

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ENTERGY NUCLEAR VERMONT YANKEE, L.L.C.)
and ENTERGY NUCLEAR OPERATIONS, INC.)
(Vermont Yankee Nuclear Power Station))

Docket No. 50-271-LR

CLI-10-17

MEMORANDUM AND ORDER

We have before us today two petitions for review – one by the NRC Staff and the other by intervenor New England Coalition, Inc. (NEC).¹ The Staff seeks review of a Partial Initial Decision (LBP-08-25) that the Licensing Board issued in this license renewal proceeding, ruling in favor of NEC on the merits of two contentions regarding metal fatigue (Contentions 2A and 2B).² In addition, five non-litigants seek permission to file a brief *amici curiae* addressing the Staff's petition.³ We conclude that the Staff's petition satisfies our standards for review, and we

¹ NRC Staff's Petition for Review of the Licensing Board's Partial Initial Decision, LBP-08-25 (Dec. 9, 2008) (Staff Petition); New England Coalition's Petition for Review of the Licensing Board's Full Initial Decision, LBP-09-09 (July 23, 2009) (NEC Petition). The Commonwealth of Massachusetts also filed a petition for review of LBP-08-25. *Commonwealth of Massachusetts Petition for Review of LBP-08-25 and Request for Consolidated Ruling* (Dec. 2, 2008). We issued a separate decision addressing the issues raised in that Petition. CLI-09-10, 69 NRC 521 (2009).

² LBP-08-25, 68 NRC 763 (2008).

³ *Motion for Leave by the States of New York and Connecticut, Hudson Riverkeeper, Inc., Hudson River Sloop Clearwater, Inc., and the Prairie Island Indian Community to Submit Brief* (continued . . .)

also grant the non-litigants' motion for leave to file a brief *amici curiae*. We further conclude that the Board should have decided in Entergy's favor regarding Contentions 2A and 2B. We therefore reverse those portions of LBP-08-25 addressing Contentions 2A and 2B, related to the calculation of the CUF_{en} for the core spray and reactor recirculation outlet nozzle.

Our reversal renders it unnecessary for us to consider NEC's petition for review of the Board's later decision, LBP-09-9, at least insofar as the Board there concluded that NEC's newly filed contention (Contention 2C) was inadmissible.⁴ We nonetheless exercise our discretion to consider the substance of NEC's arguments regarding Contention 2C and find them to be without merit. On a different appealed issue, however, we find that NEC never received its promised opportunity to revise its original Contention 2. We therefore remand the case for the limited purpose of giving NEC that opportunity.

I. OVERVIEW

This proceeding stems from an application submitted by Entergy Nuclear Vermont Yankee, L.L.C., and Entergy Nuclear Operations, Inc. (collectively, Entergy) for a twenty-year renewal of the operating license for the Vermont Yankee Nuclear Power Station (Vermont Yankee).⁵ NEC and the Vermont Department of Public Service (Vermont) sought and were granted the right to intervene and challenge the application.⁶ The State of New Hampshire and

Amici Curiae in Opposition to Staff's Petition for Review and in Support of Intervenors State of Vermont and the New England Coalition (Dec. 19, 2008) (Non-litigants' Motion).

⁴ LBP-09-9, 70 NRC 41 (2009).

⁵ Entergy License Renewal Application: Vermont Yankee Nuclear Power Station (Jan. 25, 2006) (ML060300085) (Application), as supplemented.

⁶ Vermont adopted NEC's contentions. See LBP-06-20, 64 NRC 131, 206-08 (2006); Vermont's *Notice of Intent to Adopt Contentions and Motion for Leave to be Allowed to Do So* (June 5, 2006).

the Commonwealth of Massachusetts participated in this adjudicatory proceeding as “interested states.”⁷ The Staff also participated as a party.

In today’s decision, we first decide that, contrary to NEC’s request, the Staff’s and NEC’s petitions for review need not be stayed. Next, we determine that the Staff’s petition for review satisfies the applicable regulatory standards for appellate review. Having resolved those threshold issues, we provide regulatory background information on the issue of metal fatigue, and then describe the procedural history of this case. Finally, we consider the two petitions for review. We agree with the Staff that the Board should not have ruled in NEC’s favor in LBP-08-25 as to Contentions 2A and 2B and also that the Board in LBP-09-9 correctly decided not to admit Contention 2C . Based on these conclusions, we reverse the portion of LBP-08-25 that addresses metal fatigue, and we uphold the portion of LBP-09-9 that addresses Contention 2C. We nevertheless remand the proceeding for further consideration of Contention 2.

A. The Staff’s Petition for Review

The Board admitted five contentions, of which the following three are at issue in the Staff’s petition:

Contention 2:

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, 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).⁸

Contention 2A:

[T]he analytical methods employed in Entergy’s [[First] environmentally corrected CUF or] CUF_{en}⁹ Reanalysis were flawed by numerous uncertainties, unjustified

⁷ See 10 C.F.R. § 2.315(c).

⁸ LBP-06-20, 64 NRC at 183 (brackets in original).

⁹ “CUF” is the abbreviation for “Cumulative Use Factor” (or, alternatively, “Cumulative Usage Factor”) – a means of “quantif[y]ing] the fatigue that a particular metal component experiences (continued . . .)

assumptions, and insufficient conservatism, and produced unrealistically optimistic results. Entergy has not, by this flawed reanalysis, demonstrated that the reactor components assessed [i.e., the feedwater, core spray and reactor recirculation outlet nozzles] will not fail due to metal fatigue during the period of extended operation.¹⁰

Contention 2B:

Entergy's Second CUF_{en} Reanalysis neither validates the results of Entergy's First CUF_{en} Reanalysis, nor independently demonstrates that CUF_{en}s for all components . . . are less than one.¹¹

In LBP-08-25, the Board declined to authorize issuance of the renewed license, based on its merits findings with respect to Contentions 2A and 2B:

Entergy's metal fatigue analyses of the core spray and reactor recirculation outlet nozzles do not comply with relevant requirements and do not provide the reasonable assurance of safety required by 10 C.F.R. §§ 54.21(c)(1) and 54.29 [T]he license renewal is not authorized and thus cannot be granted until 45 days after Entergy satisfactorily completes these metal fatigue calculations and serves them on the NRC Staff and the other parties herein. Until that time, this proceeding on Contentions 2A and 2B will remain open and Contention 2 will be held in abeyance.¹²

during plant operation." *AmerGen Energy Co., LLC (Oyster Creek Nuclear Generating Station)*, CLI-08-28, 68 NRC 658, 663 (2008).

"CUF_{en}" is the abbreviation for "Cumulative Use [or Usage] Factor Environmentally Adjusted." This term refers to a CUF as modified by an F_{en} ("Environmental Adjustment Factor") to reflect the corrosive environment inside a nuclear reactor – a factor that may accelerate "fatigue failure." See, e.g., Regulatory Guide 1.207, Guidelines for Evaluating Fatigue Analyses Incorporating the Life Reduction of Metal Components due to the Effects of the Light-Water Reactor Environment for New Reactors, at 2 (Mar. 2007) (ML083300592); NUREG/CR-6909/ANL-06/08, Final Report: Effect of LWR Coolant Environments on the Fatigue Life of Reactor Materials (NUREG/CR-6909), at xv, 4, 22, 38, 51, 63, 70, & App. A (Argonne National Laboratory Feb. 2007) (ML082520022).

For a further explanation of CUF and CUF_{en}, see the text associated with notes 63-68, *infra*.

¹⁰ LBP-08-25, 68 NRC at 779-80 (citing LBP-07-15, 66 NRC 261, 267-68 (2007)).

¹¹ LBP-08-25, 68 NRC at 780.

¹² *Id.* (emphasis deleted). NEC's Contentions 3 and 4 challenged Entergy's plans to monitor and manage aging of the steam dryer and flow-accelerated corrosion of plant piping, respectively, during the period of extended operation. As to these contentions, the Board ruled that Entergy's aging management programs comply with the relevant requirements and provide the reasonable assurance of safety required by the regulations. *Id.*, 68 NRC at 780-81. The Board conditioned its decision with respect to Contention 3 on the requirement that Entergy (continued . . .)

The Staff filed a petition for review of LBP-08-25 pursuant to 10 C.F.R. § 2.341(b)(4). The Staff challenges the Board's rulings on Contentions 2A and 2B, and particularly the Board's interpretation of 10 C.F.R. §§ 54.3, 54.21(c)(1), and 54.29.¹³ NEC and Vermont oppose the Staff's petition,¹⁴ while Entergy supports it.¹⁵ In addition, the States of New York and Connecticut, Hudson Riverkeeper, Inc., Hudson River Sloop Clearwater, Inc., and the Prairie Island Indian Community (collectively, New York) seek permission to file a brief *amici curiae* regarding the Staff's petition for review.¹⁶ We grant their request.

continue to monitor and inspect the steam dryer during the period of extended operation at specified intervals. No party has challenged the Board's ruling on Contention 3. In addition, the Board rested its findings regarding Contention 4, in part, on certain facts that it "officially noticed" under 10 C.F.R. § 2.337(f) and Rule 201(e) of the Federal Rules of Evidence. The Board noted that a party wishing to challenge those facts could do so either by filing a motion for reconsideration with this Board, or an appeal to the Commission. No party did so. Therefore, the Board's findings with respect to Contentions 3 and 4 are not at issue on appeal.

¹³ Staff Petition at 1-2, 8-11, 14-23.

¹⁴ *New England Coalition's Response to NRC Staff's Petition for Review of the Licensing Board's Partial Initial Decision, LBP-08-25* (Dec. 19, 2008); *Vermont Department of Public Service Opposition to Petition for Review of Partial Initial Decision LBP-08-25* (Dec. 19, 2008) (Vermont Opposition).

¹⁵ *Entergy's Answer in Support of NRC Staff's Petition for Review of the Licensing Board's Partial Initial Decision, LBP-08-25* (Dec. 19, 2008) (Entergy Answer to Staff Petition for Review).

¹⁶ See generally Non-litigants' Motion. New York and its co-applicants are parties in other Commission adjudications that presented or present an issue similar to the one we address today. In the past, we have welcomed appellate briefs *amicus curiae* under such circumstances. See *Dominion Nuclear Connecticut, Inc.* (Millstone Power Station, Unit 3), CLI-02-27, 56 NRC 367, 370 n.10 (2002). Both Entergy and the Staff oppose New York's motion and direct our attention to our general policy of permitting the filing of *amicus* briefs *only after* we either accept a petition for review filed pursuant to 10 C.F.R. § 2.341(b) or *sua sponte* approve of the submittal. *Entergy's Answer Opposing Motion by New York et al. for Leave to Submit Brief Amici Curiae* (Dec. 23, 2008), at 1-2; *NRC Staff's Reply to Motion to Submit Brief Amicus [sic] Curiae* (Dec. 23, 2008), at 2 (quoting *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-97-7, 45 NRC 437, 438-39 (1997) (our regulations "contemplate *amicus curiae* briefs only after the Commission grants a petition for review, and do not provide for *amicus* briefs supporting or opposing petitions for review" (emphasis omitted))). This argument is inapposite here because, in today's decision, we both grant the Staff's petition for review and consider the arguments contained in that same petition.

B. NEC's Petition for Review

Following the Board's ruling in LBP-08-25, and pending our resolution of the Staff's petition, the proceeding continued. Entergy performed the additional analyses of the core spray and reactor recirculation outlet nozzles, as directed by the Board. In response, NEC submitted a new contention challenging those analyses, which the Board declined to admit. In that contention (which we designate "Contention 2C"), NEC argued that:

. . . Entergy has not *properly* recalculated the Core Spray and [Reactor] Recirculation Outlet nozzle CUF_{en}s such that they demonstrate that these important components will not fail during the period of extended operation Such recalculations involve complex scientific and technical judgments.

The complex scientific and technical judgments employed in Entergy's [March 2009] recalculation of environmentally assisted metal fatigue for [Reactor] Recirculation Outlet and Core Spray nozzles . . . are technically and factually flawed and do not conform to ASME [American Society of Mechanical Engineers], NRC, or National Laboratory guidance, nor do they fully conform to established engineering practice, or the rules of applied physics. As such[,] Entergy's reanalysis of these pressure boundary components cannot be relied upon for adequate assurance of public health and safety.¹⁷

In LBP-09-9, the Board concluded that Contention 2C had "failed to satisfy either the requirements specified in [the] Partial Initial Decision [LBP-08-25¹⁸] or the new contention pleading requirements of 10 C.F.R. § 2.309(f)(2)(i)-(iii)."¹⁹

¹⁷ *New England Coalition, Inc.'s Motion for Leave to File a Timely New Contention and Motion to Hold in Abeyance Action on this Proposed Contention Until Issuance of NRC Staff Supplemental Safety Evaluation Report* (Apr. 24, 2009), at 1-2 (NEC's Motion to File Contention 2C) (emphasis in original).

¹⁸ See LBP-09-9, 70 NRC at 43-44 (citations omitted):

[In LBP-08-25, w]e . . . required that any new or amended contentions "must specifically state how the new analyses are not consistent with the legal requirement and the calculations performed for the feedwater nozzle." We cautioned NEC . . . that this was not an opportunity to "rehash or renew technical challenges that have already been raised and resolved in this proceeding."

¹⁹ *Id.*, 70 NRC at 48. Section 2.309(f)(2)(i)-(iii) entitles an intervenor to submit a new safety contention, with leave of the Board, upon three showings: the information upon which the new contention is based was previously unavailable; the information is materially different from any (continued . . .)

NEC filed a petition for review, arguing that the Board in LBP-09-9 had made clear errors of fact, had denied NEC its right to “present [its] case with respect to an accepted contention” (Contention 2), had raised substantial issues of first impression, and had adversely “affect[ed] public confidence” in our agency and its hearing process.²⁰ As relief, NEC asks us to (i) review LBP-09-9, (ii) order independent experts to examine the Board’s findings of fact, (iii) make independent safety and policy determinations after reviewing the independent expert’s examination, and (iv) constitute a new licensing board to consider NEC’s original Contention 2.²¹ The Staff and Entergy oppose NEC’s Petition.²²

II. PRELIMINARY MATTERS

A. NEC’s Motion for Stay

On December 19, 2008, NEC moved that we either “reject the Staff’s Petition for Review, or in the alternative, . . . stay or withhold decision on the Staff’s Petition for Review until it can be addressed in a way that does not result in overlapping, confused, and duplicative litigation; and until NEC has exhausted its allotted time in which to file a petition for review.”²³ The Office of the Secretary had previously defined this “allotted time” as within “15 days after the date the Board rules on any NEC motion for reconsideration.”²⁴

previously available information; and the submission of the new contention was timely, in light of the date upon which the new information became available.

²⁰ NEC Petition at 2-3, 13.

²¹ *Id.* at 3, 19.

²² *NRC Staff’s Answer in Opposition to New England Coalition’s Petition for Review of the Licensing Board’s Full Initial Decision, LBP-09-09* (Aug. 3, 2009) (Staff Response to NEC Petition for Review); *Entergy’s Response in Opposition to New England Coalition’s Petition for Review of LBP-09-09* (Aug. 3, 2009) (Entergy Response to NEC Petition for Review).

²³ *New England Coalition’s Response to NRC Staff’s Petition for Review of the Licensing Board’s Partial Initial Decision, LBP-08-25* (Dec. 19, 2008), at 10, referring to LBP-08-25, 68 NRC at 831-32.

²⁴ Order (SECY Dec. 11, 2008) (unpublished).

Events have overtaken NEC's motion, rendering it moot. The Board denied NEC's Motion for Reconsideration of LBP-08-25²⁵ on January 26, 2009,²⁶ and NEC filed no petition for review of that Order. Moreover, the Board has now issued its final Initial Decision²⁷ rejecting NEC's most recent variation on its second contention,²⁸ and NEC has submitted a petition for review of that decision. Consequently, we now hold exclusive jurisdiction over this adjudication, and there is no possibility that the appellate litigation now before us will overlap or duplicate any hearing-level litigation before the Board.

