

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of)
)
ENTERGY NUCLEAR VERMONT YANKEE,)
L.L.C., and ENTERGY NUCLEAR) Docket No. 50-271-LR
OPERATIONS, INC.)
)
(Vermont Yankee Nuclear Power Station))

NRC STAFF'S PETITION FOR REVIEW OF THE
LICENSING BOARD'S PARTIAL INITIAL DECISION, LBP-08-25

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December 9, 2008

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INTRODUCTION

Pursuant to 10 C.F.R. § 2.341(b)(1), the staff of the U.S. Nuclear Regulatory Commission ("Staff") hereby petitions for review of the Atomic Safety and Licensing Board's ("Board") Partial Initial Decision (Ruling on Contentions 2A, 2B, 3 and 4), LBP-08-25, 68 NRC ____ (Nov. 24, 2008) (slip op.) ("Decision" or "LBP-08-25"). In accordance with 10 C.F.R. § 2.341(b)(4), the Staff submits that Commission review is warranted because the Board's decision regarding Contentions 2, 2A and 2B raises substantial questions of law and policy that are without governing precedent, and the Board makes clearly erroneous findings of fact. Furthermore, Commission review is in the public interest because this decision raises issues that could affect pending and future license renewal determinations.

Specifically, the Board's decision raises substantial legal questions with regard to the proper interpretation and application of 10 C.F.R. §§ 54.3, 54.21(c)(1), and 54.29. The Board's ruling also made a number of clearly erroneous findings regarding the contents of Vermont Yankee's license renewal application, including amendments thereto, that are not supported by

the record viewed in its entirety. Additionally, the Board's finding that the use of an aging management program ("AMP") consistent with the Generic Aging Lessons Learned (GALL) Report, NUREG-1801, does not satisfy the Commission's regulations, raises important questions of policy and is a clear departure from Commission precedent.¹

Therefore, the Staff respectfully requests that the Commission reverse the Board's decision with respect to NEC Contentions 2, 2A and 2B.

STATEMENT OF THE CASE

This proceeding concerns the application of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.'s ("Entergy" or "Applicant") for renewal of Operating License No. DPR-28 for the Vermont Yankee Nuclear Power Station ("VY" or "VYNPS").² On May 26, 2006, New England Coalition ("NEC") filed a timely request for hearing concerning Entergy's license renewal application ("LRA").³ As admitted, NEC Contention 2 read as follows:

Entergy's License Renewal Application does not include an adequate plan to monitor and manage the effects of aging [due to metal fatigue] on key reactor components that are subject to an aging management review,

¹ See *AmerGen Energy Co., LLC (Oyster Creek Nuclear Generating Station) et al.*, CLI-08-23, 68 NRC ___ slip op. at 6 (Oct. 6, 2008) ("CLI-08-23").

² Vermont Yankee Nuclear Power Station License Renewal Application (Jan. 25, 2006) (ADAMS Accession No. ML060300085). Entergy has since supplemented and amended its application several times. See e.g., Staff Exhibits ("Exh.") 8, 22 & 23; Entergy Exh. E2-09 & E2-28. All Exhibits regarding contentions 2A and 2B were admitted by the Board during the July evidentiary hearing. See LBP-08-25 at 6 n.16 & 17.

³ Petition for Leave to Intervene, Request for Hearing, and Contentions (May 26, 2006). Petitions to intervene were also filed by the Vermont Department of Public Service ("DPS"), the Massachusetts Attorney General ("MassAG"), and the Town of Marlboro, Vermont ("Marlboro"). The Board also admitted one of DPS's contentions, which was later settled. See Order (Approving Settlement of DPS Contention 1) (May 31, 2007) (unpublished). The petitions of the MassAG and Marlboro were denied.

pursuant to 10 C.F.R. § 54.21(a) and an evaluation of time limited aging analysis under 10 C.F.R. § 54.21(c).⁴

NEC's Contention 2 focuses on Section 4.3.3 of Entergy's LRA which assessed the effects of the reactor coolant environment on fatigue life for nine plant-specific locations in six reactor components at VY. See LBP-06-20 at 64 NRC at 184 (quoting LRA at 4.3-7). Entergy's calculations indicated that the environmentally-adjusted cumulative usage factors ("CUFen") for 7 of 9 locations had CUFens greater than unity (1.0).⁵ To address the results of this assessment, Entergy stated that "prior to entering the period of extended operation, for each location that may exceed a cumulative usage factor ("CUF") of 1.0 when considering environmental effects, VY will implement one of three possible courses of action, including "further refinement of the fatigue analyses to lower the predicted CUFs to less than 1.0." Joint Stipulation (July 8, 2008) at ¶ 3 (*citing* LRA Section 4.3.3 at 4.3-7).⁶ NEC's Contention challenged this plan to address the environmental effects of the reactor coolant environment on

⁴ *Entergy Nuclear Vermont Yankee, LLC & Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Generating Station), LBP-06-20, 64 NRC 131, 183-87 (2006) ("LBP-06-20").

⁵ Joint Stipulation at ¶1-2 (July 8, 2008). Section III of the ASME Boiler and Pressure Vessel Code ("ASME Code") requires that the cumulative usage factor ("CUF") for Class I components not exceed unity (1.0). NRC Staff's Proposed Findings and Conclusion of Law and Order in the Form of an Initial Decision (Aug. 25, 2008) at 24 ¶ 53 ("Staff Proposed Findings"). The CUF is the sum of the ratios of applied stress cycles (n) to the number of allowable stress cycles (N) for all the various stress magnitudes. *Id.* The ASME Code fatigue curves used to determine N are based on laboratory tests in air. *Id.* at 24-25 ¶54. Effects of the reactor coolant environment on component fatigue are accounted for by multiplying the CUF by an environmental adjustment factor ("Fen"). Entergy's Proposed Findings of Fact and Conclusions of Law on New England Coalition Contentions (Aug. 25, 2008) at 19 ("Entergy's Proposed Findings"). This results in an environmentally adjusted fatigue CUF, which is the "CUFen." *Id.*

⁶ A CUF or CUFen of 1.0 is an acceptance criterion. Staff Proposed Findings at 25 ¶55 (*citing* Transcript of Entergy Nuclear Vermont Yankee Evidentiary Hearing ("Tr.") 825). A CUF or CUFen exceeding 1.0 does not mean the component will fail, but that there is a one to five percent chance of initiating a crack that is three millimeters deep. *Id.* at 25 ¶¶ 55-56 (*citing* Tr. 825, 838, 900-903).

component life.

