, Exhibits and Statements of Position on Contention NYS-38/RK-TC-5 (July 6, 2012) (ADAMS Accession No. ML12188A745) (requesting Aug. 20 filing date).

¹⁶ Order (Memorializing Items Discussed During the July 9, 2012, Status Conference), at 2 (July 12, 2012) (unpublished) (ADAMS Accession No. ML12194A538).

¹⁷ Entergy’s Motion In Limine To Exclude Portions Of Intervenor’s Prefiled Direct Testimony, Expert Report, Statement Of Position, And Exhibits For Contention NYS-38/RK-TC-5 (Safety Commitments) (July 6, 2012) (ADAMS Accession No. ML12188A747).

¹⁸ State Of New York And Riverkeeper’s Joint Answer To Entergy’s Motion In Limine To Exclude Portions Of Intervenor’s Prefiled Direct Testimony, Expert Report, Statement Of Position, And [Exhibits] for Contention NYS-38/RK-TC-5 (July 16, 2012) (ADAMS Accession No. ML12198A548).

¹⁹ Order (Denying Entergy’s Motion in Limine Seeking to Exclude Portions of Intervenor’s Direct Evidence Addressing Contention NYS-38/RK-TC-5), at 3 (Aug. 16, 2012) (unpublished) (emphasis added).

²⁰ *Id.* at 3 (quoting Order (Granting Entergy’s Motion for Clarification of Licensing Board Memorandum and Order Admitting Contention NYS-38/RK-TC-5), at 3 (Dec. 6, 2011) (unpublished) (emphasis added)).

[W]e reiterate that NYS-38 is a broad contention, the scope of which is not limited to Entergy Commitments 30, 41, 43, and 44. Instead it broadly encompasses the claim that there is insufficient information in Entergy's commitments as addressed in the SSER.²¹

The Staff's SSER, to which the Board referred, delineated a total of six commitments that had not been delineated in the Staff's original SER (Commitments 41, 42, 43, 44, 45, and 46).²² The Board's rulings indicate that these are the commitments at issue in Contention NYS-38/RK-TC-5.²³

APPLICABLE LEGAL STANDARDS

I. Procedural Matters

A. Standards for Issuance of a Renewed License

The Commission may issue a renewed license if:

(a) Actions have been identified and have been or will be taken with respect to the matters identified in paragraphs (a)(1) and (a)(2) of this section, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB, and that any changes made to the plant's CLB in order to comply with this paragraph are in accord with the Act and the Commission's regulations. These matters are:

- (1) managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under § 54.21(a)(1); and
- (2) time-limited aging analyses that have been identified to require review under § 54.21(c).

10 C.F.R. § 54.29(a). The Commission intends that 10 C.F.R. § 54.29(a) define the findings the Commission must make in order to issue a renewed license to a nuclear power plant and the

²¹ *Id.* at 3-4 (emphasis added).

²² Compare SSER, App. A, at A-22 – A-25, with SER, Vol. 2, App. A, at A-25.

²³ The SSER addresses Commitment 41, at 3-19; Commitment 42, at 3-22 – 3-23; Commitment 43, at 4-1 – 4-2; Commitment 44, at 4-2; Commitment 45, at 4-2 – 4-3; and Commitment 46, at 3-15. In addition, the SSER further addresses four commitments (Commitments 15, 25, 30, and 40) that were addressed in the original SER, *i.e.*, Commitment 15, at 3-8; Commitment 25, at 3-14; Commitment 30, at 3-20; and Commitment 40, at 3-6 and 3-8; these four commitments were not raised in this contention.

scope of any hearing on the renewal application. See Final Rule, Nuclear Power Plant License Renewal; Revisions, 60 Fed. Reg. 22,461, 22,481 (May 8, 1995) (describing changes to 10 C.F.R. §§ 54.29 and 54.30 to "minimize any possibility of misinterpreting the scope of the renewal review and finding"). The scope of Commission review determines the scope of admissible contentions in a renewal hearing. 10 C.F.R. § 2.309(f)(iii).

B. The Scope of a Contested Renewal Hearing is Limited

As the Board has emphasized, the scope of license renewal proceedings is significantly circumscribed from the scope of the original licensing proceedings. The Board stated:

[The] Commission determined that the safety issues relevant to reactor relicensing are significantly different from, and defined more narrowly than, those relevant during the original licensing proceedings that authorize facility construction and operation.

Entergy Nuclear Operations Inc., (Indian Point, Units 2 and 3), LPB-08-13, 68 NRC 43, 67 (2008) (discussing technical review for reactor licensing); *compare* 10 C.F.R. § 54.29 (findings needed to issue a renewed license) with 10 C.F.R. § 50.57 (findings needed to issue of operating licenses). Certain safety issues that were reviewed for the initial license are already closely monitored and inspected by the NRC, and do not need to be re-reviewed in the context of a license renewal application. *Indian Point*, LBP-08-13, 68 NRC at 67 (*citing* Nuclear Power Plant License Renewal, Final Rule, 56 Fed. Reg. 64,943, 64,946 (Dec. 13, 1991); *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 7 (2001)).

C. The Scope of a Contention Is Limited By Its Bases

"The scope of a contention is limited to issues of law and fact pled with particularity in the intervention petition, including its stated bases, unless the contention is satisfactorily amended in accordance with our rules." *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), CLI-10-5, 71 NRC 90, 100 (2010) (footnotes omitted). The Commission recently emphasized that the "reach of a contention necessarily hinges upon its terms *coupled*

with its stated bases.” *NextEra Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-05, 75 NRC __, __ (March 8, 2012) (slip op. at 10-11 n.50) (quoting *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, 309 & n.103 (2010) (emphasis in original; footnote and internal quotation marks omitted)).

Thus, bases define the scope of a contention and no testimony may be entertained on NYS-38/RK-TC-5 that strays beyond the bases used to admit the contention.

D. Burden of Proof

In an NRC licensing proceeding, the applicant has the burden of proof. *AmerGen Energy Co., LLC*, (Oyster Creek Nuclear Generating Station), CLI-08-23, 68 NRC 461, 477 (2008) (citing *Curators of the University of Missouri*, CLI-95-1, 41 NRC 71, 121 1995).²⁴ Entergy must demonstrate how its programs will be effective in managing the effects of aging during the proposed period of extended operation. *Turkey Point*, CLI-01-17, 54 NRC at 8 (citing 10 C.F.R. § 54.21(a)). Entergy must identify actions that will need to be taken to manage adequately the detrimental effects of aging. See *id.* (citing “Nuclear Power Plant License Renewal; Revisions,” 60 Fed. Reg. 22,461, 22,463 (May 8, 1995)).