B. NEC's Request to Suspend Proceeding

NEC recently submitted a letter requesting that the Commission stay its consideration of NEC's July 23, 2009 petition for review of LBP-09-9.²⁹ NEC filed this request in conjunction with an enforcement petition that it previously had submitted to the NRC pursuant to 10 C.F.R. § 2.206.³⁰ Without offering any supporting reasons, NEC requests that the Commission stay further review of the petition until:

- (1) The issues raised in the subject 2.206 Petition are resolved.
- (2) Entergy Nuclear Vermont Yankee (ENVY) has provided answers to NRC's Demand for Information letter of March[]1, 2010.

²⁵ *New England Coalition's Motion for Reconsideration of the Licensing Board's Partial Initial Decision* (Dec. 17, 2008).

²⁶ Order (Denying NEC Petition for Reconsideration Under 10 C.F.R. § 2.345(b)) (Jan. 26, 2009) (unpublished).

²⁷ LBP-09-9, *supra*.

²⁸ NEC's Motion to File Contention 2C.

²⁹ Letter from Raymond Shadis (NEC Consultant) to Annette L. Vietti-Cook (Mar. 2, 2010) (Shadis Letter) (ML100630425).

³⁰ *Request for Expedited NRC Action Under 10 CFR §[]2.206 to Address Conditions Trending to a Degradation of Public Safety Margin at Vermont Yankee Nuclear Power Station* (Dkt. 50-271) (Feb. 8, 2010) (NEC § 2.206 Petition) (ML100470430), attached to Shadis Letter. NEC's request for suspension also refers to the NRC Staff's "Demand for Information" to Entergy. See Attachment to Letter from Roy P. Zimmerman (Director, NRC Office of Enforcement) to Mr. John Herron (Entergy) (Mar. 1, 2010) (ML100570237).

- (3) ENVY'S answers to the Demand for Information are examined and verified by NRC and, in as much as both the 50-271 License Renewal Application proceeding and the 50-271 Extended Power Uprate proceeding fall within the five year period with which the Demand for Information is concerned, the parties to these proceedings.
- (4) Should the uncovering of any significant material misrepresentations warrant, the aforementioned dockets are reopened with an opportunity for the affected parties to litigate any issues that may, as a product of resolution of the subject NEC 2.206 and/or the NRC Demand for Information, come forth.³¹

At bottom, NEC seeks not a stay but rather a suspension of this proceeding. As we recently observed, such a request does not fit cleanly into our procedural rules.³² However, we will exercise discretion and consider NEC's request to suspend this proceeding.

We have reviewed NEC's enforcement request and see nothing in it that relates to metal fatigue – the sole remaining issue in this adjudication. Rather, the issues raised in the enforcement petition relate to underground piping.³³ The Staff's Demand for Information similarly is a general one, not specifically keyed to license renewal. Just as we did not think it "sensible to postpone consideration and resolution of various . . . issues having little or nothing to do with the Commission's ongoing review of security requirements" following the September 11th attacks,³⁴ we likewise see no reason to postpone the consideration of the metal fatigue

³¹ Shadis Letter at 2.

³² See *Shieldalloy Metallurgical Corp.* (License Amendment Request for Decommissioning of the Newfield, New Jersey Site), CLI-10-8, 71 NRC __ (Jan. 7, 2010) (slip op. at 6); 10 C.F.R. §§ 2.342, 2.1213 (governing stays of effectiveness of presiding officer's initial decision and NRC Staff action, respectively). See also *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), CLI-91-8, 33 NRC 461, 471 (1991).

³³ See generally NEC § 2.206 Petition.

³⁴ *Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-02-23, 56 NRC 230, 239 (2002). See also *Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), CLI-01-28, 54 NRC 393, 400 (2001) ("there is no reason to postpone the MOX fuel proceeding – which, after all, will require resolution of many issues having nothing to do with terrorism"), *reconsideration denied*, CLI-02-2, 55 NRC 5 (2002); *Shoreham*, CLI-91-8, 33 NRC at 471 (abeyance request denied on (continued . . .)

issues until the resolution of other issues unrelated to this adjudication. Moreover, we have, in the past, declined to hold a licensing adjudication in abeyance pending completion of a related NRC enforcement action,³⁵ and we generally have declined to hold proceedings in abeyance pending the outcome of other Commission actions or adjudications.³⁶ NEC has offered us no reason to treat its request for suspension any differently.³⁷

C. The Regulatory Standards for Review

Section 2.341(b)(1) of our regulations provides for discretionary Commission review of a presiding officer's initial decision.³⁸ As a partial initial decision, LBP-08-25 falls within the scope of that provision. The Board's "Full Initial Decision," LBP-09-9, does so as well. We will consider a petition for review under section 2.341(b)(4) if it raises a substantial question with respect to one or more of the following:

the ground that "there is nothing before the New York Court of Appeals which is central to our decisions").

³⁵ *Consolidated Edison Co. of New York* (Indian Point, Units 1 and 2), CLI-01-8, 53 NRC 225, 228-29 (2001).

³⁶ See, e.g., *Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-03-4, 57 NRC 273, 275-77 (2003) (rejecting requests for suspension pending completion of our post-September 11th review of measures to protect against terrorist attacks); *Diablo Canyon*, CLI-02-23, 56 NRC at 237-40 (same); *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-01-26, 54 NRC 376, 380-84 (2001) (same); *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-01-27, 54 NRC 385, 389-91 (2001) (same); *Savannah River*, CLI-01-28, 54 NRC at 399-401 (same).

³⁷ We observe, however, that the proceeding will remain open during the pendency of the remand. During that time, NEC and Vermont are free to submit a motion to reopen the record pursuant to 10 C.F.R. § 2.326, should they seek to address any *genuinely new* issues related to the license renewal application that previously could not have been raised. Once this proceeding has been closed, NEC and Vermont will still have the opportunity to raise issues by using our enforcement and rulemaking procedures under 10 C.F.R. §§ 2.206 and 2.802, respectively. However, the extended power uprate proceeding to which NEC refers has been terminated and may not be reopened. See *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Unit 3), CLI-09-5, 69 NRC 115, 124 (2009). NEC or Vermont may seek action as to any related issued pursuant to sections 2.206 and 2.802.

³⁸ 10 C.F.R. § 2.341(b)(1).

- (i) A finding of material fact is clearly erroneous or in conflict with a finding as to the same fact in a different proceeding;
- (ii) A necessary legal conclusion is without governing precedent or is a departure from or contrary to established law;
- (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.³⁹

On appeal, we review legal issues *de novo*.⁴⁰ By contrast, we generally defer to our boards' findings of fact, unless they are clearly erroneous.⁴¹ When we review our boards' rulings on contention admissibility, we employ the "clear error [and] abuse of discretion" standards of review.⁴²

1. *The Staff's Petition for Review*

The Staff seeks review under subsections (i), (ii), (iii), and (v) above. Regarding subsection (i), the Staff asserts that the Board's ruling on Contentions 2A and 2B reflects clearly erroneous factual findings that are implausible in light of the record when viewed in its entirety.⁴³ The Staff directs our attention to what it considers to be two specific instances.

First, the Staff claims that the Board ignored the fact that, according to clear record evidence, Entergy is implementing a Fatigue Monitoring Program, or Aging Management

³⁹ 10 C.F.R. § 2.341(b)(4).

⁴⁰ See, e.g., *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-00-13, 52 NRC 23, 29 (2000) ("legal question[s] . . . we review *de novo*").

⁴¹ *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Unit 1; Sequoyah Nuclear Plant, Units 1 and 2; Browns Ferry Nuclear Plant, Units 1, 2, and 3), CLI-04-24, 60 NRC 160, 189 (2004). To satisfy the "clearly erroneous" standard, a litigant must show that the Board's findings are "*not even plausible* in light of the record viewed in its entirety." *Id.* (emphasis added; citation and internal quotation marks omitted).

⁴² *Progress Energy Florida, Inc.* (Combined License Application, Levy County Nuclear Power Plant, Units 1 and 2), CLI-10-2, 71 NRC __ (Jan. 7, 2010) (slip op. at 2 & n.4).

⁴³ Staff Petition at 11 (citing *Watts Bar*, CLI-04-24, 60 NRC at 189).

Program (AMP),⁴⁴ that is consistent with the Generic Aging Lessons Learned Report (GALL Report).⁴⁵ Among other things, the GALL Report sets forth three ways that a license renewal applicant proposing to use an AMP may comply with the requirements of 10 C.F.R.

§ 54.21(c)(1)(iii).⁴⁶ Second, according to the Staff, the Board erroneously stated that *CUF* calculations are at issue when, in fact, both the record generally and the admitted contentions in particular indicate that the contested issue is *CUF_{en}* calculations.⁴⁷

The Staff also raises three legal questions:

- (i) Whether the Board's interpretation that the Applicant's *CUF_{en}* analyses fall within the definition of TLAA [time-limited aging analyses]⁴⁸ in 10 C.F.R. § 54.3, was correct,⁴⁹

⁴⁴ Application at B-39. An AMP is a program intended to manage the effects of aging on a particular component by, *e.g.*, ensuring that the fatigue usage factor for the component does not exceed the design code limit. See 10 C.F.R. § 54.21(c)(1)(iii); NUREG-1801, Vol. 2, Rev. 1, Generic Aging Lessons Learned (GALL) Report, Chapter X ("Time-Limited Aging Analyses: Evaluation of Aging Management Programs under 10 CFR 54.21(c)(1)(iii)"), § X.M1 ("Metal Fatigue of Reactor Coolant Pressure Boundary"), at pp. X M-1 to X M-2 (Sept. 2005) (ML052780376).

⁴⁵ Staff Petition at 11 (citing LBP-08-25, 68 NRC at 825-26). See *generally* GALL Report at § X.M1, at pp. X M-1 to X M-2 (description of the "Metal Fatigue of Reactor Coolant Pressure Boundary" AMP).

⁴⁶ See GALL Report, § X.M1, at p. X M-2 ("repair of the component, replacement of the component, and a more rigorous analysis of the component to demonstrate that the design code will not be exceeded").

⁴⁷ Staff Petition at 11 (citing LBP-08-25, 68 NRC at 830). Regarding the difference between CUFs and *CUF_{en}*s, see note 9, *supra*.

⁴⁸ 10 C.F.R. § 54.3(a) defines TLAAAs as "those licensee calculations and analyses that:

- (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;

(continued . . .)

- (ii) Whether the Board was correct in ruling that Entergy's AMP, which the Staff asserts is consistent with the . . . GALL Report . . . , fails to satisfy the demonstration requirements of 10 C.F.R. § 54.21(c)(1) and likewise fails to provide reasonable assurance in accordance with § 54.29,⁵⁰ and
- (iii) Whether the Board was correct in holding that CUF_{en} calculations are a "condition precedent" to issuing a renewed license.⁵¹

Finally, the Staff argues that Commission review is in the public interest because this decision could affect pending and future license renewal determinations.⁵²

We conclude that, because the challenged portions of LBP-08-25 address significant issues of law and policy that lack governing precedent and raise issues that could affect other license renewal determinations,⁵³ the Staff Petition satisfies subsections (ii), (iii) and (v) of our standards for review.⁵⁴ We therefore grant the Staff's petition and consider the merits of its arguments.

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- (5) Involve conclusions or provide the basis for conclusions related to the capability of the system, structure, and component to perform its intended functions, as delineated in § 54.4(b); and
 - (6) Are contained or incorporated by reference in the [current licensing basis].

⁴⁹ Staff Petition at 8.

⁵⁰ *Id.* at 8-9, 11. The Staff also asserts that the Board's ruling is a clear departure from Commission precedent. Staff Petition at 11 (citing *AmerGen Energy Co. (Oyster Creek Nuclear Generating Station)*, CLI-08-23, 68 NRC 461, 468 (2008)).

⁵¹ *Id.* at 8, 9, 18.

⁵² *Id.* at 11 (citing *Hydro Resources, Inc. (P.O. Box 777, Crownpoint, New Mexico 87313)*, CLI-06-7, 63 NRC 165, 166 (2006)).

⁵³ *See id.* at 1-2.

⁵⁴ In view of these determinations, we need not consider whether the Staff's petition for review would likewise qualify for appellate review under subsection (i).

2. *NEC's Petition for Review*

NEC seeks review of LBP-09-9 under 10 C.F.R § 2.341(b)(4)(i), (iii), (iv), and (v). Under subsection (i), NEC asserts that the Board misunderstood the facts relevant to the fatigue analysis.⁵⁵ Under subsection (iii), NEC argues that LBP-09-9 raises substantial questions of policy, practice, and procedure that lack governing precedent.⁵⁶ Under subsection (iv), NEC claims both that the Board conducted the hearing in a manner that was biased against NEC and that Contention 2 still requires litigation, preferably by a different panel of judges.⁵⁷ And finally, under subsection (v), NEC asserts that appellate review would be in the public interest because LBP-09-9 “raises issues that could affect public confidence in the NRC and its hearing process.”⁵⁸

We find that NEC’s argument regarding Contention 2 satisfies subsection (iv) of our standards for review (prejudicial procedural error). We also exercise our discretion to consider the remainder of NEC’s petition for review, which addresses the Board’s adverse ruling on the admissibility of Contention 2C.

III. BACKGROUND

The Staff challenges the Board’s merits rulings on Contentions 2A and 2B, and NEC challenges both the Board’s refusal to admit Contention 2C for litigation and its failure to resurrect Contention 2 for litigation. An understanding of the Staff’s and NEC’s assertions

⁵⁵ NEC Petition at 2, 14-19.

⁵⁶ *Id.* at 2.

⁵⁷ *Id.* at 2, 3, 12-14.

⁵⁸ *Id.* at 2-3. See also *id.* at 13 (the Board’s “findings . . . are so often at odds with basic science and established engineering practice” that they “are detrimental to the [Board’s] and the NRC’s scientific and technical reputation of competence” (footnote omitted)).

requires familiarity with the complex technical, procedural and factual background of this proceeding, which we provide below.

A. Technical Background Regarding Metal Fatigue

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.⁵⁹ 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.”⁶⁰ The period during which this number of load cycles occurs for *all* types of stress is called the material’s “fatigue life.”⁶¹

Determining the stress acting on the component during a transient is a complicated inquiry, requiring detailed knowledge of material properties, component design, and the temperature profile of the transient, among other parameters. A detailed stress analysis uses the methodology from the ASME Code to consider six different stress inputs.⁶²

⁵⁹ A “stress cycle” is the time period it takes for a material to go from its minimal stress level to its maximum level and back again to its minimum level. See American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code), Section III, Division 1, Subsection NB, Subarticle NB-3213.16.

⁶⁰ *Oyster Creek*, CLI-08-28, 68 NRC at 663. We did not mean to suggest in *Oyster Creek* that a component will physically “fail” once it has experienced its characteristic number of load cycles. Rather, as the Board correctly observed, the phrase “fatigue failure” refers to the point in a component’s life where there is a 1%-5% chance of initiating a crack that is three millimeters deep. LBP-08-25, 68 NRC at 802. See also Transcript [of Evidentiary Hearing] (Tr.) 898-903 (testimony of NRC Staff witness Mr. John Fair) (July 22, 2008).

⁶¹ See NUREG/CR-6909 at 7.

⁶² See ASME Code, Section III, Division 1, Subsection NB, Subarticle NB-3200. Because of the complexity of such an analysis, and its associated costs, some license renewal applicants (including Entergy) have sought to take a simplified approach whereby they use only one stress (continued . . .)