On September 22, 2006, the Board issued a decision admitting four of NEC's contentions, including Contention 2.⁷

During the summer of 2007, Entergy performed a revised metal fatigue analysis ("Metal Fatigue Reanalysis") to demonstrate that all CUFens would be less than 1.0 for the Period of Extended Operation ("PEO").⁸ These calculations were disclosed to the parties in August 2007.⁹ On September 4, 2007, in response to this disclosure, NEC moved to file a new or amended contention challenging the adequacy of Entergy's Metal Fatigue Reanalysis.¹⁰ On November 7, 2007, the Board admitted NEC's Contention 2A, which read as follows:

. . . . the analytical methods employed in Entergy's . . . CUFen Reanalysis were flawed by numerous uncertainties, unjustified assumptions, and insufficient conservatism, and produced unrealistically optimistic results. Entergy has not, by this flawed reanalysis, demonstrated that the reactor components assessed will not fail due to metal fatigue during the period of extended operation.¹¹

In admitting Contention 2A, the Board decided to hold Contention 2 in abeyance, stating that Contention 2 would not be litigated "unless and until Entergy returns to reliance on a metal

⁷ LBP-06-20, 64 NRC at 175-201.

⁸ Tr. 568-69. Prior to disclosure of the final calculations in August 2007, Entergy provided draft versions of these analyses to all parties on June 7, 2007 (Tr. at 571-74; *Entergy Nuclear Vermont Yankee, LLC & Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), LBP-07-15, 66 NRC 261, 265 (2007) ("LBP-07-15")).

⁹ LBP-07-15, 66 NRC at 265.

¹⁰ [NEC]'s Motion to File a Timely New or Amended Contention (Sept. 4, 2007).

¹¹ LBP-07-15, 66 NRC at 270.

fatigue management program”¹²

On September 17, 2007, Entergy submitted Amendment 31 to its LRA.¹³ This Amendment removes the exceptions to the GALL Report’s¹⁴ recommendations for a fatigue monitoring AMP previously identified in LRA Section B.1.11.¹⁵ This Amendment made Entergy’s Fatigue Monitoring Program (“FMP”) consistent with the AMP described in Section X M-1 of the GALL Report and explicitly stated that Entergy’s program would manage the affects of aging in accordance with 10 C.F.R. § 54.21(c)(1)(iii).¹⁶ Consequently, Entergy’s FMP will include assessment of the impact of the reactor water environment and will “include periodic review of accumulated transient cycles and associated updates of fatigue usage calculations, if necessary.”¹⁷ Amendment 31 also docketed the results of the Metal Fatigue Reanalysis disclosed to the parties in August 2007. See Staff Exh. 22.

¹² *Id.* at 271.

¹³ Staff Exh. 22.

¹⁴ Staff Exh. 7 (NUREG-1801, Generic Aging Lessons Learned (GALL) Report, Vol. 2 Rev. 1 (2005)).

¹⁵ Staff Exh. 22 at Attachment 1; Staff Exh. 1 at 3-72 to 3-75. As originally submitted, Section B.1.11 of the LRA described a fatigue monitoring program, with exceptions and enhancements to the GALL Report’s AMP. Staff Exh. 1 at 3-72. Specifically, as originally submitted, the LRA took exception to the “preventive actions” element stating: “[t]he Fatigue Monitoring Program only involves tracking the number of transient cycles and does not include assessment of the impact of reactor water environment on critical components.” Staff Exh. 1 at 3-73. The Applicant also took exception to the program element “detection of aging effects” stating: “[t]he VYNPS program does not provide for periodic update of the fatigue usage calculations.” *Id.*

¹⁶ Staff Exh. 22 at Attachment 1. Counsel for Entergy suggested that the calculations provided to the parties in August 2007 would “eliminate the need for Entergy to have a program to manage [environmentally assisted] metal fatigue.” LBP-07-15, 66 NRC at 265. This did not prove to be the case. See Staff Exh. 22.

¹⁷ Staff Exh 22 at Attachment 1; see also Staff Exh. 1 at 3-72 to 3-75.

After review of the Metal Fatigue Reanalysis, the Staff raised concerns regarding the calculation of stresses for the core spray (“CS”), reactor recirculation (“RR”), and feedwater (“FW”) nozzles.¹⁸ In response, Entergy performed a confirmatory metal fatigue analysis (“Confirmatory Analysis”) for the FW nozzle.¹⁹ This prompted Contention 2B, in which NEC asserted that the Confirmatory Analysis was insufficient because it only addressed one of the alleged deficiencies in the revised analyses and only addressed the FW nozzle.²⁰ On April 24, 2008, the Board admitted this new contention and designated it as Contention 2B.²¹ Thus, NEC’s contentions challenge the Applicant’s consideration of environmental effects on component fatigue life.