The regulations at 10 C.F.R. §§ 54.21 and 54.29 require Entergy to establish aging management programs that provide "reasonable assurance" that the structures and components will continue to perform their intended functions consistently with the CLB during the period of extended operation. *AmerGen Energy Company, LLC* (Oyster Creek Nuclear Generating Station), CLI-09-7, 69 NRC 235, 263 (2009) (*affirming* LBP-07-17, 66 NRC 327 (2007)). In the context of Entergy's LRA, "Reasonable assurance' ... is not susceptible to formalistic quantification or mechanistic application." *Oyster Creek*, LBP-07-17, 66 NRC at 339.

²⁴ Entergy must shows that its LRA meets the regulatory requirements of 10 C.F.R. § 54.21 by a “preponderance of the evidence.” *Amergen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-09-7, 69 NRC 235, 263 (2009).

“Reasonable assurance” is based on sound technical judgment and on compliance with the Commission's regulations. *Oyster Creek*, CLI-09-7, 69 NRC at 263.

II. Requirements Applicable to Management of Metal Fatigue

Bases 1 and 2 of NYS-38/RK-TC-5 address the issue of metal fatigue. Contention at 1-3.

The Commission has described the issue of metal fatigue as follows:

Metal fatigue can be defined as the weakening of a metal due to mechanical and thermal stresses, which are variously referred to as load cycles, stress cycles, and cyclical loading. Metal components experience these stresses during “transients” such as significant temperature changes during plant startup and shutdown. An excessive number of load cycles or transients may result in a fracture or a significant reduction in the strength of a component. These fractures or significant reductions are called “fatigue failure.” For any material, there is a characteristic number of stress cycles that it “can withstand at a particular applied stress level before fatigue failure occurs.” The period during which this number of load cycles occurs for *all* types of stress is called the material’s “fatigue life.”

Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Vermont Yankee Nuclear Power Station), CLI-10-17, 72 NRC 1, 14 (2010) (footnotes omitted). The fatigue that a metal component experiences is quantified by the "Cumulative Usage Factor" or "Cumulative Use Factor" ("CUF"). *Id.* at 5 n.9 (citing *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-08-28, 68 NRC 658, 663 (2008)). When the corrosive environment in a reactor is considered, it is reflected by an "Environmental Adjustment Factor" or " F_{en} " which is used to modify the CUF into a "Cumulative Use [or usage] Factor Environmentally Adjusted" or " CUF_{en} ". *Id.* An applicant may manage metal fatigue by using an AMP²⁵ under 10 C.F.R. § 54.21(c)(1)(iii). *Id.* at 19-22. As the Commission stated, “One way to do this [i.e., to satisfy 10 C.F.R. § 54.21(c)(1)(iii)] is to reference the Metal Fatigue AMP that is approved in the GALL

²⁵ Entergy has committed to implement an AMP (the “Fatigue Monitoring Program”) during the period of extended operation. LRA Amendment 2 at 15.

Report.” *Id.* at 20 (referring to NUREG-1801, “Generic Aging Lessons Learned (GALL) Report” (Sept. 2005)).²⁶

Finally, the Commission observed that NRC regulations contain no requirement that an applicant using an AMP to manage metal fatigue complete its CUF_{en} analyses prior to the issuance of a renewed license. *Id.* at 34. Rather, an applicant is only required to complete such an analysis prior to license renewal if “the analysis is needed to support a demonstration that the tracking AMP will satisfy [NRC] regulatory requirements,” for example, to demonstrate that a proposed “AMP is consistent with the GALL Report.” *Id.* at 36.

ARGUMENT

I. Commitments Are Legally Acceptable For Demonstrating That There Is Reasonable Assurance

When it comes to the adequacy of an aging management program, future implementation of an action which an applicant commits to perform is clearly and unequivocally permissible as part of a “reasonable assurance” finding. The plain language of the Commission’s regulations in 10 C.F.R. § 54.29(a) contemplates a finding that “[a]ctions have been identified and have been or will be taken” with respect to aging. A fair reading of 10 C.F.R. § 54.29(a) can only lead to the conclusion that an applicant can commit to take an action *in the future*, and thereby satisfy the regulation.

The LRA does not need to include detailed results, but instead may meet the requirements of 10 C.F.R. § 54.29 by describing the measures that will be taken to address aging during the period of extended operations. *Vermont Yankee*, CLI-10-17, 72 NRC at 36.²⁷ In other words, an applicant’s use of a GALL-consistent program is a sufficient demonstration

²⁶ The GALL Report was subsequently revised in December 2010.

²⁷ The Commission also recognized that a successful and sufficient AMP may be found even where the AMP included “state-of-the-art” tests, about which no further details were provided. *Seabrook*, CLI-12-05, 75 NRC at __ (slip op. at 12-13).

that it will manage the targeted aging effect during the period of extended operations.²⁸

Binding Commission precedent holds that “a commitment to implement an AMP that the NRC finds is consistent with the GALL Report constitutes one acceptable method for compliance with 10 C.F.R. § 54.21(c)(1)(iii).” *Vermont Yankee*, CLI-10-17, 72 NRC at 36. Further, the Commission has recognized that 10 C.F.R. § 54.29(a) speaks to both past and *future* actions, referring to actions that “have been or *will be*” taken to manage aging. *Id.* In *Oyster Creek*, CLI-08-23, 68 NRC at 468, the Commission expressly interpreted 10 C.F.R. § 54.21(c)(1) to permit a demonstration *after* the issuance of a renewed license, stating that an applicant’s use of an aging management program identified in the GALL Report constitutes reasonable assurance that it *will* manage the targeted aging effect during the renewal period. *Vermont Yankee*, 72 NRC at 36 (discussing *Oyster Creek*, CLI-08-23, 68 NRC at 468).²⁹ Thus, the Commission reiterated that “a commitment to implement an AMP that the NRC finds is consistent with the GALL Report constitutes one acceptable method for compliance with 10 C.F.R. § 54.21(c)(1)(iii).” *Id.*

In some instances, the commitments themselves represent part of the execution of the aging management program itself. For example, performing new metal fatigue calculations

²⁸ During its review of an LRA, the Staff validates the claims of consistency made therein. As the Commission stated in *Vermont Yankee*:

An applicant may commit to implement an AMP that is consistent with the GALL Report and that will adequately manage aging. But such a commitment does not absolve the applicant from demonstrating, prior to issuance of a renewed license, that its AMP is indeed consistent with the GALL Report. We do not simply take the applicant at its word. When an applicant makes such a statement, the Staff will draw its own independent conclusion as to whether the applicant’s programs are in fact consistent with the GALL Report.

Vermont Yankee, CLI-10-17, 72 NRC at 37.