The ASME Code contains fatigue design curves for various materials, such as low alloy steel and stainless steel used in nuclear power plants. These curves indicate the allowed number of stress cycles at any applied stress.⁶³ In addition, ASME took actual laboratory fatigue data, derived from tests performed at room temperature in the air, and then adjusted the laboratory data by reducing the stress – where stress is expressed as the number of cycles – to account for the difference in a material’s behavior in a controlled laboratory environment as compared with a real-world *non*-nuclear industrial setting where the component could be used.⁶⁴ From these adjusted data, an applicant can calculate the CUF for a component at a particular location on that same component, i.e., the applicant can quantify “the fatigue that a particular [location on a] metal component experiences during . . . operation”⁶⁵ of a *non*-nuclear industrial facility.⁶⁶

But the correction factors applied by ASME were not intended to account for the potentially corrosive environment present in a light water reactor – an environment that may

as the stress input, and then apply the “Green’s function” methodology to estimate the stress response of a component. The NRC Staff has recognized potential problems in performing fatigue analyses using the Green’s function with a simplified stress input – specifically, that the license renewal applicant may underestimate the stress acting on the component, and in turn, underestimate the fatigue usage. See NUREG-1907, Vol. 2, Safety Evaluation Report Related to the License Renewal of Vermont Yankee Nuclear Power Station, section 4.3.3.2, at p. 4-40 (May 2008) (ML081430109) (SER); NRC Regulatory Issue Summary 2008-30, “Fatigue Analysis of Nuclear Power Plant Components” (Dec. 16, 2008), at 2 (ML083450727) (requesting a confirmatory fatigue analysis using the ASME Code methodology with all six stress inputs).

⁶³ See ASME Code, Section III, Division 1, Mandatory Appendix I, Figures I-9.1 to I-9.6.

⁶⁴ See NUREG/CR-6909 at xv, 1-5. See also “Resolution of GSI [Generic Safety Issue]-190, ‘Fatigue Evaluation of Metal Components for 60-year Plant Life,’” appended as Attachment 1 to 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 Closeout Memorandum) (ML003673136).

⁶⁵ NUREG/CR-6909 at 1. See also *id.* at A3.

⁶⁶ *Id.* at 3.

accelerate fatigue failure.⁶⁷ The effects of the reactor environment can be significant under certain circumstances.⁶⁸ To take the reactor environment into account, a license renewal applicant may apply a concept called the “environmental fatigue correction factor,” or F_{en} , which yields the environmentally adjusted CUF, *i.e.*, the CUF_{en} ⁶⁹ upon which Contentions 2A and 2B focus.

B. NRC Standards Regarding Metal Fatigue

The scope of a license renewal proceeding under Part 54 of our regulations “encompasses a review of the plant structures and components that will require an aging management review for the period of extended operation and the plant’s systems, structures, and components that are subject to an evaluation of time-limited aging analyses.”⁷⁰ The “aging management review” is the process that the Staff and license renewal applicants use in determining whether a reactor’s structures, systems, and components will require additional activities in order effectively to manage aging in the period of extended operation, and if so, what those activities would be. This review addresses both aging management activities identified in section 54.21(a)(3) regarding the integrated plant assessment and the aging management activities identified in section 54.21(c)(1) regarding the evaluation of TLAAAs.

The issue of metal fatigue of the feedwater, core spray, and reactor recirculation outlet nozzles falls within the scope of an aging management review.⁷¹ When examining this issue,

⁶⁷ *Id.*

⁶⁸ For instance, “[l]aboratory data indicate that under certain reactor operating conditions, fatigue lives of carbon and low-alloy steels can be a factor of 17 lower in the [reactor] coolant environment than in air.” *Id.*

⁶⁹ *Id.* at 4.

⁷⁰ *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2), CLI-01-20, 54 NRC 211, 212 (2001).

⁷¹ It is undisputed that these three components fall within the scope of the license renewal review. See Application at pp. 2.3-27 & 3.1-43 (as part of the reactor vessel and the pressure (continued . . .)

both the agency and the applicant focus on the adequacy of the relevant AMP and/or TLAAs.⁷²

And this adequacy turns upon whether the AMP and TLAAs, as applicable, satisfy the requirements of the following six regulations.

In the license renewal context, sections 54.33 and 54.35 of our regulations require that a licensee comply with our Part 50 regulations, including the provisions requiring compliance with the ASME Code, during the period of extended operation.⁷³ In particular, section 50.55a(c)(1) requires that the feedwater, core spray, and the reactor recirculation outlet nozzles, as part of the reactor coolant pressure boundary, meet the metal-fatigue requirements for Class 1 components in Section III of the ASME Code.⁷⁴ The ASME Code in turn provides the methodology for calculating the CUFs for nuclear power plant components, and specifies a design limit of 1.0 for the CUF of any given component, including any additional stress cycles that may occur during the period of extended operation.⁷⁵

Other regulations specifically address aging management. Section 54.29(a)(1)-(2) provides in general terms that:

A renewed license may be issued by the Commission up to the full term authorized by § 54.31 if the Commission finds that:

boundary, core spray nozzles are subject to aging management review), 3.1-2, -19 & -42 (as part of the reactor coolant system and the reactor vessel, the reactor feedwater nozzle is subject to aging management review), 3.1-41 (listing the reactor recirculation outlet nozzle as part of the reactor vessel).

⁷² 10 C.F.R. § 54.29(a) (requiring a “reasonable assurance” finding with regard to “(1) managing the effects of aging . . . and (2) time-limited aging analyses”).

⁷³ 10 C.F.R. §§ 54.33, 54.35.

⁷⁴ 10 C.F.R. § 50.55a(c)(1).

⁷⁵ ASME Code, Section III, Division 1, Subsection NB, Subarticle NB-3222.4. See also NUREG/CR-6909 at 1; NUREG-1800, Rev. 1, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (Sept. 2005) (SRP), § 4.3.1.1, at p. 4.3-1 (ML052770566).

- (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 [current licensing basis], and that any changes made to the plant's [current licensing basis] in order to comply with this paragraph are in accord with the [Atomic Energy 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).⁷⁶

Section 54.21(a) requires, among other things, that each application contain an integrated plant assessment which must:

- (1) For those systems, structures, and components within the scope of this part, as delineated in § 54.4, identify and list those structures and components subject to an *aging management review*.

* * * *
- (3) For each structure and component identified in paragraph (a)(1) of this section, demonstrate that the *effects of aging will be adequately managed* so that the intended function(s) will be maintained consistent with the [current licensing basis] for the period of extended operation.⁷⁷

Section 54.21(c)(1) focuses specifically on TLAAAs and requires that a license renewal application include an evaluation of TLAAAs demonstrating at least one of the following:

- (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 period of operation; or
- (iii) The *effects of aging on the intended function(s) will be adequately managed* for the period of extended operation.⁷⁸

⁷⁶ 10 C.F.R. § 54.29(a)(1)-(2) (emphases added).

⁷⁷ 10 C.F.R. § 54.21(a)(1), (3) (emphases added).

⁷⁸ 10 C.F.R. § 54.21(c)(1)(i)-(iii) (emphases added).

Subsection (iii) of this regulation differs from both subsections (i) and (ii) in that it does not require a demonstration that an *existing* TLAA either is good for the 20-year period of extended operation or has been projected to the end of that period. Rather, subsection (iii) tracks the language of section 54.21(a)(3), and its “adequate management” requirement is generally accomplished by establishing a prospective AMP (or similar plan). In short, a license renewal applicant seeking to satisfy our regulations’ aging management requirements by reliance upon the *existing* TLAs in its current licensing basis would rely upon sections 54.21(c)(1)(i) or (ii), while a license renewal applicant seeking to do so by reliance upon an *AMP* would rely instead upon sections 54.21(a)(3) and (c)(1)(iii).⁷⁹

In addition to the regulatory requirements set forth above, the agency has issued guidance documents that assist both the Staff in reviewing license renewal documents and applicants in complying with sections 54.21(a)(3) and (c)(1). One of these is the SRP.⁸⁰ Regarding the use of the CUF in particular, the SRP provides that an applicant who chooses to rely upon an existing TLAA pursuant to 10 C.F.R. § 54.21(c)(1)(i) may demonstrate compliance with the rule by showing that “[t]he existing *CUF* calculations remain valid because the number of assumed transients would not be exceeded during the period of extended operation.”⁸¹ In other words, the applicant should demonstrate that its *existing analyses* are *valid* for 60 years.⁸²

⁷⁹ Some license renewal applicants have sought to satisfy more than one of the three subsections. See text immediately following note 98, *infra*; *Oyster Creek*, CLI-08-28, 68 NRC at 664 n.24.

⁸⁰ See note 75, *supra*.

⁸¹ SRP, § 4.3.2.1.1.1, at p. 4.3-4 (emphasis added).

⁸² For instance, if the applicant can demonstrate by plant operating experience that the initially predicted number of stress cycles would not be exceeded even in the extended 20-year operating period, then section 54.21(c)(1)(i) would be satisfied.

The SRP also provides that an applicant who chooses to employ the TLAA option under 10 C.F.R. § 54.21(c)(1)(ii) may demonstrate compliance with the rule by showing that “[t]he CUF calculations have been reevaluated based on an increased number of assumed transients to bound the period of extended operation [and that t]he resulting CUF remains less than or equal to [1.0] for the period of extended operation.”⁸³ In other words, the applicant should demonstrate that its *existing analyses* have been *projected* to 60 years, such that no further analysis or management is necessary.

Alternatively, or in addition to other analyses,⁸⁴ a license renewal applicant may address the CUF issue via an aging management program. The SRP permits an applicant who chooses to implement an AMP under 10 C.F.R. § 54.21(c)(1)(iii) to reference Chapter X of the GALL Report:

[NRC] staff has evaluated a program for monitoring and tracking the number of critical thermal and pressure transients for the selected reactor coolant system components. The staff has determined that this program is an acceptable aging management program to address metal fatigue of the reactor coolant system components according to 10 CFR 54.21(c)(1)(iii). The GALL [R]eport may be referenced in a license renewal application and should be treated in the same manner as an approved topical report. In referencing the GALL [R]eport, the applicant should indicate that the material referenced is applicable to the specific plant involved and should provide the information necessary to adopt the finding of program acceptability as described and evaluated in the report.⁸⁵

Stated differently, “if an applicant cannot or chooses not to justify or extend an existing [TLAA]” by demonstrating compliance with subsection (i) or (ii), then it must demonstrate under subsection (iii) that it can adequately manage the effects of aging for the period of extended

⁸³ SRP, § 4.3.2.1.1.2, at p. 4.3-4.

⁸⁴ See note 79, *supra*.

⁸⁵ SRP, § 4.3.2.1.1.3, at p. 4.3-4. See also *Oyster Creek*, CLI-08-23, 68 NRC at 468 (“the 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”).

operation.⁸⁶ One way to do this is to reference the Metal Fatigue AMP that is approved in the GALL Report.⁸⁷

Finally, the SRP presents one acceptable methodology for calculating the CUF_{en} .⁸⁸ Prior to publication of the latest SRP revision in 2005, the Staff already had determined on a general level that licensees should “address the effects of the [light water reactor’s] coolant environment on component fatigue life as aging management programs are formulated in support of license renewal.”⁸⁹ But this determination did not specifically address the use of the environmental adjustment factor (F_{en}).⁹⁰ Later, the SRP did so, stating that “[t]here is a concern that *the effects of the reactor coolant environment on the fatigue life of components* were not adequately addressed by the code of record,” i.e., ASME Code, Section III.⁹¹ The SRP went on to state that “the adequacy of the code of record relating to metal fatigue is a potential safety issue to be addressed by the current regulatory process for operating reactors,”⁹² and that “licensees are to address the effects of coolant environment on component fatigue life as aging management programs are formulated in support of license renewal.”⁹³ The SRP provides guidance but does

⁸⁶ Final Rule, Nuclear Power Plant License Renewal: Revisions, 60 Fed. Reg. 22,461, 22,480 (May 8, 1995).

⁸⁷ GALL Report at § X.M1, at pp. X M-1 to X M-2 (description of the “Metal Fatigue of Reactor Coolant Pressure Boundary” AMP).

⁸⁸ *Oyster Creek*, CLI-08-28, 68 NRC at 665.

⁸⁹ GSI-190 Closeout Memorandum at 1.

⁹⁰ *Id.*, Att. 1, NRC Staff Paper, “Resolution of GSI-190, ‘Fatigue Evaluation of Metal Components for 60-year Plant Life’” at 4, 5. See also *id.*, Att. 2, Letter from Dana A. Powers, Chairman, Advisory Committee on Reactor Safeguards, to Dr. William D. Travers, NRC Executive Director for Operations (Dec. 10, 1999), at 1, 2. Although the GSI-190 Closeout Memorandum itself does not specifically address the F_{en} factor, its Appendix C cites three topical reports by the Electric Power Research Institute that do refer to the factor.

⁹¹ SRP, § 4.3.1.2, at p. 4.3 2 (emphasis added).

⁹² *Id.*

⁹³ SRP, § 4.3.1.2, at p. 4.3 3.

not impose requirements upon license renewal applicants; the same is true for the GSI-190 Closeout Memorandum.⁹⁴

C. Procedural Background Regarding the Metal Fatigue Contentions

The procedural history of Contentions 2, 2A, 2B, and 2C is lengthy and muddled – due, in large part, to Entergy’s multiple revisions to the relevant portions of its license renewal application as it responded to multiple Staff inquiries and, in a related vein, Entergy’s apparent lack of precision as to the specific subsection of section 54.21(c)(1) with which it sought to comply for the components at issue.

In its initial application, Entergy calculated both the CUFs and CUF_{ens} for metal fatigue at nine locations on six components, including the core spray, feedwater, and reactor recirculation outlet nozzles.⁹⁵ None of the nine locations had a CUF in excess of 1.0,⁹⁶ although the CUF_{ens} at seven locations exceeded that number.⁹⁷ Regarding metal fatigue at these seven locations, Entergy acknowledged its obligation to make at least one of the three demonstrations specified in section 54.21(c)(1)(i), (ii) and (iii).⁹⁸ But in its initial application, it did not identify which of these demonstrations it intended to make. It stated only that “[p]rior to entering the period of extended operation, for each location that may exceed a CUF of 1.0 when considering environmental effects, [Entergy] will implement one or more of the following options:

- (1) *further refinement* of the fatigue analyses to lower the predicted CUFs to less than 1.0;^[99]

⁹⁴ See *U.S. Enrichment Corp.* (Paducah, Kentucky Gaseous Diffusion Plant), CLI-01-23, 54 NRC 267, 280 n.37 (2001).

⁹⁵ See Application, § 4.3.3 at p. 4.3-6.

⁹⁶ See *id.*, § 4.3.1 at p. 4.3-3 (Table 4.3-1).

⁹⁷ *Id.*, § 4.3.3 at pp. 4.3-6 & 4.3-8 (Table 4.3-3); SER, § 4.3.3.1, at p. 4-32.

⁹⁸ See Application, § 4.3 at p. 4.3-1.

⁹⁹ NRC Staff’s expert witness Dr. Kenneth C. Chang described Entergy’s use of this “refinement” as follows:

(continued . . .)

- (2) *management of fatigue* at the affected locations by an inspection program that has been reviewed and approved by the NRC (e.g., periodic non-destructive examination of the affected locations at inspection intervals to be determined by a method acceptable to the NRC);
- (3) *repair or replacement* of the affected locations.¹⁰⁰

All three of these options are specifically identified in the GALL Report as actions that satisfy two elements of the GALL Report's "Metal Fatigue of Reactor Coolant Pressure Boundary" AMP.¹⁰¹ Moreover, the GALL Report states that no further evaluation is recommended for license renewal if the applicant selects that AMP under 10 C.F.R.

When a calculated CUF_{en} for a component is greater than the allowable value of 1.0, it is possible to reduce the predicted value of CUF_{en} . This is done by analyzing the actual transients cycles experienced by the plant to obtain CUF_{en} instead of using original design cycles. In general, actual plant transients are less severe than the design transients, which are defined on a generic basis for all similar plants for the design of the component, and therefore, typically result in a CUF value that is lower than that of the original design calculation. In addition, transients may occur less frequently than specified by the original design, which may lead to a lower CUF value for the component. The ASME Code allows performance of a more detailed analysis as a way to demonstrate code compliance.

Affidavit of Kenneth C. Chang Concerning NEC Contentions 2A and 2B (Metal Fatigue) (May 12, 2008) (Chang Affidavit), at 5-6 (ML081350168).

¹⁰⁰ Application, § 4.3.3 at p. 4.3-7 (emphases added). See *also* SER, § 4.3.3.2, at p. 4-34.