An evidentiary hearing concerning the admitted contentions was held in Newfane, Vermont on July 21-24, 2008. LBP-08-25 at 1. On November 24, 2008, the Board issued its

¹⁸ See Staff Proposed Findings at 31 ¶¶ 75-76. Entergy used a single stress term as input to a Green’s Function to calculate stresses due to temperature transients. *Id.* at 31 ¶ 75. The Green’s Function is an analytical technique used to solve “mathematical equations derived to model and predict certain observed physical behavior.” See LBP-08-25 at 49 n.72 (internal citation omitted). The Staff’s concern was not the use of the Green’s Function, but the use of a single stress term, instead of the use of all six stress terms, to calculate the stresses. *Id.* at 31 ¶ 76; see also NEC Ex. NEC-JH_23 (draft RIS 2008-10 explaining the Staff’s concern about the use of a single stress term).

¹⁹ Staff Ex. 1 at 4-40 to 4-41 (NUREG-1907, Safety Evaluation Report Related to the License Renewal of Vermont Yankee Nuclear Power Station (May 2008) (“SER”)(finding the Confirmatory Analysis for the FW nozzle acceptable and imposing a license condition to perform similar analyses for the CS and RR nozzles)). See also *id.* at 3-72 to 3-75 (reviewing VY’s fatigue monitoring AMP).

²⁰ New England Coalition, Inc.’s (NEC) Motion to File a Timely New or Amended Contention (Mar. 17, 2008) (“March 17 Amendment”).

²¹ Order (Granting Motion to Amend NEC Contention 2A) at 2 (Apr. 24, 2008) (unpublished) (“April 24 Order”). In the April 24 Order, the Board deemed NEC’s March 17 Amendment to be “a subset of Contention 2A” designed to prevent NEC from being foreclosed from challenging Entergy’s Confirmatory Analysis. April 24 Order at 2. Because the deadline for NEC to file its initial statements of position was approaching, the Board did not endeavor to restate Contention 2A or NEC’s March 17 Amendment, instead, the Board designated NEC’s March 17 Amendment Contention 2B. *Id.*

Partial Initial Decision, LBP-08-25.

SUMMARY OF THE BOARD'S DECISION

In LBP-08-25, the Board concluded that “Entergy’s CUFen analyses [for the CS and RR nozzles] do not comply with relevant requirements and do not provide reasonable assurance of safety that is required by 10 C.F.R. §§ 54.21(c)(1) and 54.29.” LBP-08-25 at 151. The Board stated that it would be “inconsistent with the language, structure and intent of the Part 54 regulations” to allow Entergy to postpone the “necessary” metal fatigue analyses. *Id.* at 57. Thus, the Board ruled that “authorization to issue the license renewal is contingent upon, and the license renewal application cannot be granted unless and until, Entergy completes the confirmatory CUFen analyses on the core spray and reactor recirculation nozzles” *Id.* at 151.

The Board reasoned that “current science and NRC policy (GSI-190 Memo)²² have determined” that environmental adjustment factors “are clearly necessary to accurately assess whether the component is likely to fail due to metal fatigue during the PEO.” LBP-08-25 at 65. Thus, the Board concluded that the environmental effects of the reactor water environment “must be included in the CUF calculations when a license renewal is being considered” *Id.* at 66. The Board also stated that CUFen analyses are TLAAs “within the meaning of 10 C.F.R. § 54.3(a).” *Id.* at 13.

In addition, the Board alleged that the Applicant attempted to “re-package” its time-limited aging analysis (“TLAA”) as an AMP. *See id.* at 59. Indicating that Energy was not

²² Entergy Exh. E2-03 (Memorandum from Ashok C. Thadani to William D. Travers, Closeout of Generic Safety Issue 190, “Fatigue Evaluation of Metal Components for 60-year Plant Life” (Dec. 26, 1999) (“GSI-190 close out memorandum”).

currently pursuing an AMP, the Board stated that if Entergy were to choose “to proceed under the AMP route, NEC may revitalize dormant Contention 2 (as to the adequacy of Entergy’s AMP).” *See id.* at 67.

In conclusion, the Board ruled that Entergy must complete the necessary confirmatory analyses for the CS and RR nozzles before a renewed license can be granted. *See id.* at 151. The Board further stated that the “record will be held open with regard to Contentions 2A and 2B, and Contention 2 will be held in abeyance until 45 days after those events occur.”²³

ISSUES PRESENTED

In LBP-08-25, the Board erred in several respects. First, the Board erroneously interpreted and applied 10 C.F.R. §§ 54.3, 54.21(c)(1), and 54.29 to Entergy’s LRA. Then, due to a misinterpretation and misapplication of these regulations, the Board erroneously concluded that CUFen calculations are a “condition precedent” to issuing a renewed license. *See* LPB-08-25 at 151. Finally, the Board erroneously concluded that Entergy’s LRA, which includes a fatigue monitoring program consistent with the GALL Report, does not provide reasonable assurance required by § 54.29. *See* LBP-08-25 at 2. Accordingly, the issues presented include the following:

1. Whether the Board’s interpretation that the Applicant’s CUFen analyses fall within the definition of TLAA in 10 C.F.R. § 54.3, is incorrect?
2. Whether the Board’s conclusion that the Applicant’s AMP, which is consistent with GALL, does not make the demonstration required by 10 C.F.R. § 54.21(c)(1) and is not adequate to provide reasonable assurance in accordance with § 54.29 is incorrect?

²³ *Id.* at 152. It is not clear from the Board’s Decision if the record will be held open for 45 days after submission of the calculations or 45 days after Staff approval of the calculations. *Compare* LBP-08-25 at 67-68 *with* LBP-08-25 at 151-52. Entergy filed a motion for clarification regarding this matter with the Board. *See* Entergy’s Motion for Clarification (Dec. 4, 2008).