²⁹ “If the applicant uses a different method for managing the effects of aging for particular SSCs at its plant, then the applicant should demonstrate to the Staff reviewers that its program includes the ten elements cited in the GALL Report and will likewise be effective.” *Oyster Creek*, CLI-08-23, 68 NRC at 468. The ten elements cited in the GALL Report are: 1. Scope of Program; 2. Preventive Actions; 3. Parameters Monitored/Inspected; 4. Detection of Aging Effects; 5. Monitoring and Trending; 6. Acceptance Criteria; 7. Corrective Actions; 8. Confirmation Process; 9. Administrative Controls; and 10. Operating Experience. *E.g.* GALL Report, Rev. 1, § X.M1, at pp. X M-1 to X M-2.

represents “corrective actions” in the form of “a more rigorous analysis of the component to demonstrate that the design code limit will not be exceeded during the extended period of operation” pursuant to the GALL Report, § X.M1, at pp. X M-1 to X M-2. *Vermont Yankee*, CLI-10-17, 72 NRC at 43 n.236. Significantly, in the case of metal fatigue, calculations to determine when a CUFen will exceed 1.0 do not have to be completed prior to the issuance of a renewed license. See *id.* at 40-41. The calculations are part of the aging management -- the “corrective actions” of the AMP.

The Commission’s regulations clearly allow applicants to commit to take future actions as part of their implementation of AMPs. As demonstrated by the cases discussed above, the Commission finds no fault with this practice. A commitment is simply one method of identifying a future action. The Commission has clearly held that an LRA is not deficient for using commitments to identify future actions. Moreover, as the Commission has held, an LRA does not lack sufficient specificity where the LRA states it will implement a GALL-compliant AMP.

II The Intervenor’s Legal Arguments Do Not Withstand Scrutiny

The Intervenor’s argue that (1) “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” (SOP at 29-34) and (2) “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” (SOP at 34-41). Further, the Intervenor’s allege that Entergy and NRC Staff offer differing accounts of what is, and is not, enforceable (SOP at 35-41) (citing the NRC Inspector General Report to support their position).

The Intervenor’s arguments are unavailing because the LRA sufficiently demonstrates that the specified components of the reactor coolant pressure boundary are being appropriately managed to address the effects of aging, and the Intervenor’s experts do not show any link

between the adequacy of an AMP and methods of enforcement.³⁰ In addition, as discussed in § C.2, *infra*, the Applicants' commitments will be incorporated into the plants' FSARs and licensing bases, and will be subject to regulatory controls governing how changes to those commitments may be made

A. The Board and Public Are Not Precluded From Review of Safety Questions

The Intervenors assert that information is missing from the LRA, and that the public, the Board, and the State are being cut out of the review of the missing information. SOP at 31 (alleging "extra-hearing resolution of important safety questions"). These claims lack merit. There are no important safety questions that are being left for post-hearing resolution. Indeed, to issue a renewed license, the Commission must make the important safety and environmental findings listed in 10 C.F.R. § 54.29. The Staff's SSER and the commitments listed therein demonstrate the resolution of these safety issues in accordance with established Commission practice, which includes addressing aging management via commitments to take future actions. *Vermont Yankee*, CLI-10-17, 72 NRC at 36.

The Intervenors argue that the public can add value to identification and resolution of important safety and environmental concerns. SOP at 31. Far from excluding the public from this role, the Commission's practices and regulations provide ample opportunity for public participation through, for example, the current hearing. In this instance, however, the Staff's review of the testimony presented by Intervenors has not revealed any important safety reason which would preclude an applicant's use of a commitment to identify actions that will be taken to manage the effects of aging, pursuant to 10 C.F.R. § 54.29(a).

B. The Intervenors Misapply the Requirements of the Atomic Energy Act

The Intervenors argue that the LRA falls short of the Atomic Energy Act's requirements.

³⁰ Often, the Intervenors' arguments proceed from a false assumption that their disagreements with the structures of the NRC rules and regulations are litigable issues that could preclude the Board from resolving the contention in the Applicant's favor. See, e.g., SOP at 38.

SOP at 33 (citing 42 U.S.C. §§ 2133(b) & (d) (no license may be issued if the issuance "would be inimical to the common defense and security or to the health and safety of the public.")). However, because the Intervenor's incorrectly apply initial licensing standards, their arguments are irrelevant. The standards for issuing a renewed license in 10 C.F.R. § 54.29(a)(1) are narrow, requiring that an applicant demonstrate it will manage the effects of aging during the period of extended operation; the regulations in 10 C.F.R. Part 54 do not require applicants for license renewal to make broader demonstrations that license renewal will not be "inimical to common defense and security or health and safety of the public," inasmuch as these findings are already addressed in the plants' current licensing basis through 10 C.F.R. § 50.57(a)(6) (requirements for initial licensing). In a nutshell, and as this Board had held previously, the safety issues that were reviewed for the initial license do not need to be re-reviewed in the context of a license renewal application. *Indian Point*, LBP-08-13, 68 NRC at 67 (citing Nuclear Power Plant License Renewal, Final Rule, 56 Fed. Reg. 64, 943, 64, 946 (Dec. 13, 1991); *Turkey Point*, CLI-01-17, 54 NRC at 7).

C. The Intervenor's Assertions Regarding Enforceability are Incorrect and Raise Issues that Are Beyond the Scope of the Proceeding

The Intervenor's assert that they 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. SOP at 35. They argue that the statements made by Entergy or NRC Staff and relied upon by the Board 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. SOP at 38. The Intervenor's base their concerns on two items. First, they cite a letter written by an NRC Staff

official to an official of the State of Vermont Department of Public Safety (“VT DPS”),³¹ which responded to questions from VT DPS concerning commitments. Second, the Intervenor’s cite an NRC Office of the Inspector General (“OIG”) audit report concerning the NRC Staff’s overview of licensee commitments.³² See SOP at 35-41. However, as explained below, neither the Vermont Yankee Letter nor the OIG Report supports Intervenor’s position and concerns.

1. Existing Regulations Address Enforceability of the LRA

Regarding the Intervenor’s concern over reliability and enforceability of statements made by Entergy or the Staff (SOP at 38), any information provided by the applicant is required by regulation to be “complete and accurate in all material respects.” 10 C.F.R. § 54.13(a). As to the Staff, its performance and official conduct is to be accorded a presumption of legitimacy,³³ and is not subject to challenge in an NRC licensing proceeding. Further, 10 C.F.R. § 50.100 provides the Commission with the ability to take “for cause” action based on misinformation in the application, or new information, to revoke, suspend, or modify a license, and 10 C.F.R. § 2.206 allows the public to request the Staff to initiate such a proceeding “for any other action as may be proper.” Thus, the regulations already provide appropriate enforcement tools which could be used to address any inappropriate changes to a commitment that may occur after a renewed operating license has been issued. See 10 C.F.R. §§ 2.206, 50.100 and 54.13; see also 10 C.F.R. § 54.37(a) (requiring records to show compliance with 10 C.F.R. part 54) and 10 C.F.R. § 54.37(b) (requiring inclusion of newly-identified systems into license renewal).