¹⁰¹ GALL Report, § X.M1, at pp. X M-1 to X M-2. The GALL Report contains ten elements that an applicant must satisfy in order to "reference" (rely upon) the generic AMP. See *id.*; SRP, § 4.3.2.1.1.3, at p. 4.3-4. The first element relevant to our discussion is "Corrective Actions," which refers to "repair of the component, replacement of the component, and a more rigorous analysis of the component to demonstrate that the design code will not be exceeded." See GALL Report, § X.M1, at p. X M-2. A second relevant element is "Parameters Monitored/Inspected." This element provides that the AMP should

monitor[] all plant transients that cause cyclic strains, which are significant contributors to the fatigue usage factor. The number of plant transients that cause significant fatigue usage for each critical reactor coolant pressure boundary component is to be monitored. Alternatively, more detailed local monitoring of the plant transient may be used to compute the actual fatigue usage for each transient.

Id. at p. X M-1.

§ 54.21(c)(1)(iii). It therefore appears that Entergy, when it submitted its application, intended all three of these options to fall under subsection (iii), as part of an AMP – though not one that satisfied all criteria of the GALL Report. In this last respect, Entergy acknowledged that the proposed Fatigue Monitoring Program in its license renewal application¹⁰² differed from the “Metal Fatigue of Reactor Coolant Pressure Boundary” AMP described in the GALL Report because Entergy’s AMP excluded consideration of the effects of reactor environment on the fatigue usage.¹⁰³

On May 26, 2006, NEC submitted its petition to intervene. The petition contained Contention 2, which challenged Entergy’s failure to include a proposed AMP¹⁰⁴ in its license renewal application pursuant to 10 C.F.R. § 54.21(c)(1)(iii). According to NEC, the description of Entergy’s proposed aging management plan in section 4.3.3 of the Application was so “vague, incomplete and lacking in transparency” that it constituted merely a “plan to create a plan,” and therefore failed to qualify as an AMP under 10 C.F.R. § 54.21(c)(1)(iii).¹⁰⁵ The Board admitted this contention on September 22, 2006.¹⁰⁶

¹⁰² Application, App. B (Aging Management Programs and Activities), at p. B-39.

¹⁰³ See Application, § 4.3.1 at p. 4.3-2 (“the documents reviewed are current design basis fatigue evaluations that do not consider the effects of reactor water environment on fatigue life”), App. B, Table B-3, at p. B-12 (indicating that the Fatigue Monitoring Program contained “Exceptions to NUREG-1801,” *i.e.*, the GALL Report), & B-39 (same). The Fatigue Monitoring Program also was inconsistent with the GALL Report in a second respect: it did not provide for periodic update of the fatigue usage calculations. *Id.* at B-39.

¹⁰⁴ *Petition for Leave to Intervene, Request for Hearing, and Contentions* (May 26, 2006), at 14 (“Entergy’s License Renewal Application Does Not Include A Plan to Manage Aging Due to Metal Fatigue During the Period of Extended Operation”) (NEC Petition to Intervene). See also LBP-08-25, 68 NRC at 789-90. Contention 2 is quoted in the text associated with note 8, *supra*.

¹⁰⁵ NEC Petition to Intervene at 16.

¹⁰⁶ LBP-06-20, 64 NRC at 186-87.

In August 2007, Entergy served a new set of metal fatigue calculations and analyses on the parties,¹⁰⁷ and, the following month, submitted a conforming Amendment 31 to its license renewal application.¹⁰⁸ Entergy styled these as its “refined fatigue analyses.” In Amendment 31, Entergy specified its reliance upon 10 C.F.R. § 54.21(c)(1)(iii). In performing these new stress analyses to determine CUFs, Entergy used plant-specific data,¹⁰⁹ followed the methodology of ASME Code Section III, NB-3200, and used the Green’s function methodology for determining the stress intensities on the respective components during thermal transients. Entergy then factored in the effects of environmentally-assisted fatigue (F_{en}).¹¹⁰ Based upon those calculations, Entergy concluded that all CUF_{en} s were less than 1.0.¹¹¹ In addition, Amendment 31 removed from the original application’s Fatigue Monitoring Program the two exceptions that had precluded the consideration of how the reactor environment affected fatigue usage.¹¹² Entergy therefore asserted that its Fatigue Monitoring Program was now fully consistent with the corresponding “Metal Fatigue of Reactor Coolant Pressure Boundary” AMP in the GALL Report, thus demonstrating compliance with subsection (iii).¹¹³

¹⁰⁷ See Letter from Elina Teplinsky to Sarah Hofmann (Aug. 2, 2007) (cover letter stating that each party and the State of New Hampshire was provided a compact disk with the proprietary calculation package) (ML072210355). See also LBP-07-15, 66 NRC at 265.

¹⁰⁸ Letter from Ted A. Sullivan to NRC (Sept. 17, 2007), Att. 1 (Amendment 31 to Application), at unnumbered p. 1 (ML072670135) (Amendment 31).

¹⁰⁹ See Chang Affidavit at 11. Entergy in its application had based its calculations upon data from a plant of the same vintage as Vermont Yankee but had not used design and transient information specific to Vermont Yankee. See *id.*

¹¹⁰ Calculation of CUF and F_{en} are two separate mathematical processes. Compare NUREG/CR-6909 at 1 (CUF) *with id.* at 4 & Appendix A, “Incorporating Environmental Effects into Fatigue Evaluations” (F_{en}).

¹¹¹ Amendment 31 at unnumbered p. 1.

¹¹² See SER, § 3.0.3.2.10, at p. 3-73; note 103 and accompanying text, *supra*.

¹¹³ Amendment 31 at unnumbered pp. 1-2.

Responding to Entergy's August 2007 calculations, NEC filed Contention 2A.¹¹⁴ This new contention differed from Contention 2 in that it constituted a challenge to the validity of Entergy's CUF and CUF_{en} recalculations¹¹⁵ rather than an assertion that Entergy's Fatigue Monitoring Program was too vague to qualify as an AMP. Shortly thereafter, the Board admitted Contention 2A and held Contention 2 in abeyance, in case Entergy were to lose on Contention 2A and then decide to rely on or modify its original Fatigue Monitoring Program.¹¹⁶ The Board, however, treated the calculations in Amendment 31 as an effort to demonstrate compliance with 10 C.F.R. § 54.21(c)(1)(i) or (ii), rather than, as Entergy had stated, an effort to demonstrate the adequacy of its metal fatigue management program under 10 C.F.R. § 54.21(c)(1)(iii).¹¹⁷

Thereafter, responding to a Request for Additional Information from the Staff,¹¹⁸ Entergy submitted Amendment 33 to the license renewal application, containing a further-refined version (styled a "reanalysis") of its September 2007 CUF calculations and still using the Green's function methodology.¹¹⁹ The Staff, after reviewing those calculations, determined that CUF calculations using the Green's function methodology might underestimate the actual stress on the feedwater, core spray, and reactor recirculation outlet nozzles.¹²⁰ Therefore, at a follow-up

¹¹⁴ *New England Coalition, Inc.'s (NEC) Motion to File a Timely New or Amended Contention* (Sept. 4, 2007), at 3. Contention 2A is quoted in the text associated with note 10, *supra*. NEC appears also to have been under the misimpression that CUF_{en}s were a kind of TLAA – a misconception we address *infra*.

¹¹⁵ See LBP-08-25, 68 NRC 787, 789-90; LBP-07-15, 66 NRC at 271.

¹¹⁶ LBP-07-15, 66 NRC at 271.

¹¹⁷ *Id.* See also notes 100-101, *supra*.

¹¹⁸ Letter from Pao-Tsin Kuo (NRC) to Michael A. Balduzzi (Entergy), "Update on Extension of Schedule for the Conduct of Review of the Vermont Yankee Nuclear Power Station License Renewal Application" (Nov. 27, 2007) (ML073130536). See also Chang Affidavit at 3-4.

¹¹⁹ Letter from Ted A. Sullivan to NRC (Dec. 11, 2007), Att. 1 (Amendment 33 to Application: RAI 4.3.3-2 Additional Information), at 2 (ML073650228) (Amendment 33).

¹²⁰ See Chang Affidavit at 4.

meeting with Entergy,¹²¹ the Staff asked Entergy to calculate the CUF – excluding the environmental adjustment factor – for the feedwater nozzle, using the methodology from ASME Code Section III, NB-3200, including all six stress components (i.e., without using the Green’s function methodology). Entergy would then calculate the CUF_{en} and compare the result to the CUF_{en} presented in Amendment 33 to determine whether the latter was conservative.¹²²

In response, Entergy submitted Amendment 34,¹²³ containing what it styled as its “confirmatory fatigue analysis.”¹²⁴ In Amendment 34, Entergy recalculated the CUF in accordance with the Staff’s request, and also recomputed the CUF_{en} .¹²⁵ However, with the Staff’s approval,¹²⁶ Entergy evaluated only one of the three components – the feedwater nozzle.¹²⁷ Entergy stated that it had selected this particular component because it had the most severe and the largest number of transients and the feedwater nozzle’s analysis would therefore be bounding for all other components.¹²⁸ The “confirmatory analysis” yielded lower CUF_{en} s for the feedwater nozzle than had been calculated in the earlier analysis associated with Amendment 33.¹²⁹ On the basis of those confirmatory calculations, Entergy concluded that the

¹²¹ See Letter from Ted A. Sullivan to NRC (Jan. 30, 2008) at 1 (ML080370478).

¹²² SER, § 4.3.3.2, at p. 4-40; LBP-08-25, 68 NRC at 791, 818; Chang Affidavit at 4, 17.

¹²³ Letter from Ted A. Sullivan to NRC (Jan. 30, 2008) Att. 1 & 2 (Amendment 34 to Application) (ML080370478) (Amendment 34). See also SER, § 4.3.3.2, at p. 4-40.

¹²⁴ Amendment 34. See also LBP-08-25 at 791; Chang Affidavit at 4, 16 (referring to the “confirmative analysis”).

¹²⁵ LBP-08-25 at 819. See generally Amendment 34; Chang Affidavit at 14.

¹²⁶ LBP-08-25, 68 NRC at 803; Chang Affidavit at 17-19.

¹²⁷ Amendment 34 at unnumbered pp 1-2; SER at p. 4-40; Chang Affidavit at 18.

¹²⁸ Amendment 34 at unnumbered pp. 1-2.

¹²⁹ See Amendment 34, Table 1. The differences between the calculations submitted in Amendments 33 and 34 are summarized in the “Testimony of [Entergy witnesses] James C. Fitzpatrick and Gary L. Stevens on NEC Contention 2A / 2B – Environmentally Assisted (continued . . .)

methodologies used in the earlier analyses for all three components were conservative and therefore acceptable.

The Staff in its review recognized that Entergy's approach to establishing the values of the F_{en} terms in the Amendment 34 "confirmatory" analysis differed from its approach in the "reanalysis" performed in connection with Amendment 33. This change in approach effectively reduced the overall F_{en} value for the "confirmatory analysis" of the feedwater nozzle. The Staff concluded that using transient-specific F_{ens} , while not technically inappropriate, nevertheless obscured the effect of changing the stress calculation methodology on the CUF_{en} calculation.¹³⁰ The Staff also concluded that, given the assumptions underlying the data in Amendment 34, the Staff could not judge whether the reduction in F_{en} would also apply to the core spray and reactor recirculation outlet nozzles.¹³¹

Therefore the Staff, during a follow-up audit in February 2008, requested that Entergy calculate the CUF_{en} for the feedwater nozzle corner by multiplying the conservative F_{en} used in the Amendment 33 fatigue "reanalysis" by the CUF from the Amendment 34 "confirmatory analysis."¹³² This combined approach yielded a CUF_{en} higher than Entergy had reported in the Amendment 34 "confirmatory analysis," yet still with a value of less than 1.0.¹³³

Fatigue" (May 12, 2008), at 20 (A39(3)), appended as Att. 1, Ex. E2-01 to *Entergy's Initial Statement of Position on New England Coalition Contentions* (May 13, 2008).

¹³⁰ See, e.g., NRC Staff's Proposed Findings of Fact and Conclusions of Law, and Order in the Form of an Initial Decision (Aug. 25, 2008), at 33 (Staff's Proposed Findings of Fact).

¹³¹ *Id.*

¹³² *Id.*; SER, § 4.3.3.2, at p. 4-42.

¹³³ SER, § 4.3.3.2, at pp. 4-42 to 4-43; Testimony of James C. Fitzpatrick and Gary L. Stevens on NEC Contention 2A / 2B – Environmentally Assisted Fatigue (May 12, 2008), at 20-22 (A40-A41), appended as Att. 1, Ex. E2-01 to *Entergy's Initial Statement of Position on New England Coalition Contentions* (May 13, 2008).

Based on this last fact, the Staff concluded in its SER that, with respect to the feedwater nozzle, Entergy had satisfied the requirements of 10 C.F.R. § 54.21(c)(1)(iii) by virtue of its “confirmatory analysis” – an analysis which the Staff and Entergy agreed would be considered the analysis of record for the feedwater nozzle.¹³⁴ But as for the two other components (the core spray and reactor recirculation outlet nozzles), the Staff determined that use of the Green’s function for the simplified stress input could underestimate the CUF and that the calculations using the Green’s function (performed in connection with Amendment 33) therefore could not stand as the analyses of record for those components.¹³⁵ Therefore, the Staff required Entergy to perform similar “confirmatory analyses” for those two components,¹³⁶ but the Staff postponed the deadline for Entergy to complete these analyses until two years prior to the start of the period of extended operation.¹³⁷ The Staff’s approval of the postponement stems from its position, first stated in the record in August 2007, that because Entergy’s proposal constitutes

¹³⁴ SER, § 4.3.3.2, at pp. 4-42 to 4-43, § 4.3.3.4, at p. 4-43. See *a/so* Tr. at 753 (Mr. Lloyd B. Subin for the Staff) (July 21, 2008); Chang Affidavit at 16. The Staff, in its SER, accepted Entergy’s January 30, 2008 CUF_{en} calculations as the final analysis of record for the feedwater nozzle. See SER, § 4.3.3.2, at p. 4-43 (“In the letter dated February 21, 2008, the applicant stated that it considers the updated [environmentally assisted fatigue] analysis, submitted in the January 30, 2008 letter, as the analysis-of-record for the [feedwater] nozzle”); *id.* (“the updated analysis, whether using the maximum F_{en} or appropriate F_{en}, yields CUFs lower than the Code allowable [*sic*]. The staff concludes that this updated analysis is the analysis-of-record for the [feedwater] nozzle.”).

¹³⁵ SER § 4.3.3.2, at pp. 4-42 to 4-43.

¹³⁶ SER, § 4.3.3.2, at p. 4-43; Chang Affidavit at 18; LBP-08-25 at 792; Entergy Answer to Staff Petition for Review at 5-6.

¹³⁷ SER, § 4.3.3.2, at p. 4-43; LBP-08-25 at 792; Entergy Answer to Staff Petition for Review at 6. The “two years prior” provision first appeared in Commitment 27, which Entergy added to its “License Renewal Commitment List” on August 22, 2006, in Amendment 11. See Letter from Ted A. Sullivan to NRC (Aug. 22, 2006), Attachment 1, “Vermont Yankee Nuclear Power Station, License Renewal Application - Amendment 11, License Renewal Commitment List, Revision 1” at 5 (ML062400342). The Staff later included this in License Condition 4. See LBP-08-25, 68 NRC at 792.

an AMP under section 54.21(c)(1)(iii), the CUF_{en} calculations need not be completed and approved prior to the issuance of a renewed license.¹³⁸

NEC filed a new contention on March 17, 2008, arguing that the January 2008 calculations and analysis were insufficient because Entergy had addressed only one of the asserted deficiencies in the Amendment 33 analyses¹³⁹ and likewise had addressed only one of the three kinds of nozzles – the feedwater nozzle.¹⁴⁰ The Board admitted this new contention and designated it Contention 2B.¹⁴¹ According to the Board, a finding that the January 2008 TLAAAs associated with Amendment 34 were adequate would result in the rejection of Contentions 2A and 2B on their merits and the dismissal of Contention 2 as moot.¹⁴²

The Board held an evidentiary hearing concerning Contentions 2A and 2B on July 21-24, 2008,¹⁴³ in which it expressly interpreted the two contentions as focusing on 10 C.F.R. § 54.21(c)(1)(ii) rather than 10 C.F.R. § 54.21(c)(1)(iii).¹⁴⁴

¹³⁸ See LBP-08-25, 68 NRC at 791-92, 825. Previously, the Staff had taken the position that such calculations, when performed as part of a TLAA, must be completed prior to the issuance of a renewed license. See *id.* at 792, 825 (quoting NEC Ex. NEC-JH-62 at enclosure 2, NRC Summary of Telephone Conference Call Held August 20, 2007, Between the U.S. Nuclear Regulatory Commission and Entergy Nuclear Operations, Inc., Concerning the Vermont Yankee Nuclear Power Station License Renewal Application (Oct. 25, 2007) (ML082340112)). See also Order (Regarding the Briefing of Certain Legal Issues) (June 27, 2008), at 2 (unpublished) (commenting on the Staff change of position) (citing *NRC Staff Initial Statement of Position on NEC Contentions 2A, 2B, 3, and 4* (May 13, 2008), at 11-12).