3. Whether the Board's finding that CUFen calculations are required as a legal and technical matter is incorrect?

DISCUSSION

I. Legal Standards Governing Petitions for Review

The Commission's regulations provide for discretionary Commission review of "a full or partial initial decision by a presiding officer." 10 C.F.R. § 2.341(b)(1). The Commission will consider a petition if it raises a substantial question with respect to one or more of the following:

- (i) a finding of material fact is clearly erroneous . . . ;
- (ii) a necessary legal conclusion is without governing precedent or is a departure from or contrary to established law;²⁴
- (iii) a substantial and important question of law, policy or discretion has been raised;
- (iv) the conduct of the proceeding involved a prejudicial procedural error;
or
- (v) any other consideration which the Commission may deem to be in the public interest.

10 C.F.R. § 2.341(b)(4).

The Commission reviews legal or policy questions *de novo*.²⁵ The Commission has cited several reasons for granting review of legal and policy questions including: (1) when a case presents "a legal issue that is essential to a broad spectrum of Commission licensing decisions," (2) when a question of proper interpretation of the Commission's regulations exists, and

²⁴ See, e.g., *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Unit 1; Sequoyah Nuclear Plant, Units 1 & 2; Browns Ferry Nuclear Plant, Units 1, 2 & 3), CLI-04-24, 60 NRC 160, 190 (2004) ("TVA").

²⁵ See *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-00-13, 52 NRC 23, 29 (2000) ("PFS") (citing *Sequoyah Fuels Corp. & Gen. Atomics* (Gore, Oklahoma Site), CLI-97-13, 46 NRC 195, 206 (1997)).

(3) when “the Presiding Officer’s ruling is without governing precedent,” i.e., the Commission “has not had the opportunity to rule on the precise issue presented”²⁶

The standard of review for findings of fact is “clearly erroneous,” i.e., the Board’s findings are “not even plausible in light of the record viewed in its entirety.”²⁷ The Commission defers to a licensing board’s findings of fact as long as the “Licensing Board has issued a plausible decision that rests on carefully rendered findings of fact.”²⁸ The Commission will, however, reject or modify a licensing board’s findings if, after accounting for appropriate deference to the “primary fact finder,” the Commission is “convinced that the record compels a different result.”²⁹

II. The Commission Should Undertake Review of the Board’s Decision on Contentions 2, 2A and 2B

The Board’s decision regarding contentions 2, 2A and 2B warrants Commission review under 10 C.F.R. § 2.341(b)(4) because the Board’s legal and factual conclusions raise substantial questions of law, fact, and policy. The Board’s decision raises legal questions with regard to the proper interpretation and application of 10 C.F.R. §§ 54.3, 54.21(c)(1), and 54.29. Commission review is warranted because the Board’s decision raises substantial questions with regard to the proper interpretation of these regulations, which “the Commission has not had the

²⁶ See *Hydro Resources, Inc.* (P.O Box 777, Crownpoint, New Mexico 87313), CLI-06-7, 63 NRC 165, 166 (2006) (“*HRI*”).

²⁷ *TVA*, CLI-04-24, 60 NRC at 189; *Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), CLI-03-8, 58 NRC 11, 25-26 (2003) (“*PFS*”).

²⁸ *PFS*, CLI-03-8, 58 NRC at 25-26; *Union Electric Co.* (Callaway Plant, Unit 1), ALAB-740, 18 NRC 343, 368 (1983).

²⁹ *General Public Utilities* (Three Mile Island Nuclear Station, Unit No. 1), ALAB-881, 26 NRC 465, 473 (1987).

opportunity to rule on” *HRI*, CLI-06-7, 63 NRC at 166; see also 10 C.F.R.

§ 2.341(b)(4)(ii), (iii).

In addition, the Board’s ruling reflects a number of clearly erroneous factual findings that are not plausible in light of the record viewed in its entirety. See *TVA*, CLI-04-24, 60 NRC at 189. First, the Board states that the *CUF* calculations are at issue (LBP-08-25 at 65), when in fact, the admitted contentions and record indicate that the contested issue is the *CUFen* calculations. See *supra* at 4-6. Second, the Board erroneously failed to account for the fact that the record clearly indicates that Entergy is implementing a fatigue monitoring AMP consistent with the GALL Report. See LBP-08-25 at 59, 60. The Board’s finding that the use of an AMP consistent with the GALL Report is inadequate to demonstrate compliance with the Commission’s regulations raises important questions of policy regarding whether an applicant for license renewal may rely on GALL, and is a clear departure from Commission precedent. See CLI-08-23, 68 NRC ____, slip op at 6; see also 10 C.F.R. § 2.341(b)(4)(ii), (iii). Finally, Commission review is in the public interest because this decision could affect pending and future license renewal determinations. See *HRI*, CLI-06-7, 63 NRC at 166.

A. Legal Standards for License Renewal

To renew an operating license, 10 C.F.R. § 54.29 requires the Commission to find that “actions have been identified and have been or *will be* taken . . . such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB.”³⁰ 10 C.F.R. § 54.29(a) (emphasis added).

³⁰ Current Licensing Basis (“CLB”) is defined in 10 C.F.R. § 54.3. It does not include the LRA. See 10 C.F.R. § 54.3. The Final Safety Analysis Report (“FSAR”) supplement required by § 54.21(d) (continued. . .)

Pursuant to 10 C.F.R. § 54.21(c), a license renewal application must include “[a]n evaluation of time-limited aging analyses.” In the context of license renewal, TLAAAs are limited to those that meet the following six criteria:

(1) involve systems, structures, and components within the scope of license renewal, as delineated in § 54.4(a); (2) consider the effects of aging; (3) involve time-limited assumptions *defined by the current operating term*, for example, 40 years; (4) were determined to be relevant by the licensee in making a safety determination; (5) involve conclusions or provide the basis for conclusions related to the capability of the system, structure, and component to perform its intended function, as delineated in § 54.4(b); and (6) *are contained or incorporated by reference in the CLB.*

10 C.F.R. § 54.3 (emphasis added).

Specifically, with respect to TLAAAs, 10 C.F.R. § 54.21 requires that each application contain:

- (c) An evaluation of time-limited aging analyses.
- (1) A list of time-limited aging analyses, as defined in § 54.3, must be provided. The applicant shall demonstrate that—
- (i) The analyses remain valid for the period of extended operation;
 - (ii) The analyses have been projected to the end of the period of extended operation; *or*
 - (iii) The effects of aging on the intended function(s) *will be* adequately managed for the period of extended operation.