³¹ Letter from Christopher G. Miller, Director, Division of Reactor Safety, Region I, NRC, to Sarah Hofmann, Deputy Commissioner, Vermont Department of Public Service (March 20, 2012) (ADAMS Accession No. ML12103A158)(Exhibit NYS000396) (“Vermont Yankee Letter”). The SOP incorrectly added an extra digit to the ADAMS Accession Number.

³² OIG Audit of NRC’s Management of Licensee Commitments, OAG-A-17 (Sept. 19, 2011), (ADAMS Accession No. ML112620529) (Exhibit NYS000171) (“OIG report”).

³³ See *All Operating Boiling Water Reactor Licensees with Mark I and Mark II Containments* (Docket Nos. EA-12-050 and EA-12-051), LBP-12-14, 76 NRC ___, ___ (July 10, 2012) (slip op. at 9 n. 36) (quoting *United States Dep’t of State v. Ray*, 502 U.S. 164, 179 (1991)).

2. A License Condition Will Be Imposed To Address Commitments

The undisputed facts presented by Intervenors simply do not address the adequacy of any AMP in the LRA. Rather, the Intervenors argue that commitments discussed in the Staff's SSER are not binding, enforceable, or tracked, and therefore no reasonable assurance may be found. SOP at 40.

In fact, through regulations and conditions imposed upon renewed licenses, the NRC already addresses these concerns. Specifically, pursuant to 10 C.F.R. § 54.21(d), a license renewal application is required to include a supplement to the plant's Final Safety Evaluation Report ("FSAR"). The FSAR supplement for the facility must contain a summary description of the programs and activities for managing the effects of aging and the evaluation of time-limited aging analyses for the period of extended operation. 10 C.F.R. § 54.21(d). The Commission's established practice is to insert a license condition in the renewed license to indicate that the FSAR supplement, as supplemented by the appropriate active commitments made by the applicant and documented in the Staff's safety evaluation report, are henceforth part of the FSAR, are subject to the recordkeeping and reporting requirements in 10 CFR § 50.71(e), and can only be changed through the proper application of 10 C.F.R. § 50.59. In addition, the Commission imposes a license condition specifying that the licensee is to inform the Commission of the completion of commitments which were made during the LRA review.³⁴

The Intervenors have not identified any reason to believe that these regulations and regulatory practices do not provide a sound basis for finding reasonable assurance that aging effects will be adequately managed following license renewal.

a. The Vermont Yankee Letter Does Not Support Intervenors' Concerns

The Intervenors hold up the Vermont Yankee Letter as showing that regulatory

³⁴ Written commitments made in docketed licensing correspondence, the NRC's safety evaluation report, and the licensee's FSAR are part of the CLB and subject to enforcement if changed in a manner contrary to regulations.

commitments might not become legally binding. SOP at 36. But, as discussed in § II.C.2., *supra*, the Intervenor's concerns over enforceability are readily resolved through imposition of a license condition. Thus, the Vermont Yankee Letter fails to support their position.

b. Existing Regulations Control Changes to Commitments

The Intervenor's note that the Vermont Yankee Letter discusses NEI 99-04, 'Managing NRC Commitment Changes,' July 1999 (ADAMS Accession No. ML003680088), and the uncontested fact that not all changes need prior NRC approval. SOP at 36-37. The Intervenor's further assert that the Staff and the public are unaware of changes that may be made. *Id.* at 27.

As described in § II.C.2, *supra*, the commitments associated with the renewed license become incorporated into the FSAR and subject to the Commission's well-established change process described in 10 C.F.R. § 50.59. Thus, whenever a holder of a renewed license seeks to change a commitment that is incorporated in the FSAR, it would be required to screen the change against the regulatory requirements of 10 C.F.R. § 50.59 to determine when it must formally request prior approval of the change; as described in the regulation, for some changes, the licensee would need to submit a license amendment request ("LAR"), which would result in an opportunity for a hearing. See 10 C.F.R. § 50.59(c)(2).

c. Existing Regulations Control Recordkeeping

The Intervenor's express concern that the NRC may not be informed when changes to commitments are made which do not involve a LAR. SOP at 37. However, the Intervenor's concerns are resolved by 10 C.F.R. § 50.59(d)(1)-(3), under which a licensee is required both to maintain records of changes *and* to submit to the NRC, at least every 24 months, reports of the changes made. These are existing rules and requirements which are beyond the scope of NYS-38/RK-TC-5 and Intervenor's concerns with these processes are impermissible topics for the limited scope of a license renewal proceeding.

d. The Intervenor's Impermissibly Attack Commission Regulations

The Intervenor's demand that all future changes to "statements relied upon by the Board"

must be made via the license amendment process, and argue that Staff cannot use 10 C.F.R. § 50.12. See SOP at 38. Clearly, advocating for restrictions on the ability of Commission to use its own regulations governing operating reactors constitutes an impermissible challenge to the regulations, and is entirely irrelevant to the sufficiency of license renewal application and the four topics addressed in NYS-38/RK-TC-5. See 10 C.F.R. § 2.335(a) (no rule is subject to attack by argument in an adjudicatory proceeding). If the Intervenor believe that the licensee incorrectly changed "statements relied upon by the Board" via an exemption request under 10 C.F.R. § 50.12, or 10 C.F.R. § 50.59, they may challenge the action only by means of a petition under 10 C.F.R. § 2.206. See *Yankee Atomic Elec. Co.* (Yankee Nuclear Power Station), CLI-94-3, 39 NRC 95, 101 n.7 (1994) (holding that a "member of the public may challenge an action taken under 10 C.F.R. § 50.59 only by means of a petition under 10 C.F.R. § 2.206").

3. The OIG Audit Report Does Not Support NYS-38/RK-TC-5.

The Intervenor argue that the OIG report shows that the process used by the NRC and its licensees for creating, tracking and handling commitments does not produce the evidence needed for a "reasonable assurance" finding. SOP at 40. This claim is without merit.

Significantly, the OIG report discussed regulatory commitments in general, not commitments made in connection with license renewal. Specifically for license renewal, the NRC assesses licensees' performance, including, for example, their activities implementing their license renewal commitments. See Hiser/Yee/Ng Testimony at A46 (describing NRC Inspection Manual, Inspection Procedure 71003, Post-Approval Site Inspection for License Renewal (October 2008) (ADAMS Accession No. ML082830294) (Ex.ENT000251) ("IP71003")). This inspection will verify the Applicant's actions implementing its commitments for license renewal and satisfaction of the license conditions that have been added as part of the renewed license, and will ensure that selected aging management programs are implemented in accordance with the license renewal regulations. *Id.* (citing IP71003 at 1 (Ex. ENT000251)). Thus, the NRC

does inspect and audit the commitments made in connection with license renewal. Further, as discussed in § II.C.2, *supra*, the Commission requires the commitments to be incorporated into the FSAR through a license condition, thereby controlled by the change process established in § 50.59. In short, the OIG report is not relevant to and does not invalidate the Commission's reliance on commitments made as part of the license renewal process.