¹³⁹ *New England Coalition, Inc.'s (NEC) Motion to File a Timely New or Amended Contention* (Mar. 17, 2008), at 3.

¹⁴⁰ *Id.*

¹⁴¹ Order (Granting Motion to Amend NEC Contention 2A) (Apr. 24, 2008), at 2 (unpublished). Contention 2B is quoted in the text associated with note 11, *supra*.

¹⁴² See LBP-08-25, 68 NRC at 791.

¹⁴³ See Entergy Answer to Staff Petition for Review at 6; LBP-08-25 at 779.

¹⁴⁴ See LBP-08-25, 68 NRC at 794.

Thereafter, the Board issued LBP-08-25, in which it concluded that Entergy had met the requirements of section 54.21(c)(1) regarding the feedwater nozzle.¹⁴⁵ But it found differently regarding the core spray and reactor recirculation outlet nozzles.¹⁴⁶ Specifically, the Board found that Entergy's metal fatigue analyses of the core spray and reactor recirculation outlet nozzles had been submitted under subsection (ii)¹⁴⁷ – not subsection (iii) as Entergy had claimed since September 2007 and as the Staff had found in the SER.¹⁴⁸ As a result, the Board found that, as to these two components, Entergy had failed to comply with the relevant requirements of 10 C.F.R. §§ 54.21(c)(1) and 54.29, and that it therefore had not provided information sufficient for the Staff to find a reasonable assurance of safety under 10 C.F.R. § 54.29(a).¹⁴⁹ In support of its determination, the Board reasoned that completion of “these predictive time-limited aging analyses [is] a condition precedent to issuance of the license renewal.”¹⁵⁰ The Board also rejected Entergy's and the Staff's position that Entergy should be permitted to make its calculations and analyses regarding those two components as late as two years before the start of the period of extended operation.¹⁵¹ Based on these conclusions, the Board declined to authorize the license renewal but indicated that it would revisit the issue 45

¹⁴⁵ *Id.* at 822.

¹⁴⁶ *Id.*

¹⁴⁷ *See id.* at 824-26.

¹⁴⁸ In Amendment 34, Entergy addressed both the GALL Report (which provides guidance for compliance with subsection (iii) but not subsection (ii)) and the F_{en} (an analytical approach that the Staff accepts from applicants seeking to comply with subsection (iii)). Entergy also indicated that Amendment 34 is a follow-up document to Entergy's November 27, 2007 “update to the Aging Management Program (AMP) Audit Q&A Database” – a document that (as the “AMP” reference indicates) addressed the demonstration requirements of subsection (iii). See Letter from Ted A. Sullivan to NRC (Jan. 30, 2008), at 1 (ML080370478).

¹⁴⁹ LBP-08-25, 68 NRC at 780, 895.

¹⁵⁰ *Id.* at 895. See also *id.* at 794, 831.

¹⁵¹ *Id.* at 824-31.

days after Entergy had satisfactorily completed and served on the litigants “the confirmatory CUF_{en} analyses on the core spray and reactor recirculation [outlet] nozzles with satisfactory results without using the . . . Green’s function methodology.”¹⁵²

The Board held that the adjudication would terminate if Entergy performed revised confirmatory analyses of the core spray and reactor recirculation outlet nozzles that met the following criteria:

- (1) the analyses were in accordance with the Board’s guidance and the basic approach used in the CUF_{en} analysis for the feedwater nozzle,
- (2) they contained no significantly different scientific or technical judgments, and
- (3) they demonstrated values less than 1.0.¹⁵³

On the other hand, if Entergy’s revised CUF_{en} analyses failed to meet any one of these three criteria, then NEC could file new or amended contentions challenging the confirmatory analyses.¹⁵⁴ The Board declared that any such contention “must specifically state how the new analyses are not consistent with the legal requirement and the calculations performed for the feedwater nozzle.”¹⁵⁵ The Board further instructed NEC not to “rehash or renew technical challenges that have already been raised and resolved in this proceeding.”¹⁵⁶ The Board therefore held open Contentions 2A and 2B; it continued to hold Contention 2 in abeyance.¹⁵⁷

¹⁵² *Id.* at 895, as clarified in Order (Granting Entergy Motion for Clarification) (Dec. 22, 2008) (unpublished). See also LBP-08-25, 68 NRC at 832.

¹⁵³ See *id.* at 831-32.

¹⁵⁴ *Id.* at 832.

¹⁵⁵ *Id.* at 832 n.95.

¹⁵⁶ *Id.* In a later Order, the Board advised NEC that such contentions also must satisfy the requirements of 10 C.F.R. §§ 2.309(f)(1) and 2.309(f)(2). Order (Clarifying Deadline for Filing New or Amended Contentions) (Mar. 9, 2009) at 3 (unpublished).

¹⁵⁷ LBP-08-25, 68 NRC at 895.

The Staff filed a petition for review challenging the adverse rulings of LBP-08-25. Entergy, while awaiting action on the Staff's petition, responded to the Board's mandate and served the resulting CUF_{en} calculations on the Board and parties.¹⁵⁸ Entergy later revised those calculations and stated that it intended to make still further revisions.¹⁵⁹ The Board responded by issuing an Order ruling that the period for reviewing the revised calculations and analyses would begin to run only upon Entergy's filing of its "final analyses of record"¹⁶⁰ for the core spray and reactor recirculation outlet nozzles. The next day, Entergy submitted "its final calculations of record for the confirmatory environmentally assisted fatigue (CUF_{en}) analyses" of those nozzles.¹⁶¹ This chain of events had the effect of extending the deadline for revised contentions to April 24, 2009.

On that date, NEC filed a new contention, which we designate Contention 2C, challenging the adequacy of the March 10, 2009 CUF_{en} analyses of the core spray and reactor recirculation outlet nozzles.¹⁶² Entergy and the NRC Staff opposed the motion.¹⁶³

¹⁵⁸ Letter from Matias Travieso-Diaz to the Atomic Safety and Licensing Board (Jan. 8, 2009) (ML090230555).

¹⁵⁹ Letter from Matias Travieso-Diaz to the Atomic Safety and Licensing Board (Feb. 26, 2009) (ML090690302).

¹⁶⁰ Order (Clarifying Deadline for Filing New or Amended Contentions) (Mar. 9, 2009), at 3 (unpublished).

¹⁶¹ Letter from Matias Travieso-Diaz to the Atomic Safety and Licensing Board (Mar. 10, 2009), at 1 (ML090840422), and attached documents. See also Letter from Michael J. Colomb, Entergy, to the Document Control Desk, NRC (Mar. 12, 2009) at 1 (ML090760976) (Amendment 38). Entergy did not, however, revise its January 8, 2009 "Calculation 0801038.301, Revision 0" for "Design Inputs and Methodology for ASME Code Fatigue Usage Analysis of Reactor Core Spray Nozzle" so, at least as to that particular calculation, the version that Entergy "sent to the parties on January 8, 2009 remains the final calculation of record." Letter from Matias Travieso-Diaz to the Atomic Safety and Licensing Board (Mar. 10, 2009), at 1 (ML090840422).

¹⁶² NEC's Motion to File Contention 2C.

¹⁶³ *Entergy's Opposition to NEC's Motion to File a Timely New Contention* (May 18, 2009); *NRC Staff's Answer in Opposition to NEC Motion for Leave to File a New Contention* (May 19, 2009).

On July 8, 2009, the Board issued a final initial decision rejecting Contention 2C and terminating the proceeding.¹⁶⁴ The Board concluded:

NEC's challenges to the assumptions made by Entergy are, in essence, challenges that either were made previously and already rejected by the Board, or were not made before and are now not timely. The new contention is based on assumptions that cannot be considered information that was "not previously available" or "materially different than information previously available" and therefore does not meet the requirements of 10 C.F.R. § 2.309(f)(2)(i) or (ii).¹⁶⁵

NEC filed a timely petition for review from LBP-09-9.¹⁶⁶

IV. ANALYSIS OF THE STAFF'S PETITION FOR REVIEW

With this background in mind, we turn to the Staff's petition for review.

A. The Board's Findings of Fact

The Staff argues that the Board's ruling on Contentions 2A and 2B reflects clearly erroneous factual findings that are implausible in light of the record viewed in its entirety.¹⁶⁷ According to the Staff, the Board erroneously stated that the specified CUF calculations are at issue when, in fact, the record generally and the admitted contentions in particular indicate that the contested issue is the adequacy of Entergy's CUF_{en} calculations¹⁶⁸ – including the environmental adjustment factor.¹⁶⁹

¹⁶⁴ LBP-09-9, 70 NRC at 48-49.

¹⁶⁵ *Id.*, 70 NRC at 49.

¹⁶⁶ In September 2009, following the close of the hearing record, the Staff issued an SSER that accepted the March 12, 2009 CUF_{en} calculations as the analyses of record for the core spray and reactor recirculation outlet nozzles. Safety Evaluation Report Related to the License Renewal of Vermont Yankee Nuclear Power Station, Supplement 1, § 4.3.3.2, at p. 4-4 (Sept. 2009) (SSER) (ML091200162) ("The staff's review of the confirmatory analyses for the [reactor recirculation outlet] and [core spray] nozzles confirmed that the calculations were performed in accordance with ASME Code requirements, the F_{en} values were calculated in accordance with staff guidance documents, and the resulting CUF_{en} values were within the acceptance limit of 1.0"). The SSER refers here to Amendment 38, filed March 12, 2009.

¹⁶⁷ Staff Petition at 11.

¹⁶⁸ As explained above, "CUF" is a means of quantifying the fatigue that a particular metal component experiences during plant operation. By contrast, "CUF_{en}" refers to a CUF that has (continued . . .)

We are “generally disinclined to upset *fact*-driven Licensing Board determinations,”¹⁷⁰ such as the statement to which the Staff objects. We find the Staff’s argument cursory and lacking explanation as to why one inaccurate reference to the CUF (rather than the CUF_{en}) is material¹⁷¹ to the Board’s ruling regarding Contentions 2A and 2B.¹⁷² Based upon our own review of LBP-08-25, we conclude that, ultimately, the Board’s misuse of the term “CUF” had no effect on its overall analysis.¹⁷³ We are therefore unconvinced that the Board’s single misplaced reference to “CUF” constituted a factual error sufficiently serious to require reversal.

The Staff also argues that the Board ignored the fact that, according to clear record evidence, Entergy is implementing a fatigue monitoring AMP that is consistent with the GALL Report.¹⁷⁴ We address this argument in the context of the Staff’s challenge to the Board’s

been modified by an environmental adjustment factor (F_{en}) to reflect the environment inside a nuclear reactor. See note 9, *supra*.

¹⁶⁹ Staff Petition at 11 (citing LBP-08-25, 68 NRC at 830).

¹⁷⁰ *Oyster Creek*, CLI-08-28, 68 NRC at 675 (emphasis added).

¹⁷¹ Materiality is a requirement for any fact-based argument in a petition for review. 10 C.F.R. § 2.341(b)(4)(i).

¹⁷² We have repeatedly stated that we will not consider cursory, unsupported arguments. See, e.g., *Pacific Gas and Electric Co.* (Diablo Canyon Power Plant, Units 1 and 2), CLI-02-16, 55 NRC 317, 337 (2002); *Northeast Nuclear Energy Co.* (Millstone Nuclear Power Station, Units 1, 2, and 3), CLI-00-18, 52 NRC 129, 132 (2000); *GPU Nuclear, Inc.* (Oyster Creek Nuclear Generating Station), CLI-00-6, 51 NRC 193, 204 n.6 (2000).

¹⁷³ New York points out that, as a general matter, the acronyms CUF and CUF_{en} are used interchangeably. *Brief Amicus Curiae by the States of New York and Connecticut, Hudson Riverkeeper, Inc., Hudson River Sloop Clearwater, and The Prairie Island Indian Community in Opposition to Staff’s Petition for Review and in Support of Intervenors State of Vermont and the New England Coalition* (Dec. 19, 2008), at 2 n.2, appended to Non-litigants’ Motion. While we consider this practice imprecise, we do not find it to have had a material impact on the Board’s analysis.

¹⁷⁴ Staff Petition at 11 (citing LBP-08-25 at 825-26).

conclusion regarding the timing of the required demonstration pursuant to 10 C.F.R.

§ 54.21(c)(1)(iii) rather than here.¹⁷⁵

B. The Board's Conclusions of Law

The crux of the Staff's legal argument is that the Board substantially erred in interpreting how, generally, an applicant may comply with section 54.21(c)(1) and how, specifically, Entergy did so.¹⁷⁶ Both the Board's and the Staff's positions are internally consistent, but they are based on different, and incompatible, assumptions. To set the context for our analysis, we summarize below the Board's and the Staff's respective positions.

In finding that Entergy's metal fatigue analyses of the core spray and reactor recirculation outlet nozzles neither complied with the ASME Code nor provided the requisite reasonable assurance pursuant to 10 C.F.R. § 54.29(a), the Board focused on a question regarding timing: whether Entergy permissibly could postpone performance of necessary metal fatigue analyses until two years prior to the period of extended operation.¹⁷⁷ The Board observed that a license renewal applicant has the choice of either preparing a one-time predictive TLAA pursuant to 10 C.F.R. § 54.21(c)(1)(i) or (ii), or making a commitment to managing aging by virtue of an aging management plan pursuant to 10 C.F.R. § 54.21(c)(1)(iii). The applicant must demonstrate, respectively, either that aging will not cause the components to fail during the period of extended operation, or that the effects of aging will be adequately managed during that period. The Board concluded that, in either case, the applicant must complete the analysis of record *prior to* the issuance of a renewed license.¹⁷⁸

¹⁷⁵ See section IV.B.2 of this decision, *infra*.

¹⁷⁶ Although the interpretation of sections 54.3 and 54.29 are also at issue, they revolve around the central question of how to construe section 54.21(c)(1).

¹⁷⁷ LBP-08-25, 68 NRC at 824.

¹⁷⁸ *Id.* at 824-25.

In this case, the Board determined that Entergy had not completed its metal fatigue analysis as required by the rules and, as a result, had made neither demonstration. Rather, in the Board's view, Entergy in Amendment 31 raised form over substance by merely "relabeling" its delayed TLAA as an AMP, which the Staff, in turn, improperly accepted as compliant with 10 C.F.R. § 54.21(c)(1)(iii).¹⁷⁹

The Staff makes three interrelated arguments.¹⁸⁰ First, it asserts that Entergy's AMP is consistent with the GALL Report and therefore satisfies the demonstration requirements of 10 C.F.R. § 54.21(c)(1)(iii).¹⁸¹ In this regard, the Staff takes specific exception to the Board's fundamental finding that Entergy simply "re-packag[ed] its TLAA as an AMP" and that this "relabeling" effectively elevated "form over substance."¹⁸² According to the Staff, Entergy in Amendment 31 explicitly modified its Fatigue Monitoring Program so that it conformed to the fatigue monitoring AMP provisions in the GALL Report.¹⁸³ Entergy did this, says the Staff, by removing both exceptions that the application had previously taken to the GALL Report¹⁸⁴ and, in particular, by making the consideration of environmentally assisted fatigue a part of the

¹⁷⁹ *Id.* at 826.