(emphasis added). To satisfy § 54.21(c)(1), an applicant must list TLAAAs and demonstrate

(. . .continued)

does not become part of the CLB until the new license is issued with a condition requiring that the FSAR supplement be included in the next FSAR update in accordance with § 50.71(e). See *e.g.*, James A. Fitzpatrick Nuclear Power Plant Renewed Facility Operating License, No. DPR-59 at 8 (Sept. 8, 2008) (ADAMS Accession No. ML052720287).

compliance with (i), (ii), or (iii).³¹

If a license renewal applicant selects 10 C.F.R. § 54.21(c)(1)(i), its application must demonstrate that its existing analyses, as defined in § 54.3, are valid for 60 years. Staff July 9 Brief at 4. If an applicant selects (ii), its application must demonstrate that its existing analyses have been projected to 60 years, such that no further analysis or management is necessary. Staff July 9 Brief at 4-5. Finally, if the applicant “cannot or chooses not to justify or extend an *existing* TLAA,” its application must list TLAAs and demonstrate that the effects of aging *will be* adequately managed for the period of extended operation pursuant to § 54.21(c)(1)(iii).³² Thus, in accordance with the Commission’s regulations, an applicant can properly demonstrate under (iii) that aging effects associated with the TLAA will be adequately managed by using an AMP. *Id.* (citing 60 Fed. Reg. at 22,480).

There is no requirement to show that CUFens (as opposed to CUFs) will not exceed 1.0. Neither the Commission’s regulations nor the ASME Code require that licensees, including license renewal applicants, calculate CUFens. See Staff Proposed Findings at 24 ¶53; Staff Exh. 1 at 4-32. License renewal applicants consider CUFens because of the recommendation in the GSI-190 close out memorandum, which states that “licensees *should* address the affects of the coolant environment on component fatigue life as aging management programs are formulated in support of license renewal.” Entergy Exh. E2-03 at 1; Staff Proposed Findings

³¹ NRC Staff’s Brief in Response to Board Order (July 9, 2008) at 4 (“Staff July 9 Brief”). The Staff July 9 Brief was in response to the Board Order (Regarding the Briefing of Certain Legal Issues) (June 27, 2008) (unpublished) (“June Order”).

³² Staff July 9 Brief at 5 (citing Nuclear Power Plant License Renewal; Revisions, Final Rule, 60 Fed. Reg. 22,461, 22,480 (May 8, 1995) (emphasis added)).

at 26 ¶ 59.³³

One way for a license renewal applicant to make the demonstration required by 10 C.F.R. § 54.21(c)(1)(iii) is to commit to follow the guidance provided in the GALL Report in Section X M-1 “Metal Fatigue of Reactor Coolant Pressure Boundary” (Staff Exh. 7 at X M-1 to X M-2).³⁴ Section X M-1 provides guidance for an adequate metal fatigue AMP that includes consideration of environmental effects.³⁵ The Commission has stated that a “license renewal 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.” CLI-08-23, 68 NRC ____, slip op. at 6.

B. The Board’s Interpretations of 10 C.F.R. §§ 54.3, 54.21(c)(1) and 54.29 Are Erroneous

The Board’s interpretations of 10 C.F.R. §§ 54.3, 54.21(c)(1) and 54.29 are without precedent and raise important questions of law and policy, thereby warranting Commission review. As discussed below, the Board has misconstrued the definition of TLAA as it applies to license renewal. Proper interpretation and application of § 54.3 is a necessary prerequisite to

³³ See also Staff Exh. 19 (NUREG-1800, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants at 4.3-2 to 4.3-3 (Sept. 2005) (“SRP”).

³⁴ See NRC Staff Initial Statement of Position on NEC Contentions 2A, 2B, 3 and 4 (May 13, 2008) at 12 (“Staff Initial Position”); Staff July 9 Brief at 6.

³⁵ Staff Exh. 7 at X M-1 to X M-2. The GALL Report states that an acceptable AMP for metal fatigue will “[p]rovide[] for corrective actions to prevent the usage factor from exceeding the design code limit during the period of extended operation. Acceptable corrective actions include repair of the component, replacement of the component and a more rigorous *analysis*” Staff Exh. 7 at X M-1 to X M-2. (emphasis added). In this context, CUFen analyses are part of an AMP, they are not an existing analysis under 10 C.F.R. § 54.21(c)(1)(i) or (ii).

implementation of §§ 54.21(c)(1) and 54.29.³⁶ Because the Board misconstrued the definition of TLAA as defined in § 54.3, the Board erroneously concluded that Entergy did not make the “demonstration” required by § 54.21(c)(1), and thus the Board stated that it could not make a finding of reasonable assurance under § 54.29(a). See LBP-08-25 at 57, 63, 151. This improper interpretation and application of the Commission’s regulations warrants Commission review under § 2.341(b)(4).