D. Reasonable Assurance Does Not Rely Upon Public Participation

Finally, the Intervenors assert that there can be no "reasonable assurance" if changes to commitments can be made without an opportunity for public participation. SOP at 40-41. This claim, like others discussed above, is without merit. First, the content of an LRA is specified by the regulations in 10 C.F.R. Part 54, and the content does not change based on public participation. Second, the demonstration the applicant must make to satisfy the standards for issuance of a renewed license are specified in 10 C.F.R. Part 54 and do not change based upon public participation. Third, there *is* public participation by Intervenors right now. Moreover, in the event a renewed license is issued, additional hearing opportunities will be made available for those changes found to require prior NRC approval, under the § 50.59 change process.

Thus, looking to the future, the Commission's regulations already address when and how public participation is permissible. See *e.g.* 10 C.F.R. §§ 2.206, 50.59, and 50.90. The only statutory "right" to an opportunity for a hearing under section 189a of the Atomic Energy Act exists for those actions that are identified in section 189a as licensing proceedings. *Yankee*, CLI-94-3, 39 NRC at 101. The Intervenors do not explain the link between public participation through a hearing and a finding of "reasonable assurance," nor could they, inasmuch as the "reasonable assurance" finding in 10 C.F.R. § 54.29(a) is independent of any public or State participation on an applicant's implementation of its license renewal commitments.

III. Contention NYS-38/RK-TC-5 Lacks Technical Merit

The Staff's testimony presents the Staff's sound technical judgment, based on its review of the LRA, that the concerns raised in NYS-38/RK-TC-5 Bases 1, 2, and 3, lack merit and

should be resolved in Entergy's favor.³⁵ The attached testimony presents the opinions of four highly-qualified witnesses who explain (a) why the information provided by the Applicant on aging management provides an adequate demonstration of reasonable assurance under 10 C.F.R. § 54.29(a), and (b) that the additional information requested by NYS and Riverkeeper is not necessary for resolution of this issue.

A. Metal Fatigue Witnesses

Appended to this filing is the Staff's testimony and certifications of Dr. Allen Hiser, Dr. Ching Ng, and Mr. On Yee, (NRC000148) ("Hiser/Ng/Yee Testimony") and Staff's Ex. NRC000149 through NRC000156) regarding Metal Fatigue.

Dr. Allen Hiser, Jr. has 22 years of experience at the NRC and also has been a participant in American Society of Mechanical Engineers ("ASME") Working Groups on Flaw Evaluation and Pipe Flaw Evaluation dating back to the early 1980s. See Hiser Professional Qualifications (Ex. NRC000103). Hiser/Ng/Yee Testimony at A1(a) & A2(a). His current responsibilities include providing technical advice and assistance to the Division of License Renewal on a variety of technical, regulatory and policy issues related to aging management of nuclear power plant systems, structures, and components. *Id.* His current responsibilities also include serving as a lead technical expert for aging management evaluation and assisting other NRC staff as they implement their review of license renewal applications. *Id.* Dr. Hiser holds Bachelor of Science and Master of Science degrees in Mechanical Engineering from the University of Maryland at College Park, and a Ph.D. in Materials Science and Engineering from Johns Hopkins University. *Id.* Dr. Hiser previously provided testimony to present the Staff's view with respect to the consolidated New York Contention 26B and Riverkeeper Contention TC-1B (NYS-26B/RK-TC-1B) (Metal Fatigue). *Id.* at A3(a).

³⁵ The Staff does not address Basis 4, which involves the adequacy of Entergy's reactor vessel internals program, as that issue is currently under Staff review.

Mr. On Yee has more than six years of experience at the NRC. See Yee Professional Qualifications (Ex. NRC000104). Hiser/Ng/Yee Testimony at A1(b) & A2(b). He is responsible for conducting technical reviews of license renewal aging management programs, aging management review (“AMR”) items and time-limited aging analyses (“TLAA”) in the area of metal fatigue. *Id.* In addition to performing in-office reviews and on-site audits, he documents the agency’s findings in the area of metal fatigue and incorporates them into safety evaluation reports and audit reports, assuring a record of the agency’s decision on license renewal requests. *Id.* Mr. Yee holds a Bachelor of Science degree in Mechanical Engineering from Polytechnic University in Brooklyn, NY. *Id.* Mr. Yee previously provided testimony to present the Staff’s view with respect to NYS-26B/RK-TC-1B (Metal Fatigue). *Id.* at A3(b).

Dr. Ching Ng has six years of experience with the agency. See Ng Professional Qualifications (Ex. NRC000105); Hiser/Ng/Yee Testimony at A2(c). In the area of metal fatigue, Dr. Ng also has reviewed numerous LRAs and performed on-site audits. *Id.* Dr. Ng was responsible for the review of the supplemental information associated with the Staff’s operating experience in the area of metal fatigue. *Id.* at A3(c). In particular, Dr. Ng developed the updated environmentally-assisted fatigue section in Section 4.3.3 of the Staff’s supplemental safety evaluation report on Indian Point. *Id.* Dr. Ng holds Bachelor of Science, Master of Science, and Doctoral degrees in Mechanical Engineering from the University of California, Berkeley. *Id.* at A1(c). Dr. Ng previously provided testimony to present the Staff’s view with respect to NYS-26B/RK-TC-1B (Metal Fatigue). *Id.* at A3(b).

B. Steam Generator Divider Plate Witnesses

Appended to this filing is the Staff’s testimony and certifications of Dr. Allen Hiser and Mr. Kenneth Karwoski (Ex. NRC000161) (“Hiser/Karwoski Testimony”) and Staff’s Ex. NRC000158 through NRC000160 regarding steam generators.

Mr. Karwoski has 21 years of experience at the NRC and another 6 years with the U.S. Navy. Ex. NRC000157; See Hiser/Karwoski Testimony at A1b-A2b. His current responsibilities

include providing technical advice and guidance to senior management related to steam generator integrity and related issues. *Id.* Mr. Karwoski holds Bachelor of Science degrees in Chemistry and Computer Science. Mr. Karwoski's testimony will address Staff's analysis of the Applicant's proposed aging management for the steam generator divider plate assemblies ("SGDPs") and tube-to-tubesheet welds ("TTSW") and the Staff's views with respect to NYS-38. *Id.* at A4b.

Dr. Allen Hiser, Jr., whose credentials are recited above, provides testimony concerning the Staff's analysis of the Applicant's proposed aging management for the SGDPs and TTSWs, and the Staff's views with respect to NYS-38. *Id.* at A4a.