¹⁸⁰ Staff Petition at 8-9.

¹⁸¹ *Id.* at 11.

¹⁸² LBP-08-25, 68 NRC at 826.

¹⁸³ Staff Petition at 5, 20 n.42.

¹⁸⁴ As stated above, in its original application, Entergy proposed a "Fatigue Monitoring Program." See Application, Appendix B at p. B-39. The original application stated that the Fatigue Monitoring Program is consistent with the section X.M1 Metal Fatigue AMP in the GALL Report in all but two respects – it would not include environmental effects and it would not provide a periodic update of the fatigue usage calculations. *Id.* Amendment 31 removed those two exceptions to the GALL Report, making it (according to both Entergy and the Staff) fully consistent with section X.M1, and therefore with 10 C.F.R. § 54.21(c)(1)(iii). See text associated with note 113, *supra*; SER, § 3.0.3.2.10, at p. 3-73.

Fatigue Monitoring Program.¹⁸⁵ The Staff argues that Entergy's action places the metal fatigue portion of the application squarely within the parameters of 10 C.F.R. § 54.21(c)(1)(iii), requiring a demonstration that "the effects of aging . . . will be adequately managed" during the period of extended operation by means of an AMP.

The Staff's next argument is that, contrary to the Board's regulatory interpretation, Entergy's CUF_{en} analyses do not fall within the definition of TLAA in 10 C.F.R. § 54.3.¹⁸⁶ According to the Staff, the Board's misinterpretation of the regulatory definition of TLAA led the Board to conclude, erroneously, both that Entergy had not made the demonstration required under by 10 C.F.R. § 54.21(c)(1) and that the Board could therefore not make a finding of reasonable assurance under 10 C.F.R. § 54.29(a).¹⁸⁷

The Staff's final argument on appeal is that the Board erred in holding that the completion of CUF_{en} calculations is a "condition precedent" to the NRC's approval of a license renewal.¹⁸⁸ The Staff maintains that neither the Commission's regulations nor the ASME Code require that license renewal applicants calculate CUF_{enS}. Instead, according to the Staff, license renewal applicants consider CUF_{enS} because the Staff recommended in the GSI-190

¹⁸⁵ Staff Petition at 20 n.42.

Vermont opposes the Staff's first argument. Vermont argues that "incorporation by reference of guidance from [the GALL Report] or any other regulatory guide may only occur 'provided that the references are clear and specific.'" Vermont Opposition at 5 (citing 10 C.F.R. § 54.17(e)). Vermont further asserts that the relevant section of the GALL Report (Section X.M1) does not set forth a sufficiently specific program and does not offer sufficiently clear guidance to qualify for such incorporation by reference. Vermont is entitled to challenge the sufficiency of any guidance document on which Entergy relies. See *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 1), ALAB-698, 16 NRC 1290, 1299 (1982) (the adequacy of guidance may be litigated in individual licensing proceedings), *rev'd in part on other grounds*, CLI-83-22, 18 NRC 299 (1983). But it must do so with much more substance than appears in its Opposition brief. See note 172, *supra*.

¹⁸⁶ Staff Petition at 8.

¹⁸⁷ *Id.* at 15.

¹⁸⁸ *Id.* at 8, 9, 18.

Closeout Memorandum that they “address the affects [*sic*] of the coolant environment on component fatigue life as aging management programs are formulated in support of license renewal.”¹⁸⁹

1. *Summary*

Based on our review of both the Board’s analysis and the Staff’s and other litigants’ responsive arguments, all discussed below, we conclude that the Staff’s regulatory interpretation is correct and that the Board erred in its rulings in LBP-08-25 regarding Contentions 2A and 2B. We observe, however, that, as is evidenced by our lengthy discussion of the events in this adjudication, the record before the Board was unusually complicated and quite muddled, and that the Board’s confusion is therefore understandable. Although we do not affirm the Board’s decision today, we nonetheless consider its analysis to be a well-reasoned effort to grapple with the complicated adjudicatory record.

As discussed below, we find two fundamental flaws in the Board’s analysis. The first relates to Entergy’s modification of its Fatigue Monitoring Program to be consistent with the AMP in the GALL Report and thereby satisfy 10 C.F.R. § 54.21(c)(1)(iii). As the Staff correctly points out, Entergy ultimately did this by removing both of the exceptions that the application had previously taken to the generic AMP in the GALL Report – including the exception that omitted any consideration of environmentally assisted fatigue from Entergy’s AMP. These modifications placed the metal fatigue portion of the application within the parameters of 10 C.F.R. § 54.21(c)(1)(iii). The record is clear that Entergy amended its application to include the revised Fatigue Monitoring Program on September 17, 2007.¹⁹⁰ The Board misunderstood Entergy’s modifications and dismissed them as merely “relabeling” its demonstration in an effort

¹⁸⁹ *Id.* at 13.

¹⁹⁰ Amendment 31, *supra*.

to avoid its purported obligations under subsections (i) and/or (ii) of 10 C.F.R. § 54.21(c)(1).¹⁹¹ In so concluding, the Board was not correct in equating the fatigue analyses under subsections (i) and (ii) with the fatigue analyses under subsection (iii). Further, the Board failed to recognize that an applicant may use similar or identical methodology to calculate the fatigue usage factor for the TLAA and for the AMP— regardless of how it seeks to comply with section 54.21(c)(1), whether through a predictive TLAA or by the use of an AMP.¹⁹²

We also disagree with the Board's legal determination that CUF_{en}s are TLAA's and that the renewed license therefore may not issue without them. Our regulations at 10 C.F.R. § 54.3 define TLAA's as being contained in the current licensing basis. Because CUF_{en}s are not contained in Vermont Yankee's current licensing basis, they cannot be TLAA's and thereby a prerequisite to license renewal. The Staff's consideration of CUF_{en}s in its review of the Vermont Yankee license renewal application does not render the use of CUF_{en}s a requirement under our rules.

The Board's misunderstandings fundamentally undermine the rationale underlying its rulings on the merits of Contentions 2A and 2B. We conclude that the Board in LBP-08-25 should have found that Entergy had met its burden of proof under 10 C.F.R. § 54.21(c)(1)(iii) and ruled in favor of Entergy on the merits of Contentions 2A and 2B. We therefore reverse the portion of the Board's decision in LBP-08-25 dealing with Contentions 2A and 2B, related to the calculation of the CUF_{en} for the core spray and reactor recirculation outlet nozzles.

¹⁹¹ LBP-08-25, 68 NRC at 825-26.

¹⁹² This conclusion applies equally to the Staff's factual argument that the Board ignored Entergy's implementation of a fatigue monitoring AMP that was consistent with the GALL Report and therefore in compliance with 10 C.F.R. § 54.21(c)(1)(iii). We agree with the Staff that the Board erred in failing to take this fact into account.

2. *The Board's Interpretation of Section 54.21(c)(1)*

The Board held that, if a license renewal applicant were permitted to demonstrate compliance with section 54.21(c)(1) *prior to* issuance of a renewed license merely by promising to demonstrate it *following* issuance of the renewed license, then the applicant would have no reason to perform the TLAA's now. The Board noted that an applicant would have ample reason to choose not to perform TLAA's, such as postponing the cost of the demonstration and avoiding the expenses of a hearing.¹⁹³ The Staff asserts that the Board's interpretation would force a license renewal applicant seeking to rely on 10 C.F.R. § 54.21(c)(1)(iii) to follow the requirements of sections (i) and/or (ii), thereby "collapsing subparagraph (iii) into [subparagraph] (ii) and rendering subparagraph (iii) superfluous."¹⁹⁴

We agree with the Staff. As noted above, an applicant can satisfy the requirements of section 54.21(c)(1) in any of three ways – it may choose to demonstrate that its fatigue analyses remain valid through the period of extended operation under subsection (i), or that those analyses have been projected to the end of that period under subsection (ii), or that the effects of aging will be adequately managed during that period under subsection (iii) through, e.g., a commitment to implement an approved AMP. The Board made the understandable error of equating the fatigue analyses for an existing TLAA under subsections (i) and (ii) with the fatigue analyses for an AMP under subsection (iii). The underlying fatigue analysis calculations that support both a TLAA and an AMP are generally performed the same way, and they do have the same *general* purpose – to aid in providing reasonable assurance that "the effects of aging will be adequately managed," as required under sections 54.21(a)(3) and 54.29(a). But their *specific* purposes and results differ.

¹⁹³ LBP-08-25, 68 NRC at 826.

¹⁹⁴ Staff Petition at 18.

Predictive metal-fatigue TLAAAs that are intended to demonstrate compliance with 10 C.F.R. § 54.21(c)(1)(i) or (ii) show that the predicted fatigue usage factor is less than the design code limit of 1.0 for the period of extended operation – a showing that would automatically resolve the metal fatigue issue in the applicant’s favor.¹⁹⁵ By contrast, a fatigue monitoring program that an applicant conducts as an AMP under subsection (iii) is not intended to resolve *automatically* the metal-fatigue issue in the applicant’s favor by use of a single, predictive calculation. Rather, its goal is to ensure that the design code limit is not exceeded during the period of extended operation. The “Detection of Aging Effects” element of the Metal Fatigue of Reactor Coolant Pressure Boundary AMP in the GALL Report recommends “periodic updates of the fatigue usage calculations” based on active monitoring of high fatigue-usage locations.¹⁹⁶ In so doing, an applicant may use similar or identical methodology to calculate the fatigue usage factor for the so-called “predictive” TLAA and for the so-called “tracking” AMP. This is what Entergy did here.

Our regulations contain no requirement that an applicant complete a subsection (iii) fatigue analysis *prior* to the issuance of a renewed license, and an applicant need not do so unless the analysis is needed to support a demonstration that the tracking AMP will satisfy our regulatory requirements – here, such an analysis would be used to demonstrate that the AMP is consistent with the GALL Report. Both the Staff and Entergy assert that this exception does not apply here, and neither NEC nor Vermont has challenged the AMP’s consistency with the GALL Report. Entergy expressly has committed to implement a tracking AMP that, it claims, comports with the GALL Report and is therefore consistent with 10 C.F.R. § 54.21(c)(1)(iii).¹⁹⁷ Likewise,

¹⁹⁵ The Board correctly points this out in LBP-08-25, 68 NRC at 791.

¹⁹⁶ GALL Report, § X.M1, at p. X M-1.

¹⁹⁷ See, e.g., Amendment 31 at unnumbered pp. 1-2.

the Staff has determined that Entergy's AMP is consistent with the GALL Report.¹⁹⁸ Regardless of whether Entergy intended during the early stages of this adjudication to proceed under 10 C.F.R. § 54.21(c)(1)(iii), we conclude that it is now Entergy's intent to do so – and we hold Entergy to the requirements of subsection (iii). This conclusion not only informs our response to the Staff's instant appellate argument but also undergirds our ruling in Part V.A, *infra*, to afford NEC and Vermont the opportunity to challenge the validity of Entergy's Fatigue Management Program.

We also disagree with the Board's conclusion that Entergy's future-oriented interpretation would avoid the whole point of the license renewal process – to demonstrate that aging will be properly managed.¹⁹⁹ Section 54.29(a) of our regulations speaks of both past and future actions, referring specifically to those that “*have been or will be taken* with respect to . . . managing the effects of aging . . . and . . . time-limited aging analyses. . . .”²⁰⁰ Moreover, in *Oyster Creek*, we expressly interpreted section 54.21(c)(1) to permit a demonstration *after* the issuance of a renewed license: “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.”²⁰¹ We reiterate here 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).

The Board acknowledges our ruling in *Oyster Creek, supra*, but seeks to distinguish the language quoted above. The Board believes that our use of the future tense reflects nothing more than our recognition that licensees necessarily *implement* their AMPs during the extended

¹⁹⁸ SER, § 3.0.3.2.10, at p. 3-73.

¹⁹⁹ LBP-08-25, 68 NRC at 826.

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

²⁰¹ *Oyster Creek*, CLI-08-23, 68 NRC at 468 (emphasis added).

operating period – that is, in the future. The Board therefore draws a distinction between “tracking” and “predictive” TLAAAs. Regarding “tracking” TLAAAs, the Board concludes that the regulations permit the recalculation of TLAAAs after the grant of a renewed license in order to track how the actual calculations compare with those predicted in the license renewal application. In contrast, the Board finds that “predictive” TLAAAs must be performed prior to the grant of the renewed license if they serve as the “analysis of record,” which predicts that aging will “not be a problem” and thereby establishes that an AMP is not required.²⁰²

The Board’s theory may be valid for license renewal applicants relying on 10 C.F.R. § 54.21(c)(1)(i) or (ii), but it is incorrect if applied to subsection (iii). It runs counter to the GALL Report – a guidance document that was prepared at our behest and that we have cited with approval.²⁰³ The GALL Report provides that one way a license renewal applicant may demonstrate that an AMP *will* effectively manage the effects of aging during the period of extended operation is by stating that a program is “consistent with” or “based on” the GALL Report.²⁰⁴

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

²⁰² LBP-08-25, 68 NRC at 827 (capitalization and hyphens omitted).

²⁰³ See *Oyster Creek*, CLI-08-23, 68 NRC at 468.

²⁰⁴ In the GALL Report, the Staff recognizes acceptable AMPs, including one for metal fatigue. A license renewal application may reference the GALL Report to demonstrate that the applicant’s AMP corresponds to one that has been reviewed and approved in that Report.

applicant's programs are in fact consistent with the GALL Report. This is what the Staff did here.²⁰⁵

Finally, we are unpersuaded by Vermont's arguments in support of the Board's rulings. Vermont interprets our language in *Oyster Creek* as merely a description of "what is a satisfactory minimum that an application must meet, not that the mere assertion of an intent to comply with GALL would remove from consideration a challenge by an intervenor, based upon . . . the theory that there is insufficient detail in the GALL commitment for applicant to 'demonstrate' that it will have an adequate AMP."²⁰⁶ We do not accept Vermont's limiting interpretation of our statement in the *Oyster Creek* decision. We find nothing in that decision to support Vermont's reading, which runs contrary to the reasoning in today's decision. We also observe that Vermont provides no specific examples of the GALL Report's purported lack of specificity.²⁰⁷

Vermont also argues that the GALL Report is merely "a guidance document and compliance with it does not foreclose a challenge to the adequacy of the GALL[-]approved

²⁰⁵ For example, the Staff conducted audits on October 9-10, 2007 (see SER, § 4.3.3.2, at pp. 4-38 & 4-41), February 14, 2008 (see SER, § 4.3.3.2, at pp. 4-41 to 4-42), and February 18-20, 2009 (SSER, § 4.3.3.2, at p. 4-3). It held a meeting with Entergy on January 8, 2008 (see SER, § 4.3.3.2, at p. 4-40). It held telephone conference calls with Entergy on December 18, 2007 (see SER, § 4.3.3.2, at p. 4-40), October 23, 2007 (Memorandum, Summary of Telephone Conference Call Held on October 23, 2007, Between the U.S. Nuclear Regulatory Commission and Entergy Nuclear Operations, Inc., Concerning Audit Questions Pertaining to the Vermont Yankee Nuclear Power Station License Renewal Application (Jan. 2, 2008) (ML073610469)), and October 16, 2007 (Memorandum, Summary of Telephone Conference Call Held on October 16, 2007, Between the U.S. Nuclear Regulatory Commission and Entergy Nuclear Operations, Inc., Concerning Audit Questions Pertaining to the Vermont Yankee Nuclear Power Station License Renewal Application (Nov. 26, 2007) (ML073300152)). And it issued numerous requests for additional information to Entergy. See, e.g., RAI 4.3.3-1 (Requests for Additional Information for the Review of the Vermont Yankee Nuclear Power Station, License Renewal Application (July 24, 2007) (ML072000256)); notes 119, *supra* & 220, *infra*; SER, § 4.3.3.2, at p. 4-43.

²⁰⁶ Vermont Opposition at 5.