1. The Board’s Interpretation and Application of TLAA as Defined in 10 C.F.R. § 54.3 is Incorrect

The Board has misinterpreted and incorrectly applied the definition of TLAA. The Board states that “[t]he CUFen analyses are ‘time-limited aging analyses’ within the meaning of 10 C.F.R. § 54.3(a).” LBP-08-25 at 13. The Board also states that “[t]here is no guidance as to what the ‘evaluation’ [in § 54.21(c)(1)] must cover or contain. But since one cannot evaluate a TLAA unless the TLAA exists, the evaluation requirement seems to presume the pre-existence of the TLAAs.” LBP-08-25 at 18. The Board concluded that

in the context of license renewal, the term ‘time-limited aging analysis’ appropriately incorporates *both* the metal fatigue analysis previously embedded in the applicant’s licensing basis (e.g., the CUF), and the environmental adjustment factors (Fen) that current science and NRC policy (GSI-190 Memo) have determined are clearly necessary to accurately assess whether the components is likely to fail due to metal fatigue during the PEO.

Id. at 65 (emphasis in original). The Board’s interpretation of the definition of TLAA is clearly erroneous, raising substantial and important questions of law and policy.

³⁶ The Staff previously addressed the proper interpretation of these regulations in its briefs in response to the June Order and in the Staff’s Proposed Findings. See *generally* Staff July 9 Brief; NRC Staff’s Reply Brief (July 15, 2008); Staff Proposed Findings.

First, the definition of TLAA, for the purpose of license renewal, is specific. Section 54.3 requires that a TLAA have six characteristics, including “being contained or incorporated by reference in the CLB” and “involving time-limited assumptions defined by the current operating term.” See 10 C.F.R. § 54.3. Accordingly, for purposes of license renewal, TLAAAs are *existing* analyses that are part of the plant’s CLB. Staff Proposed Findings at 23-24 ¶ 50. They are not new analyses. *Id.*

Second, contrary to the Board’s interpretation, neither the Commission’s regulations nor the ASME Code require that license renewal applicants demonstrate that CUFens will not exceed 1.0. See Exh. E2-03 at 1; Staff Exh. 1 at 4-32 (stating “[t]he ASME code does not require environmental adjustment for fatigue analyses.”). Vermont Yankee’s CLB does not include CUFen TLAAAs. Entergy Proposed Findings at 12-13. Thus, the requirements of 10 C.F.R. § 54.21(c)(1) do not apply to Vermont Yankee’s CUFen TLAAAs because Vermont Yankee’s CLB does not include CUFen TLAAAs (therefore they do not fall within the definition of TLAA in § 54.3). See *id.*

Third, the Board erroneously asserts that the Staff’s SER³⁷ supports the Board’s interpretation that CUFens are TLAAAs as defined in 10 C.F.R. § 54.3. See LBP-08-25

³⁷ The Board also asserted that an August 20, 2007 summary of a telephone conference between the Staff and the Applicant supports the Board’s interpretation that the CUFen analyses must be performed prior to issuance of a renewed license. See LBP-08-25 at 17, 59 (referencing (NEC Exh. NEC-JH_62). This summary was selected by the intervenor from over thirty telephone conference summaries and represents a snapshot in time of an evolving process. The Board further claimed, based on this summary, that the Staff changed its position with regard to the requirements of 10 C.F.R. § 54.21(c)(1). However, as the Staff described in its July 9 Brief, the Staff did not change its position; rather Entergy changed its position with respect to how it would satisfy 10 C.F.R. § 54.21(c)(1). Staff July 9 Brief at 2-4.

at 60, 65.³⁸ The Board, however, failed to acknowledge that Entergy's FMP is discussed in the "Aging Management Review Results" section of the SER, Section 3.0.3.2.10. *Compare id.* at 60 *with* Staff Exh. 1 at 3-72 to 3-75. Moreover, the format and structure of an SER are not interpretive evidence of the intent and applicability of the Commission's regulations. The Board's conclusion to the contrary is clearly erroneous.

Since the Board misconstrued the definition of TLAA, the Board made the erroneous factual assertion that "even if we posit that the Fens are not part of the TLAA's, in this case it is the CUFs that are defective . . . Entergy's argument, that the Fen is not part of the TLAA, is irrelevant, because the defective part -the CUF- is indisputably part of the TLAA." LBP-08-25 at 65. This statement is clearly erroneous because the calculations challenged by NEC's contentions are not the CUF TLAA's required to be reviewed under 10 C.F.R. § 54.21(c)(1). *See supra* at 4-6. The CUF calculations that must be reviewed under § 54.21(c)(1) are the ones in the CLB which *do not* address environmental affects and were not calculated using the simplified Green's Function methodology.³⁹ *See* Entergy Proposed Findings at 12-13. The calculations NEC is challenging are the calculations Entergy performed to address the recommendation in the SRP and the GSI-190 close out memorandum to consider the effects of the reactor coolant environment on CUFs as AMPs are formulated.

For the reasons discussed above, the Board erroneously concluded that CUFens are

³⁸ The Board also reasoned that their interpretation of TLAA is correct because the applicant "acknowledged Contentions 2A and 2B were TLAA challenges." LBP-08-25 at 65 (citing Entergy Proposed Findings at 4). However, regardless of the parties' characterizations of what the CUFen analyses are in the course of this litigation, the Board must focus on the proper interpretation of the regulations. A Board cannot properly rely on misstatements, if any, of others to support its legal interpretations and conclusions regarding the Commission's regulations.

³⁹ For a discussion of the Green's Function methodology *see supra* at 6 n.18.

TLAAs as defined by 10 C.F.R. § 54.3. The Board's conclusion of law regarding the interpretation and application of TLAAs is contrary to the plain language of § 54.3 and is without legal precedent because the Commission "has not had the opportunity to rule on this precise issue." See CLI-06-7, 63 NRC at 166. This issue interpretation could affect pending and future license renewal reviews because it is critical that requirements associated with TLAAs are correctly applied to all LRAs. See *id.* Thus, pursuant to § 2.341, Commission review is warranted.