C. Metal Fatigue Technical Background and Staff Review

1. Metal Fatigue Technical Background

The Staff's witnesses explain that cracking due to metal fatigue is one of the effects of aging that requires management during the period of extended operation. Hiser/Ng/Yee Testimony at A24. The background and regulatory requirements for metal fatigue are given in the *American Society of Mechanical Engineers Boiler & Pressure Vessel Code (ASME Code) Section III, Rules for Construction of Nuclear Power Plant Components* (ADAMS Accession No ML11356A334) (Ex. NYS000349), and Section 4.3 of NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants* (SRP-LR), Rev. 2, (December, 2010) (Accession No. ML103490041) (Ex. NYS000161) ("SRP-LR Rev. 2"). Hiser/Ng/Yee Testimony at A10. ASME Code, Section III, provides a specific process for this analysis, which considers the anticipated severity and number of thermal and pressure cycles for all transients, and includes the calculation of a parameter called cumulative usage factor (CUF). *Id.* at A11.

When a CUF value is less than 1.0 there are no fatigue cracks assumed to be present in the location that is being evaluated; when a CUF value exceeds 1.0, it means that there is a possibility that a fatigue crack may have formed and is assumed to be present in the location

that is being evaluated. *Id.* at A12-A13. Significantly, a CUF above 1.0 does not mean that a component is about to fail, but instead indicates an increase in the possibility that a crack might form. *Id.* at A14-A19.

An environmental adjustment factor (F_{en}) may be applied to the CUF to address the local environment by calculation of a CUF_{en} . *Id.* at A23. However, the CUF_{en} is not part of the current licensing basis for the plant, although it is recommended in the GALL Report that the effect of water be addressed and treated as though it were a TLAA. *Id.* at A31. The SRP-LR provides specific guidance on addressing the effects of reactor water environment. SRP-LR, Rev. 1 and Rev. 2, recommend that the specific components identified in NUREG/CR-6260, *Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components*, (March 1995) (ADAMS Accession No. ML031480219) (Ex. NYS000355) (“NUREG/CR-6260”), as a minimum, should be considered for the effects of reactor environment on metal fatigue. Hiser/Ng/Yee Testimony at A34. There are no explicit requirements in the Commission’s regulations nor in the ASME Code for an assessment of the effects of reactor water environment on metal fatigue. *Id.* at A27. Nonetheless, the SRP-LR provides specific guidance on addressing the effects of reactor water environment. *Id.* at A34.

2. The Applicant's Metal Fatigue Is Properly Managed

The Staff described Entergy’s Fatigue Monitoring program (“FMP”) in detail in the Staff’s testimony prepared for NYS-26B/RK-TC-1B. *Id.* at A116 (*citing* NRC000102 at 23 through 27). In summary, the Fatigue Monitoring program is an existing program, described in LRA Section B.1.12, that tracks the number of critical thermal and pressure transients for selected reactor coolant system components. Hiser/Ng/Yee Testimony at A39. Metal fatigue is described in the LRA as an existing program. LRA Section 4.3 describes Metal Fatigue TLAAAs, with Section 4.3.3 addressing effects of reactor water environment on fatigue life. *Id.* at A39.

The Applicant provided Commitment No. 43 to review its design basis ASME Code Class 1 fatigue evaluations to confirm whether the NUREG/CR-6260 locations that have been

evaluated for the effects of the reactor water environment on fatigue usage are the most limiting locations for the IP2 and IP3 configurations. *Id.* at A39.at A43. If more limiting locations are identified, the most limiting location will be evaluated for the effects of the reactor water environment on fatigue usage. *Id.*

The Staff reviewed the Applicant's FMP using the extensive guidance and documents which the NRC has developed (e.g., SRP-LR and GALL Report). *Id.* at A44-A47. Additionally, the Staff performed an on-site inspection and an on-site audit of the Fatigue Monitoring program. *Id.* at A44. The inspectors concluded that Entergy had performed adequate evaluations, including reviews of industry experience and plant history, to determine appropriate aging effects. *Id.* at A48. In addition, the inspectors concluded that Entergy provided adequate guidance to ensure the aging effects are appropriately identified and addressed. *Id.* The Staff found the program to be acceptable, as documented in the SER. *Id.* at A39-A40.

The details provided by Entergy were sufficient to show that the FMP is consistent with the GALL Report. *Id.* at A46. No further detail is needed to show that it meets the regulatory requirements. *Id.* at A49. Nonetheless, the Staff did not merely take Entergy at its word. The information in the LRA was verified through on-site auditing and inspecting. *Id.* at A46 & 48.

The FMP, including the commitment, meets the GALL Report and the Commission's regulations. *Id.* at A49 & A103. The Staff has considered the possible findings the Applicant will make under Commitment 43, finding that either Entergy will confirm that the representative sample in NUREG/CR-6260 is adequate for the IP2 and IP3 plant-specific configurations, or Entergy will identify additional locations that will be managed for the effects of the reactor water environment on metal fatigue by the Fatigue Monitoring program during the period of extended operation. *Id.* at A58. Either result provides additional assurance that the FMP is adequate to manage aging effects. *Id.* Further, the results are subject to inspection. *Id.* at A61.

IV. The Bases Statements for Contention NYS-38/RK-TC-5 Lack Merit

- A. Basis (1): Contrary to Intervenors' Testimony, Metal Fatigue at Additional Locations Does Not Need To Be Analyzed Now Because the LRA, as augmented by Commitment 43 Provides a sufficient demonstration of Actions which Will be Taken to Manage Aging

Basis (1) of NYS-38/RK-TC-5 asserts that the LRA is deficient because Entergy has deferred defining the process to be used to determine the most limiting locations for environmentally-assisted metal fatigue calculations (CUF_{en} calculations) and selection of those locations. Hiser/Ng/Yee Testimony at A6. Basis (1) relates to Commitment 43. *Id.* at A7. Under Commitment No. 43, Entergy will review its design basis ASME Code Class 1 fatigue evaluations to confirm whether the NUREG/CR-6260 locations that have been evaluated for the effects of the reactor water environment on fatigue usage are the most limiting locations for the IP2 and IP3 configurations. *Id.* at A43. Then, if more-limiting locations are identified, the most limiting location will be evaluated for the effects of the reactor water environment on fatigue usage. *Id.* at A43. Dr. Hopenfeld asserts that the LRA cannot demonstrate reasonable assurance until Commitment 43 is complete. *Id.* at A104. But Dr. Hopenfeld is mistaken; the NRC's rules require that actions are *identified that will be taken* to provide reasonable assurance. 10 C.F.R. 54.29(a). In this the LRA has identified the actions, and thus shows that reasonable assurance may be had. Hiser/Ng/Yee Testimony at A105.