²⁰⁷ As already noted, we do not consider cursory, unsupported arguments. See note 172, *supra*.

program any[] more than failing to comply with the GALL[-]approved program is sufficient to demonstrate that an application is deficient.”²⁰⁸ Vermont likewise asserts that, at most, Entergy’s “commitment to comply with the GALL provision related to metal fatigue, [may] satisf[y] the Staff but [it] does not and cannot prevent the Board from reviewing the substance of the commitment and . . . explor[ing] any deficiencies alleged in that commitment to the extent they are raised by an intervenor.”²⁰⁹ Vermont is correct on both of these counts, but to no avail. The Board did not find that the GALL Report is somehow binding upon Entergy. And of course, any AMP is subject to challenge before a board in a license renewal proceeding.

3. *The Role of the CUF_{en}*

The Board concluded in LBP-08-25 that:

[T]he CUF must be adjusted to account for . . . environmental factors (i.e., the CUFs must be adjusted with the F_{en}) in order to provide reasonable assurance that metal fatigue failure will not occur. [A license renewal application’s] analysis of metal fatigue that ignored the known and substantial effects of the [light-water reactor] environment (the F_{en}) would be insufficient, both as a technical and as a legal matter under 10 C.F.R. § 54.21(c)(1)(i), (ii) or § 54.29(a).²¹⁰

In so ruling, the Board treated CUF_{en}s as if they were existing TLAAs governed by subsections (i) and (ii). The Staff challenges the Board’s ruling that the CUF_{en} calculations in question are TLAA demonstrations and that the renewed license therefore may not issue without them.²¹¹ The Staff’s argument is that (1) TLAAAs that are prerequisites to license renewal are defined in 10 C.F.R. § 54.3 as being contained in the current licensing basis, (2) metal fatigue analyses for the components *that use the environmental adjustment factor* are not contained in the pre-application current licensing basis, and (3) they therefore cannot be

²⁰⁸ *Id.*

²⁰⁹ *Id.* at 6.

²¹⁰ LBP-08-25, 68 NRC at 824. See also *id.* at 830, 895.

²¹¹ Staff Petition at 8-9 (citing LBP-08-25, 68 NRC at 895), 15-18 (citing *id.* at 789, 793, 830).

required as a prerequisite to license renewal.²¹² We agree with the Staff that the Board erred in this respect, and we address the assumption on which the Board rests its ruling.

The Board assumes that “[t]he CUF_{en} analyses are ‘time-limited aging analyses’ within the meaning of 10 C.F.R. § 54.3(a).”²¹³ In the Board’s view, the term “TLAA” includes both the metal-fatigue analyses previously embedded in the applicant’s licensing basis *and* the environmental adjustment factors (F_{en}) that Entergy provided to assess accurately the likelihood that the components would fail due to metal fatigue during the period of extended operation.²¹⁴

We disagree. As the Staff correctly observes, “TLAAs are *existing* analyses that are part of the plant’s [current licensing basis] . . . They are not new analyses. . . . [T]he requirements of 10 C.F.R. § 54.21(c)(1) do not apply to Vermont Yankee’s CUF_{en} TLAAs because Vermont Yankee’s [current licensing basis] does not include CUF_{en} TLAAs (therefore they do not fall within the definition of TLAA in § 54.3).”²¹⁵ None of our regulations requires that a license renewal applicant calculate CUF_{en} – *that is, adjust the CUF by applying the environmental adjustment factor* – prior to the issuance of a renewed license. We recognize that both the SRP and GSI-190 Closeout Memorandum *recommend* the inclusion of the environmental adjustment factor in CUF calculations. But as guidance documents, they cannot impose this as a requirement.²¹⁶

²¹² Staff Petition at 15-18.

²¹³ LBP-08-25, 68 NRC at 789.

²¹⁴ *Id.* at 830.

²¹⁵ Staff Petition at 16 (emphasis in original). See also Entergy Answer to Staff Petition for Review at 10-11, 13 n.16, 16.

²¹⁶ See, e.g., *Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 264 (2001).

We recognize the apparent inconsistency of the Staff's position in this proceeding.²¹⁷

The Staff has, as a practical matter, treated CUF_{en} calculations and analyses as a requirement by directly requesting Entergy to consider F_{en}. For instance, Entergy in Amendment 33 changed the F_{en} from the one it had used in its prior calculations. The Staff rejected this submission, but not because it had included an F_{en}. Rather, the Staff requested that Entergy resubmit the data *using the previous F_{en}*, so that the Staff could make a valid comparison of Entergy's current and prior metal fatigue data.²¹⁸ Similarly, the Staff in its SER cited the SRP for the proposition that "the applicant *must* address . . . the effects of the coolant environment on component fatigue life when aging management programs are formulated to support license renewal,"²¹⁹ and the Staff made its ultimate "reasonable assurance" finding for the metal fatigue analyses taking into

²¹⁷ The Board commented upon this inconsistency. LBP-08-25, 68 NRC at 826 and 830 (noting that the SER considered CUF_{ens} to be TLAAs). *Cf. Motion for Leave by the States of New York and Connecticut, Hudson Riverkeeper, Inc., Hudson River Sloop Clearwater, Inc., and the Prairie Island Indian Community to Submit Brief Amici Curiae in Opposition to Staff's Petition for Review and in Support of Intervenors State of Vermont and the New England Coalition* (Dec. 19, 2008), at 10-11 (where *amici* New York *et al.* point out that the NRC staff had actually "supported industry's suggestion to incorporate F_{en} into CUF analyses when . . . the Electric Power Research Institute . . . originally proposed the idea in 1999," and that the "Staff stated clearly that [e]nvironmentally assisted fatigue degradation should be addressed in [AMPs] developed for license renewal" (citations and internal quotation marks omitted)). See also GSI-190 Closeout Memorandum, Att. 1, Exhibit C ("Interaction With Industry"), at 1 (stating that "[t]he staff agrees with the concept of using an environmental correction factor (F_{en}) to obtain fatigue usage reflecting environmental effects").

²¹⁸ See SER, Section 4.3.3.2, at p. 4-40; LBP-08-25, 68 NRC at 791, 818; Memorandum, "Summary of Meeting Held on January 8, 2008, Between the U.S. Nuclear Regulatory Commission Staff and Entergy Nuclear Operations, Inc., Representatives to Discuss the Response to a Request for Additional Information Pertaining to the Vermont Yankee Nuclear Power Station License Renewal Application (Jan. 31, 2008), at 2 (ML080220508).

²¹⁹ SER, § 4.3.3.2, at p. 4-33 (emphasis added), referring to SRP, § 4.3.3.2, at p. 4.3-7. See also SRP, § 4.3.1.2, at p. 4.3-3 ("licensees are to address the effects of coolant environment on component fatigue life as aging management programs are formulated in support of license renewal").

account the F_{en} . These are only two of many such instances.²²⁰ These inconsistencies may have contributed to the confusion on the record.

Finally as to this issue, we address Vermont's argument in support of the Board's conclusion that CUF_{en} s are TLAAAs. According to Vermont, the mere fact that an applicant has agreed to implement an AMP does not free it of its "obligation to conduct a proper CUF_{en} analysis as a prerequisite to designing the appropriate AMP."²²¹ Vermont asserts that, "[w]ithout the CUF_{en} analysis, identifying which, if any, components will have a CUF_{en} in excess of 1.0 and at what point in their operating history that is likely to occur, the parameters of the AMP monitoring cannot be determined and an applicant would not be able to demonstrate that it has a technically acceptable AMP."²²² Vermont's position lacks legal support. We see nothing in our regulations to suggest that "baseline" CUF_{en} calculations are *prerequisites* to establish the "parameters" of the AMP.

For all of these reasons, we reverse the Board's ruling that because Entergy had ignored the effects of F_{en} , its license renewal application was legally and technically insufficient.

V. ANALYSIS OF NEC'S PETITION FOR REVIEW

Following the Board's decision in LBP-08-25, the proceeding continued until the issuance of the Board's final initial decision in LBP-09-9. There, the Board ultimately found against NEC and terminated the proceeding. NEC has now appealed LBP-09-9. Our resolution of the Staff's petition for review renders it unnecessary for us to consider NEC's petition for review insofar as it challenges the Board's ruling that Contention 2C was inadmissible.

²²⁰ See, e.g., Draft RAI 4.3.3-3, appended to E-mail from Jonathan Rowley to dmannai@entergy.com; hmetell@entergy.com; jdevinc@entergy.com (Dec. 21, 2007 at 12:22:52 PM), entitled "12/18 meeting summary and draft RAI" (ML073650118); Vermont Yankee Nuclear Power Station License Renewal Application; Requests for Additional Information (RAI); RAI 4.3.3-1 (July 24, 2007) (ML072000256).

²²¹ Vermont Opposition at 4.

²²² *Id.*

Nevertheless, we exercise our discretion to do so, and we both reject those challenges and affirm the portions of LBP-09-9 addressing that contention. However, based on our resolution of the issues in the Staff's petition for review, we also find that NEC has been deprived of the opportunity, promised by the Board, to "revitalize" its original Contention 2.²²³ We therefore remand the proceeding for the limited purpose of according NEC that opportunity.

A. Contention 2

Contention 2, as originally submitted, argues that Entergy's application does not include an adequate plan to monitor and manage the effects of aging due to metal fatigue. NEC complains that the Board failed to provide for the adjudication of Contention 2, and asks us to order a full adjudication of that contention by a newly constituted Board.²²⁴ In support, NEC directs our attention to the procedural history associated with that contention.²²⁵ The Board initially admitted Contention 2. When the Board later admitted Contention 2A, it held Contention 2 in abeyance, ruling that the parties would not litigate Contention 2 unless (and until) NEC prevailed on Contention 2A, and Entergy proposed a new metal fatigue AMP differing from the original Fatigue Monitoring Program.²²⁶ On appeal, NEC presents two arguments regarding its original Contention 2.

The first is that the Board forced NEC to litigate Contention 2 without giving NEC notice sufficient to enable it to prepare for such litigation. NEC states that when it filed its statement of position, testimony, and exhibits prior to the July 2008 evidentiary hearing, it was "firmly under the impression that Contention 2 was held in abeyance while Contentions 2A and 2B would first

²²³ LBP-08-25, 68 NRC at 832. See *also* LBP-07-15, 66 NRC at 271 (stating that NEC could "amend" Contention 2).

²²⁴ NEC Petition at 2, 3.

²²⁵ *Id.* at 5, 7.

²²⁶ LBP-07-15, 66 NRC at 271.

be litigated.”²²⁷ NEC claims that contrary to the plan to hold Contention 2 in abeyance, the Board, on June 24, 2008, announced that Contention 2 (along with Contentions 2A and 2B) would be considered at the oral hearing.²²⁸ According to NEC, its counsel protested that NEC had prepared for a hearing on only Contentions 2A and 2B, but the Board nonetheless conducted a hearing on all three contentions.²²⁹

NEC’s argument borders on the frivolous. The Board did not consider Contention 2 in the evidentiary hearing, nor did it address that contention’s admissibility or merits in either LBP-08-25 or LBP-09-9. To the contrary, the record is clear that the Board repeatedly indicated – both during the evidentiary hearing and in LBP-08-25 – that it was *not* considering Contention 2 at that time, and was continuing to hold it in abeyance.²³⁰

NEC’s second argument is that it has been deprived of its opportunity to litigate Contention 2. On this point, we agree. NEC never had the opportunity to revise this contention.

In its merits rulings on Contentions 2A and 2B, the Board found in favor of NEC insofar as Entergy’s CUF_{en} analyses for the core spray and reactor recirculation outlet nozzles were insufficient under 10 C.F.R. § 54.21(c)(1)(ii).²³¹ The Board gave Entergy the choice of either

²²⁷ NEC Petition at 9.

²²⁸ *Id.*

²²⁹ *Id.* at 9-10.

²³⁰ See LBP-08-25, 68 NRC at 779 n.1 (“Contention 2 is held in abeyance”), 780 (“Contention 2 will be held in abeyance”), 789 (“This partial initial decision does not deal with the original Contention 2”), 896 (“[t]his partial initial decision . . . leaves Contention 2 open and in abeyance”); Transcript of Evidentiary Hearing (July 21-24, 2008) (Tr.) at 737 (“Contention 2 . . . is now stayed by order of the Board pending the Board’s decision of Contentions 2a and 2b”) (July 21, 2008), Although the Board occasionally referred to “Contention 2” at other times during the hearing, the context of those references indicates that the Board was merely using the phrase as a shorthand for “Contention 2A and Contention 2B.” See Tr. at 712, 720, 759, 876 (July 21, 2008); Tr. 885 (July 22, 2008); Tr. 1183 (July 23, 2008).

²³¹ LBP-08-25, 68 NRC at 830-31. The Board adjudicated Contentions 2A and 2B under subsection (ii). See, e.g., *id.* at 794 (“The litigation concerning Contentions 2A and 2B focused on subsection 54.21(c)(1)(ii)”).

performing additional, revised CUF_{en} analyses for those nozzles or submitting an AMP.²³² The Board stated that if Entergy chose to submit revised analyses (i.e., TLAAs under section 54.21(c)(1)(ii)), then NEC could challenge those revised analyses,²³³ but if Entergy instead chose to prepare a revised AMP under section 54.21(c)(1)(iii), then NEC could "revitalize dormant Contention 2" challenging the adequacy of that AMP.²³⁴ The record is unclear as to whether Entergy submitted the March 10, 2009 calculations under subsection (ii) or (iii) of 10 C.F.R. § 54.21(c)(1).²³⁵ Consequently, the calculations that Entergy submitted in response to the Board's instructions could be construed to fall within either of the Board's two options.

Given that the Board in LBP-08-25 had construed Entergy's application and amendments as falling under 10 C.F.R. § 54.21(c)(1)(ii), it is understandable that the Board in LBP-09-9 would have considered it unnecessary to revisit Contention 2. After all, under the Board's construction, Contention 2 would be irrelevant because it addresses only an AMP under 10 C.F.R. § 54.21(c)(1)(iii).

But as explained above, the record as a whole indicates that Entergy's submissions provide support for its compliance with subsection (iii) rather than subsection (ii).²³⁶ At first

²³² *Id.* at 831.

²³³ *Id.* at 831-32.

²³⁴ *Id.* at 832. Likewise, in LBP-07-15, the Board stated: "If Entergy proposes a new metal fatigue management [*i.e.*, monitoring] program that differs from the one originally submitted in the Application, then NEC may need to amend NEC Contention 2 to address and support its challenges to the revised program." 66 NRC at 271.

²³⁵ Entergy's calculation packages cite neither subsection. See attachments to Letter from Matias Travieso-Diaz to the Atomic Safety and Licensing Board (Mar. 10, 2009) (ML090840422). Nor does Amendment 38, which Entergy submitted about the same time.

²³⁶ Given Entergy's commitment to implement the Fatigue Monitoring Program during the period of extended operation, we view Entergy's latest CUF_{en} calculations for the core spray and reactor recirculation outlet nozzles as part of its AMP. The calculations constitute "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.
(continued . . .)

glance, NEC arguably could be faulted for failing to exercise its right to amend Contention 2. NEC did not renew its challenge to the AMP's sufficiency. And it mentioned Entergy's AMP only once in its motion to proffer Contention 2C, and then only in a description of the procedural history that led up to Contention 2C.²³⁷ Under these circumstances, we cannot conclude that NEC somehow intended Contention 2C to be a revised version of Contention 2.

Yet when we look deeper, we find that NEC had no reason to believe it needed to revise Contention 2 at the time it submitted Contention 2C. The Board had considered the application under subsection (ii), and had adjudicated two of NEC's previous contentions under that subsection. NEC was therefore, in our view, justified in assuming that it should base its challenges to Entergy's March 2009 calculations upon that same subsection, rather than revising its Contention 2 pursuant to a seemingly irrelevant subsection (iii). Moreover, throughout this proceeding, a great deal of confusion has hung over the following question: Upon which subsection of 10 C.F.R. § 54.21(c)(1) does Entergy seek to rely? The Board and the Staff were themselves confused regarding the answer to this question at various points in this adjudication.²³⁸ Under the circumstances, we will not fault NEC for drafting Contention 2C under the assumption that subsection (ii) was the governing regulation.