2. The Board's Interpretation and Application of 10 C.F.R. §§ 54.21(c)(1) and 54.29 is Incorrect

The Board's requirement that metal fatigue calculations precede issuance of a license renewal is erroneous and raises substantial questions of law and policy. See LBP-08-25 at 151. The Board states in its Decision that under 10 C.F.R. § 54.21(c)(1) the demonstration required by 10 C.F.R. § 54.21(c)(1)(i)-(iii) "is a *condition precedent* to issuance of a license renewal." LBP-08-25 at 20 (emphasis in original). The Board states that the Staff's interpretation of Section 54.21(c)(1)(iii) "render[s] 10 C.F.R. § 54.21(c)(1)(ii) superfluous, thus violating a cardinal rule of statutory and regulatory interpretation." *Id.* at 60 (internal citations omitted). The Board reasoned that allowing an applicant to "postpone the performance of the necessary 'analysis-of-record' TLAA, is inconsistent with the language, structure, and intent of the Part 54 regulations" *Id.* at 57 (internal citations omitted). The Board is not correct.

First, the Board's interpretation of 10 C.F.R. § 54.21(c)(1) collapses subparagraph (iii) into (ii), thereby rendering subparagraph (iii) superfluous, which is contrary to the rules of

statutory construction.⁴⁰ Section 54.21(c)(1) provides an applicant with three distinct options – (i), (ii), or (iii). A demonstration in the application that a TLAA, as defined in § 54.3, is either good for 60 years or has been projected to 60 years is only required if the applicant selects 10 C.F.R. § 54.21(c)(1)(i) or (ii). Applicants selecting the subparagraph (iii) option are *not* required to demonstrate that existing TLAA analyses are either good for 60 years or have been projected to 60 years. Staff July 9 Brief at 6. The Commission has explained that “if an applicant cannot or chooses not to justify or extend an existing time-limited analysis” then the applicant can “[j]ustify that the effects of aging *will be* adequately managed for the period of extended operation” *Id.* at 5 (quoting 60 Fed. Reg. at 22,480 (emphasis added)). The Commission has explicitly acknowledged that an applicant can demonstrate that the effects of aging will be adequately managed by “commit[ing] to an aging management program.” *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-08-28, 68 NRC ___, slip op. at 7 n.24 (Nov. 6, 2008).

In this case, Entergy committed to implement an AMP in accordance with 10 C.F.R § 54.21(c)(1)(iii). Entergy Proposed Findings at 14. Entergy’s AMP incorporates the program recommended in GALL Section X M-1. *See id.* Specifically, Entergy’s program will “include periodic review of accumulated transient cycles and associated updates of fatigue usage calculations, if necessary.” Staff Exh. 1 at 3-73; Staff Exh. 22 at Attachment 1. Therefore, the Board’s suggestion that further analyses cannot be part of an AMP, see LBP-08-25 at 20, is erroneous.

⁴⁰ Staff July 9 Brief at 7. *See also Nat’l Endowment for the Arts v. Finley*, 524 US 569, 609 (1998) (“Statutory interpretations that ‘render superfluous other provisions in the same enactment’ are strongly disfavored.”) (internal citations omitted).

Even if the Staff's interpretation that CUFens are not TLAAs for the purpose of license renewal is incorrect, and the CUFens are therefore subject to 10 C.F.R. § 54.21(c)(1), Entergy's LRA includes an evaluation of CUFens for 60 years in Table 4-3-3.⁴¹ Entergy has explicitly stated that it has selected to implement an AMP under § 54.21(c)(1)(iii). See Staff Ex. 22 at Attachment 1. Although the Board did not acknowledge it, Entergy is implementing an AMP in accordance with (iii), that is consistent with the GALL Report.⁴² Thus, contrary to the Board's conclusion, Entergy has made the demonstration required by 10 C.F.R. § 54.21(c)(1).

Second, the Board erroneously concludes that an AMP that includes a commitment to perform CUFens TLAAs prior to the period of extended operation does not provide the reasonable assurance required by 10 C.F.R. § 54.29(a). See LBP-08-25 at 66.

Section 54.29(a) provides that the Commission may issue a renewed license if it finds that:

- (a) Actions have been identified and have been or *will be* taken with respect to 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 These matters are:
 - (2) Time-limited aging analyses that have been identified to require review under § 54.21(c)

⁴¹ If the Board's position that TLAAs are not frozen in time and therefore the CUFen TLAAs fall within the definition of § 54.3 is accepted, the Board still fails to recognize that Entergy is implementing an AMP consistent with GALL and that the Commission has found that this provides reasonable assurance. See CLI-08-23, 68 NRC ____, slip op. at 6.

⁴² See LBP-08-25 at 60 (stating that an AMP is not discussed in the SER). The Board states that Entergy simply "re-packag[ed] its TLAAs as an AMP" and that this is an example of "form over substance." LBP-08-25 at 59. This is incorrect. License Amendment 31 and the SER illustrate that Entergy explicitly modified its AMP so that it would be consistent with the fatigue monitoring AMP in the GALL Report by removing exceptions previously taken to GALL, in particular, making the consideration of environmentally assisted fatigue part of the AMP. See Staff Ex. 22; Staff Ex. 1 at 3-72 to 3-73.

10 C.F.R. § 54.29(a) (emphasis added).

Accordingly, a renewed license may be issued if there is reasonable assurance that actions *will be* taken to ensure continued compliance with the CLB. The Commission has stated that “an applicant’s use of an aging management program identified in GALL constitutes reasonable assurance that it will manage the targeted aging effect during the renewal period.” CLI-08-23, 68 NRC ____, slip op. at 6. Entergy has complied with this requirement. See Staff Exh. 1 at 4-37 to 4-38, Sect. 3.0.3.2.10.