Regarding the claim that Commitment 43 is vague, the Staff disagrees. See *id.* at A101-A103. It appears that Dr. Hopenfeld is ignoring that the FMP, of which Commitment 43 is just one aspect, is described in the LRA, as amended, and is an existing program that will be augmented to meet all the program elements defined in the GALL Report AMP X.M1. *Id.* at A103. The FMP is an existing program that is being improved by addressing the effects of environmentally-assisted fatigue for the purposes of license renewal. *Id.* Commitment 43 is not a vague program to be considered in isolation, but is instead an augmentation to an existing

program, which is then consistent with the program recommended in the GALL Report AMP X.M1. *Id.*

Dr. Hopenfeld asserts that Entergy must expand the scope of its review of CUF_{en}. *Id.* at A99. In fact, that is exactly what is accomplished by Commitment 43. *Id.* Entergy's FMP in the LRA meets the GALL Report. *Id.* at A103. In the end, Dr. Hopenfeld, the Staff, and Entergy all agree about the identified actions that will be taken to manage aging. *Id.* at A99. The only difference of opinion is that Dr. Hopenfeld wants them to take the actions before a license renewal decision is made. *Id.* at A104. But reasonable assurance is provided by the Applicant's use of an AMP that the NRC finds is consistent with GALL. Through that program, Entergy will take the very actions requested by Dr. Hopenfeld before the period of extended operations begins. *Id.* at A103-104.

Intervenors fail to understand the purpose of the FMP. Dr. Hopenfeld asserts that many locations will likely exceed 1.0 for the CUF_{en}. *Id.* at A99. But the very purpose of the FMP is to manage aging by taking actions to address when a component's CUF_{en} approaches 1.0. *Id.* at A49. Because Entergy's Commitment 43 involves looking for locations prior to entering the period of extended operation, any locations where the CUF_{en} will have exceeded 1.0 will already be identified and addressed through the corrective actions. *Id.* at A49 & A104. Indeed, the applicant is on track to complete these actions. *Id.* at A104. Therefore, there is no merit to the assertion that Commitment 43 must be done now; the actions that will be taken are clearly identified. *Id.* at A103.

The initial screening of design basis ASME Code Class 1 fatigue evaluations for NUREG/CR-6260 locations is scheduled to be completed well before the period of extended operation, thus satisfying the scheduling concerns of the Intervenors' witnesses. *Id.* at A115. Details on the programs are not needed in light of the existing demonstration that the FMP is capable, as confirmed by the Staff through extensive review, inspection and audit of the FMP. *Id.* at A116 & A44-A47.

Dr. Hopenfeld describes various considerations for making CUF_{en} calculations, and asserts that they are complex. See, e.g., SOP at 12. The Staff agrees that fatigue calculations involve complex calculations. Hiser/Ng/Yee Testimony at A52. But the details of these complex calculations go well beyond what is needed in an LRA because the methods are addressed by the information in the GALL Report. *Id.* at A29 & A59. The information is not needed in the LRA. *Id.* at A117. Instead of being repeated in the LRA, the methods to calculate CUF are documented in ASME Code, Section III and the methods to calculate F_{en} are documented in several NUREG/CR reports that are listed in the GALL Report. *Id.* at A59.

Dr. Hopenfeld asserts that Entergy must address his list of components and calculate CUF_{en} for everything on his list. *Id.* at A109. However, in this Dr. Hopenfeld is mistaken; there is no requirement for Entergy to expand its CUF_{en} to components which do not already have existing fatigue evaluations, inasmuch as the CLB does not address these items. *Id.*

B. Basis (2): Contrary to Intervenor's Claim, Prescriptive Documentation of WESTEMS User Intervention Is Not Needed to Provide Reasonable Assurance of Aging Management

Basis (2) of NYS-38/RK-TC-5 is that the LRA is deficient because it has not specified the criteria and assumptions for modifying the WESTEMS computer model for environmentally adjusted CUF_{en} calculations (*i.e.* ASME Code Section III design stress and fatigue analyses). Hiser/Ng/Yee Testimony at A6 & A64-65. Basis (2) relates to the Applicant's Commitment 44, which simply states that that IPEC will include written explanation and justification of any user intervention in future evaluations using the WESTEMS "Design CUF" module. *Id.* at A7 & A62.

Intervenor's witness, Dr. Lahey, incorrectly believes that no reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB can be had because Entergy did not submit details of past "user intervention" that an analyst might have taken while executing the WESTEMS program. *Id.* at A86. But Dr. Lahey's claim fails for numerous reasons. First, he fundamentally misunderstands what "user intervention" is, and how it is used in WESTEMS. *Id.* at A88. He does not understand that the

issue of "user intervention" relates to documentation, not execution, of the fatigue calculations. *Id.* at A89. The term "user intervention" is clearly defined in NRC Regulatory Issue Summary (RIS)-2011-14, *Metal Fatigue Analysis Performed By Computer Software*, (December 2011) (Ex. NRC000112) ("RIS 2011-14"). RIS 2011-14 concerns very specific steps and actions that a properly trained analyst does during the calculation. Hiser/Ng/Yee Testimony at A111. The Staff's concern with "user intervention" as described in RIS 2011-14 was associated only with sufficient documentation of modifications of stress peaks and valleys by properly trained analysts using the WESTEMS software, and not with the engineering judgment exercised by the analyst or the results of the analyses. *Id.*

Significantly, the Staff's solution to the potential documentation issue problem was to remind licensees of their duties to comply with 10 CFR 50.55a and Appendix B to 10 CFR Part 50. *Id.* at A90. The issue of "user intervention" is already taken into account by the existing requirements which provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained. *Id.* at A112. The underlying issue in Commitment 44 is also addressed by the existing quality assurance requirements in Appendix B to 10 CFR Part 50, which Entergy must still meet even if it never volunteered Commitment 44. *Id.* at A74 & A77.

Although Commitment 44 concerns how to document the use of the WESTEMS program, it is important to realize that the LRA does not request the Staff to review and approve WESTEMS. *Id.* at 65. Significantly, the Staff did find it necessary to request that Entergy make Commitment 44. *Id.* at A63.

C. Basis (3) The Potential For PWSCC in the Steam Generator Divider Plate and Tube-to-Tubesheet Welds

1. Indian Point's Approach for Verifying the Adequacy of the Water-Chemistry Program for Managing PWSCC in the Steam Generator Divider Plate and Tube-to-Tubesheet Welds Does not Frustrate the Rights of New York, Riverkeeper, or the Public

Intervenors state that NYS-38's central concern is that the Staff "allow[s] certain safety issues to be resolved ... *after* the NRC has issued an operating license and *outside* the framework of an Atomic Energy Act § 189 proceeding." SOP at 1 (emphasis in original).

Intervenors' concern is mistaken as the Applicant has proposed an adequate aging management program in combination with a one-time verification test that meets the statutory and regulatory requirements of license renewal namely, "managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified ... under §54.21(a)(1)" or (c). 10 C.F.R. § 54.29(a)(1) and (2).

Turning to Intervenors' specific concerns regarding PWSCC in the steam generator's divider plates and in the tube-to-tubesheet welds, the contention states:

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 it 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 report, which is not expected to be available for a number of years and, in the meantime, to institute an unspecified inspection program to ascertain, after commencement of the license renewal period, whether stress corrosion cracking is actually occurring in the divider plates of the steam generators. *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.