As illustrated above, the Board’s interpretation and application of 10 C.F.R. §§ 54.21(c)(1) and 54.29 are erroneous. Commission review is warranted under § 2.341(b)(4) because clarification is needed regarding the proper interpretation of these regulations. The Commission has not had “the opportunity to rule on the[se] precise issue[s].” *HRI*, CLI-06-7, 63 NRC at 166. In addition, the proper interpretation and application of these regulations may affect pending and future license renewal determinations. See *id.* Finally, the Board has raised a substantial question of policy by rejecting or otherwise not acknowledging that Entergy’s AMP is consistent with the GALL Report. See 10 C.F.R. § 2.341(b)(4)(iii).

3. The Board Misconstrued the Requirement for CUFen Calculations

As indicated earlier, the Board erroneously concluded that an analysis of metal fatigue that does not include the “effects of the LWR environment (the Fen) would be insufficient, both as a technical matter and as a legal matter under 10 C.F.R. §§ 54.29(c)(i), (ii) or 54.29(a).” See LBP-08-25 at 58. The Commission’s regulations provide applicants with three distinct options to satisfy the requirements of 10 C.F.R. § 54.21(c). Entergy has elected to address the environmental effects of fatigue through its fatigue monitoring AMP, consistent with the GALL Report’s recommendations, in accordance with § 54.21(c)(1)(iii). See Staff Exh. 22. Technical

and legal matters with respect to §§ 54.21(c)(i) and (ii) are not applicable.

In addition, the Board erroneously states that “current science and NRC Policy (GSI-190 Memo)” require that calculations for both CUF and CUFen be performed for the CS and RR outlet nozzles in order to provide reasonable assurance that metal fatigue failure will not occur. LBP-08-25 at 65; *see also id.* at 58, 66.

This conclusion is flawed for two reasons. First, NRC Policy has *not* determined that the CUFen calculations “are clearly necessary to accurately assess whether the component is likely to fail due to metal fatigue during the PEO.” *See* LBP-08-25 at 65. Contrary to the Board’s interpretation, the GSI-190 close out memorandum simply states that “licensees *should* address the effects of the coolant environmental on component fatigue life *as aging management programs* are formulated in support of license renewal.” Entergy Exh. E2-03 at 1 (emphasis added). This is simply a recommendation, it is not a requirement.

Second, as the Staff previously stated to the Board, there are no regulatory requirements requiring an applicant to perform CUFen calculations prior to the issuance of a renewed license. Staff July 9 Brief at 8; Staff Proposed Findings at 25-26. Therefore, the Board’s conclusion that CUFen calculations are required by current science and NRC policy is erroneous.⁴³

Thus, Commission review is warranted under 10 C.F.R. § 2.341 because the Board’s conclusions are not supported and raise substantial questions that the Commission has not had the opportunity to consider. *See HRI*, CLI-06-7, 63 NRC at 166. In addition, the requirements

⁴³ The Board’s reference to such a requirement based on “current science” is simply inapposite when an applicant has demonstrated compliance with NRC’s regulatory requirements.

regarding CUFen calculations and license renewal applicants' reliance on GALL programs present legal issues that may affect other license renewal determinations. *See id.*

C. Commission Review Under 10 C.F.R. § 2.341(b)(4)(v) is Warranted

Even if the Commission were to find that review of LBP-08-25 did not meet the criteria under 10 C.F.R. § 2.341(b)(4) (i)-(iv), the Staff requests that the Commission review this decision pursuant to § 2.341(b)(4)(v), which allows for Commission review for “any consideration which the Commission may deem to be in the public interest.” The Board’s conclusion in this case regarding Contentions 2, 2A and 2B is likely to affect other pending and future license renewal proceedings.⁴⁴

In addition, the viability of the GALL Report is effectively called into question by the Board’s decision. As stated herein, Entergy’s fatigue monitoring AMP is consistent with the recommendations in the GALL Report. The Commission has stated that the “use of an AMP consistent with GALL constitutes reasonable assurance that the targeted aging effect will be adequately managed during the renewal period.” CLI-08-23, 68 NRC ____, slip op. at 6. Nevertheless, the Board has concluded that this program does not satisfy 10 C.F.R. §§ 54.21(c)(1) and 54.29. In effect, the Board has called into question the Commission’s determination that use of GALL consistent programs constitutes reasonable assurance. *See* CLI-08-23, 68 NRC ____, slip op. at 6. Therefore, the Commission should exercise its discretion to review this substantial question of Commission policy.

⁴⁴ *See e.g., Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 & 3), LBP-08-13, 68 NRC ____, slip op. at 113 (July 31, 2008); *Northern States Power Co.* (formerly Nuclear Management Co., LLC) (Prairie Island Nuclear Generating Plant, Units 1 & 2), 68 NRC ____, LBP-08-26, slip op. at 56-60 (questioning the adequacy of an applicant’s description of a program “consistent” with the GALL Report).

CONCLUSION

For the reasons stated above, the Commission should consider this Petition for Review and reverse the Board's decision in LBP-08-25 regarding Contentions 2, 2A and 2B.

Respectfully submitted,

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Dated at Rockville, Maryland
this 9th day of December, 2008

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of)
)
ENTERGY NUCLEAR VERMONT YANKEE,)
LLC and ENTERGY NUCLEAR) Docket No. 50-271-LR
OPERATIONS, INC.)
)
(Vermont Yankee Nuclear Power Station))

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S PETITION FOR REVIEW OF THE LICENSING BOARD'S PARTIAL INITIAL DECISION, LBP-08-25" in the above-captioned proceeding have been served on the following by electronic mail and by deposit in the U.S. Nuclear Regulatory Commission's internal mail system, or, as indicated by an asterisk (*), by electronic mail and by deposit in the U.S. Mail system this 9th day of December, 2008.

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