SOP at 3. Again, Intervenor's concerns appear to be misplaced. Intervenor's arguments dismiss the actions Indian Point has proposed to manage PWSCC in the steam generator divider plates and tube-to-tubesheet welds simply because research continues on new or better ways to accomplish the same goals in the future.

As Dr. Hiser and Mr. Karwoski explain, Entergy has proposed a combination of programs and actions including the existing water chemistry program and one-time inspections that are well-defined as to the timing and acceptance criteria. Hiser/Karwoski Testimony at A50, A52, A77-A78. With respect to the one-time inspections of the steam generator divider plate and tube-to-tubesheet welds, the precise method of testing is left for the Applicant to determine at the time of the inspection and the precise corrective actions are not proscribed. Neither of these issues precludes the Staff from making the appropriate findings or prevents Intervenor from fully participating in these proceedings.

a. Entergy's Proposed Actions for PWSCC in the Steam Generator Divider Plate and Tube-to-Tubesheet Welds Are Well and Appropriately Defined

Intervenor argues that "Entergy's proposed plan for the steam generator divider plates assemblies, tubesheets, and welds contain several unknowns." SOP at 7. Specifically, Intervenor seems to want more details on the "inspection methods or technique ..., acceptance criteria, monitoring and trending protocols, or corrective actions responses." *Id.* Intervenor argues that Entergy's plan is "wholly deficient" and that it is a mere ruse until a plan could be developed by EPRI. *Id.* at 8.

First, Intervenor raises concerns that the monitoring and trending protocols are deficient. *Id.* Their concern is unfounded and seems to arise from a fundamental misunderstanding of the acceptance criteria, discussed later, and the schedule for examining the steam generator divider plates and tube-to-tubesheet welds. The current program proposed by Entergy is the water chemistry program applied in conjunction with a one-time inspection of the steam generator divider plate and tube-to-tubesheet welds. Hiser/Karwoski Testimony at A23, A80, A86. The

proposed one-time inspection program does not have a monitoring or trending protocol because the proposed inspection will only occur once. *See id.* at A77-A78. As such, monitoring or trending will not occur. But the one-time inspection in combination with the very conservative acceptance criteria provides a clear point where Entergy would be required to take additional actions to repair, replace, or further justify the suitability of the steam generator divider plates and tube-to-tubesheet welds. *Id.* at A15-A18.

Second, Intervenor's argue that acceptance criteria are not sufficiently well-defined. SOP at 7. As Dr. Hiser and Mr. Karwoski explain the acceptance criteria for the one-time inspections is simple, clear, and easily identified. *See* Hiser/Karwoski Testimony at A A50, A52, A77-A78. The acceptance criterion is no detectable PWSCC in either the steam generator divider plates or the tube-to-tubesheet welds. *Id.* at A50, A52, A77-A78. Even though Intervenor's seem to want Indian Point's program to identify length, depth, and orientation, the actual criterion (no detectable PWSCC) is clearer than any criteria that could have been used to define the acceptable combinations of crack depth, location, and length. *See id.* The no detectable PWSSC criteria is easily translated into Intervenor's paradigm as cracks may not exceed lengths or depths of 0 inches and may not occur on either of the components. *See id.*

Third, Intervenor's assert that Indian Point has not identified the inspection methods or techniques used to detect cracking. SOP at 7. But, Intervenor's seem to grasp that Entergy will be performing some regular type of inspection for cracking including "visual, volumetric, or surface" examinations. *Id.* The Staff's experts explain that selection of the appropriate examination will depend on a number of factors including the conditions found in the steam generators, the as-found geometry, and worker safety, among others. *See* Hiser/Karwoski Testimony at A71-A72. As the Staff's experts state, selecting the precise test now to be used in a number of years in the future would preclude applicants from making use of the best available technology at the time of the inspection. *Id.* The Applicant's choice of testing techniques is not unlimited. *Id.* The requirements of the technique(s) chosen by the Applicant must be able to

detect PWSCC, which a number of current inspection techniques have been shown to be acceptable as evidenced by the French experience in which cracks were identified in some SGDPs. *Id.*

Fourth, Intervenor raise concerns that Entergy's actions do not specifically define the appropriate corrective actions. SOP at 7. Here, again, it would be improper to proscribe the appropriate corrective actions that will depend on the results of an inspection and other conditions in the steam generator, which might impact any proposed action. See Hiser/Karwoski Testimony at A51, A77-A78. The Staff's experts explain that "appropriate corrective action[s] will depend on the actual inspection findings, but could include more detailed evaluation of the inspection results, repair of the affected component(s), or replacement of the affected component(s)." *Id.* at A51.

b. The Inspections of the Steam Generator Divider Plates and Tube-to-Tubesheet Welds are Appropriately Timed Based on the Operating History at Indian Point

Dr. Lahey complains that "the anticipated resolution of these issues [PWSCC in the SGDP and TTSW] appear to be beyond the time frame for submission of testimony and the evidentiary hearings ... and thus will not allow for a testing of the adequacy of the proposed resolution of these issues in this proceeding." SOP at 8. This concern is premised on two fundamental misunderstandings related to the license renewal process and the existing conditions at the two Indian Point plants.

First, Dr. Lahey and Intervenor's other experts want to move up all of the inspections regarding the PWSCC and any potential responses to the inspections to a time prior to the hearing on Indian Point's proposal. *Id.* This conflates the adequacy of Indian Point's performance in implementing the application's proposals with the adequacy of the program to manage the effects of aging such the safety functions will be maintained. See 10 C.F.R. § 54.29(a)(1). In other words if the inspections are adequate now, they will be adequate when

they are performed at the appropriate time based on the operating history of the steam generators.

Second, moving the scheduled inspections to prior to the hearing date would only serve to preclude their usefulness. The Staff's experts clarify that the steam generators at IP2 and IP3 have been replaced; they are not the originally-installed steam generators. See Hiser/Karwoski Testimony at A45-A47, A64. IP2's steam generators were replaced in 2000 and IP3's steam generators were replaced in 1989. *Id.* at A46. The Staff's experts explain that the steam generators need to operate over a period of time in order for PWSCC to potentially initiate and become detectable to available methods. *Id.* at A45-A47, A64. As such, inspecting the steam generator divider plate and tube-to-tubesheet welds prior to the period of extended operations may not be conclusive with respect to whether PWSCC is occurring and may not serve to confirm the effectiveness of the water chemistry program. See *Id.* at A47, A64.

CONCLUSION

For the reasons stated above, Intervenors' challenge the Entergy LRA, as presented in NYS-38/RK-TC-5, cannot be sustained, and the issue should be resolved in Entergy's favor.

Respectfully Submitted,

/Signed (electronically) by/

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