Finally, we see no other time in this proceeding where NEC properly could have re-raised or revised Contention 2. Although Entergy revised its AMP on September 17, 2007, the Board's instruction in LBP-07-15 precluded NEC from challenging it prior to the Board's ruling in favor of NEC in LBP-08-25: "the parties are not to litigate Contention 2 unless and until Entergy returns to reliance on a metal fatigue management program (as would likely happen if NEC

²³⁷ NEC's Motion to File Contention 2C at 3.

²³⁸ The Staff itself indicated on July 9, 2008, that it had been confused as to which subsection Entergy had been relying. *NRC Staff's Brief in Response to Board Order* (July 9, 2008), at 1-4. For a discussion of the Board's confusion, see Part IV.B of this decision, *supra*.

prevails on NEC Contention 2A).²³⁹ For the same reason, NEC could not have modified Contention 2 between the issuances of LBP-08-25 and LBP-09-9, at least regarding the core spray and reactor recirculation outlet nozzles. Nor, as to those two components, could NEC have raised the matter in an appeal of LBP-08-25. NEC was the winner in that decision.²⁴⁰ Moreover, appeals of partial initial decisions are not the proper procedural context in which to revise contentions.²⁴¹

Events have overtaken Contention 2 in that Entergy has remedied the *initial* vagueness to which NEC objected. Therefore, NEC may not revive the original Contention 2. However, the Board also promised NEC an opportunity to revise that contention.²⁴² For these reasons, we conclude that NEC should have the opportunity to amend its original Contention 2. Given that Vermont adopted NEC's Contention 2,²⁴³ it likewise may participate in the litigation of any revised version of that contention. If NEC and/or Vermont choose to take advantage of this opportunity,²⁴⁴ then the Board should rule expeditiously on the revised contention's admissibility. And if the Board rules that the revised contention is admissible, then the Board should conduct an expedited evidentiary hearing.

In the event of an evidentiary hearing on a revised version of Contention 2, the scope of the factual issues associated with the revised contention shall be limited to the adequacy of the

²³⁹ 66 NRC at 271.

²⁴⁰ See, e.g., *Gooden v. Neal*, 17 F.3d 925, 935 (7th Cir. 1994); *Abbs v. Sullivan*, 963 F.2d 918, 924 (7th Cir.1992) ("a winner cannot appeal a judgment").

²⁴¹ See generally 10 C.F.R. § 2.309(f).

²⁴² See note 234, *supra*, and associated text.

²⁴³ See LBP-06-20, 64 NRC 131, 206-08 (2006); *Vermont's Notice of Intent to Adopt Contentions and Motion for Leave to be Allowed to Do So* (June 5, 2006).

²⁴⁴ Because Vermont adopted original Contention 2, it may offer a revised version of that contention, and also may participate in any further proceedings regarding any revision of Contention 2 that NEC submits.

Fatigue Monitoring Program. The parties shall not re-litigate the adequacy of the CUF_{en} calculations.

B. The Board's Neutrality

NEC asserts that the Board conducted the hearing “in a manner overall prejudicial to NEC’s case,”²⁴⁵ and therefore asks us to disqualify the entire current Board and to appoint three new judges to preside over the remainder of the case.²⁴⁶ NEC offers examples of what it considers the Board’s prejudicial conduct²⁴⁷ and concludes that, “while no single act or display

²⁴⁵ NEC Petition at 12.

²⁴⁶ *Id.* at 3 (for Contention 2), 19 (for Contention 2C). NEC’s request for disqualification contravenes four different NRC procedural requirements – (1) parties must not raise arguments or issues for the first time on appeal; (2) a movant must first file with the Board the disqualification motion before seeking an appellate determination of the motion; (3) such a motion be filed at the earliest moment after the moving party obtains knowledge of the facts demonstrating a basis for disqualification; and (4) petitioners on appeal must provide us with transcript citations to the portions of the hearing about which they complain. We could therefore reject this entire line of argument on procedural grounds and end our discussion here. But given our “established practice of refusing to use procedural technicalities to avoid addressing disqualification motions” (*Hydro Resources, Inc.* (2929 Coors Road, Suite 101, Albuquerque, NM 87120), CLI-98-9, 47 NRC 326, 330 (1998)) and of treating *pro se* litigants more leniently than litigants with counsel (*U.S. Enrichment Corp.*, CLI-01-23, 54 NRC at 272), we will consider the merits of NEC’s request.

²⁴⁷ See, e.g., NEC Petition at 12 (a “snarled admonition to ‘put your hand down . . . we’re not in school here’”), 12-13 (treatment of NEC testimony “with skepticism, scorn, and rude interruptions”); *New England Coalition’s Motion for Reconsideration of the Licensing Board’s Partial Initial Decision* (Dec. 17, 2008) at 3 (incorporated by reference into NEC Petition at 14) (a grant of permission for the licensee to introduce testimony in the form of a slide show-illustrated tutorial but a refusal to permit NEC to make a countervailing presentation); *id.* (“the Board refused to permit NEC to show, for discussion purposes, an enlarged version of an exhibit graph that in its original size had already been introduced into evidence”).

We disapprove of incorporation by reference in petitions for review, where, as here, it has the effect of bypassing the page limits set forth in our regulations. See *Progress Energy Carolinas, Inc.* (Shearon Harris Nuclear Power Plant, Units 2 and 3), CLI-10-9, 71 NRC ____ (Mar. 11, 2010) (slip op. at 46 n.205); *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-04-36, 60 NRC 631, 641 n.40 (2004); *Consolidated Edison Co. of New York* (Indian Point, Units 1 and 2), CLI-01-19, 54 NRC 109, 132-33 & nn.17-18 (2001); 10 C.F.R. § 2.341(b)(2) (petitions for review may not exceed 25 pages). Here, however, we exercise our discretion to consider the two incorporated examples.

on the part of the Board, crossed the threshold of . . . error, it is impossible for NEC to see how the Board's overall attitude did not color its findings."²⁴⁸

To prevail in a disqualification motion, NEC first must demonstrate that the purported instances of bias had a substantial impact on the outcome of this proceeding.²⁴⁹ NEC has not shown that the Board's behavior affected the Board's final decision in any way prejudicial to NEC. NEC's cursory conclusion does not constitute such a showing.

To the extent NEC may be relying upon the adverse result in LBP-09-9 as proof of prejudice, then its reliance is unavailing. The mere fact of adverse findings and rulings on the merits does not imply a biased attitude on the Board's part.²⁵⁰ Alternatively, to the extent NEC relies on LBP-08-25, then NEC ignores the fact that it was the partial victor in that decision, convincing the Board that Entergy had not yet met its burden of proof to show that the core spray and reactor recirculation outlet nozzles had satisfied all of our regulatory requirements.²⁵¹

To prevail in a disqualification motion, NEC also must show either a bias against NEC or its counsel based upon matters outside the record or a "pervasive bias" against NEC based upon matters in the record. Absent such a showing, we do not remove judges from adjudications.²⁵²

²⁴⁸ NEC Petition at 13.

²⁴⁹ *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-788, 20 NRC 1102, 1151 (1984) (citing *Louisiana Power & Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1096 (1983)).

²⁵⁰ See, e.g., *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 & 2), ALAB-644, 13 NRC 903, 923 (1981).

²⁵¹ LBP-08-25, 68 NRC at 831-32.

²⁵² See *Joseph J. Macktal*, CLI-89-14, 30 NRC 85, 91-92 (1989); *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-749, 18 NRC 1195, 1200 (1983) (regarding "pervasive bias"). Cf. *Nuclear Info. & Res. Serv. v. NRC*, 509 F.3d 562, 571 (D.C. Cir. 2007) ("an agency official should be disqualified only where a disinterested observer may conclude that the official has in some measure adjudged the facts as well as the law of a particular case in advance of hearing it" (citations and internal quotation marks omitted)).

NEC's specific assertions of bias do not justify disqualifying any of the Board members – much less the entire Board. For instance, NEC's complaints concerning the Board's skepticism of the NEC expert witness's testimony focus on the Board's witness credibility rulings. As an appellate body, we are loath to address this matter, given that we lack the Board's ability to observe the demeanor of the parties' expert witnesses in general and NEC's witness in particular.²⁵³

Other NEC objections concern the Board's case management decisions, such as determinations of whether to permit additional slide shows or enlarged exhibits. This kind of ruling lies well within the discretion of the Board²⁵⁴ and involve matters for which our deference to the Board is at its highest.²⁵⁵ Still other objections involve Board members' looks or tones of voice. We have held that "extra-record conduct such as stares, glares and scowls do not constitute evidence of personal bias."²⁵⁶ Nor do "occasional outbursts towards counsel,"²⁵⁷ or a judge's use of "strong language toward a party or in expressing his views on matters before him,"²⁵⁸ or "friction between the court and counsel, including intemperate and impatient remarks

²⁵³ See *Andrew Siemaszko*, CLI-06-16, 63 NRC 708, 718-19 (2006); *Watts Bar*, CLI-04-24, 60 NRC at 189, 199; *Private Fuel Storage*, CLI-03-8, 58 NRC at 25-27; *Aharon Ben-Haim*, CLI-99-14, 49 NRC 361, 364 (1999).

²⁵⁴ See, e.g., *International Uranium (USA) Corp. (White Mesa Uranium Mill)*, CLI-02-13, 55 NRC 269, 273 (2002) ("issues of case management [are among the] areas where we are loath to second-guess the judgments of our presiding officers").

²⁵⁵ Cf. *White Mesa*, CLI-02-13, 55 NRC at 273 ("In procedural and scheduling matters, where first-hand contact with and appreciation for all the circumstances surrounding a case are necessary, maximum reliance on the proper discretion of a [presiding officer] is essential") (quoting *Virginia Electric and Power Co. (North Anna Power Station, Units 1 and 2)*, CLI-74-16, 7 AEC 313, 314 (1974)).

²⁵⁶ *Houston Power & Lighting Co. (South Texas Project, Units 1 and 2)*, CLI-82-9, 15 NRC 1363, 1366 (1982).

²⁵⁷ *Id.*

²⁵⁸ *Macktal*, CLI-89-14, 30 NRC at 91 (quoting *Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1)*, CLI-85-5, 21 NRC 566, 569 (1985)).

by the judge.”²⁵⁹ Diligent, even aggressive, probing for weaknesses in a witness’s or counsel’s position may be necessary if presiding officers are to fulfill their duty to develop an adequate record that will contribute to informed decisionmaking.²⁶⁰ To enable them to fulfill that duty, we have given presiding officers broad authority to examine witnesses at evidentiary hearings.²⁶¹ Similarly, presiding officers always have been entitled to question the parties’ counsel at oral argument hearings.²⁶² And as our hearings have moved away from the traditional trial-type adversarial format and towards a more informal model,²⁶³ the inquisitorial role of the presiding officer necessarily has increased.²⁶⁴

In sum, we see no overall pattern of bias by the Board, and we are unwilling to look behind its rulings without a great deal more evidence of prejudicial conduct than NEC has presented to us here.

C. Admissibility of Contention 2C

In LBP-08-25, the Board directed Entergy to submit additional CUF_{en} analyses (i) performed “in accordance with the . . . approach used in the confirmatory CUF_{en} analysis for the [feedwater] nozzle,” (ii) recalculated “in accordance with the ASME Code, NUREG-6583 and

²⁵⁹ *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-748, 18 NRC 1184, 1187 (1983) (citing *Hamm v. Members of Bd. of Regents of State of Florida*, 708 F.2d 647, 651, *reh’g denied*, 715 F.2d 580 (11th Cir. 1983)).

²⁶⁰ *Commonwealth Edison Co.* (Zion Station, Units 1 and 2), ALAB-222, 8 AEC 229, 236-37, *aff’d in part on other grounds*, CLI-74-35, 8 AEC 374 (1974); *Commonwealth Edison Co.* (LaSalle County Nuclear Power Station, Units 1 and 2), CLI-73-8, 6 AEC 169, 170 (1973).

²⁶¹ See 10 C.F.R. §§ 2.319(i), 2.1208(b).

²⁶² See 10 C.F.R. § 2.331.

²⁶³ See *Entergy Nuclear Vermont Yankee, L.L.C.* (Vermont Yankee Nuclear Power Station), LBP-04-31, 60 NRC 686, 692-93 (2004).

²⁶⁴ *Cf.* Final Rule, 69 Fed. Reg. at 2196 (“ . . . the Commission acknowledges that this approach [the informal procedural rules of Part 2, Subpart L] places greater emphasis and responsibility on the presiding officer to oversee the development of a full and complete record . . .”); *Vermont Yankee*, LBP-04-31, 60 NRC at 692 (quoting Final Rule, *supra*).

NUREG-5704, and all other regulatory guidance,” (iii) not using “significantly different scientific or technical judgments” than those used in the analysis for the feedwater nozzle, and (iv) “demonstrat[ing] values less than unity” (i.e., 1.0).²⁶⁵

The Board instructed NEC that it could file new contentions *only* if Entergy’s CUF_{en} analyses failed to satisfy any of these requirements.²⁶⁶ The Board also warned NEC that any new contentions must not “rehash or renew any technical challenges that have already been raised and resolved in this proceeding (e.g., dissolved oxygen, outdated equations, etc.), but rather must specifically state how the new analyses are not consistent with the legal requirement and the calculations performed for the feedwater nozzle.”²⁶⁷

NEC responded to the Board’s invitation by filing a new contention (2C) arguing that “Entergy has not *properly* recalculated the Core Spray and [Reactor] Recirculation Outlet nozzle CUF_{en}s such that they demonstrate that these important components will not fail during the period of extended operation.”²⁶⁸ According to NEC, Entergy ignored regulatory guidance by relying on technically and factually flawed scientific judgments to calculate the final core spray and reactor recirculation outlet CUF_{en} analyses. More specifically, NEC argued that Entergy made four inappropriate assumptions: “(1) a fully developed, uniform flow in calculating the heat transfer coefficient during forced convection flow, (2) that the heat transfer coefficient did not

²⁶⁵ LBP-08-25, 68 NRC at 831-32. Regarding the fourth instruction, see SRP, § 4.3.1.1.1 at p. 4.3-1 (“A Section III Class 1 fatigue analysis requires the calculation of the ‘cumulative usage factor’ (CUF) based on the fatigue properties of the materials and the expected fatigue service of the component. The ASME Code limits the CUF to a value of less than or equal to one for acceptable fatigue design.”).

²⁶⁶ LBP-08-25, 68 NRC at 831-32.

²⁶⁷ *Id.* at 832 n.95. See also Order (Clarifying Deadline for Filing New or Amended Contentions) (Mar. 9, 2009), at 3 (unpublished) (“the schedule is not being held open as an opportunity for NEC to file mere commentary or other responses to the final confirmatory CUF_{en}s. It is for the filing of new or amended contentions, meeting the requirements of 10 C.F.R. § 2.309(f)(1) and (2) and the criteria set forth in [LBP-08-25] at [pp. 831-32].”).

²⁶⁸ NEC’s Motion to File Contention 2C at 1 (emphasis in original).

vary in the vertical direction within the nozzles during natural convection flow, (3) a constant dissolved oxygen . . . concentration, and (4) the absence of cracks in the [reactor recirculation outlet] nozzle.”²⁶⁹

In LBP-09-9, the Board rejected NEC’s Contention 2C on the ground that NEC had “failed to satisfy either the requirements specified in [its] Partial Initial Decision or the new contention pleading requirements of 10 C.F.R. § 2.309(f)(2)(i)-(iii).”²⁷⁰ The Board concluded that NEC had “fail[ed] to show that the Final CUF_{en} Analyses were not performed in accordance with the approach used by Entergy in its analysis of the [feedwater] nozzle.”²⁷¹ The Board criticized NEC for having “both rehashed old arguments (e.g., adequacy of consideration of dissolved oxygen in CUF_{en} analyses and the appropriateness of the heat transfer coefficients) and . . . [for] rais[ing] new arguments concerning technical assumptions and judgments that have not changed since 2007.”²⁷²

NEC’s principal argument on appeal is that the Board, in rejecting Contention 2C, misapprehended the technical and scientific issues associated with metal fatigue analysis and therefore reached a faulty conclusion regarding the admissibility of NEC’s most recent contention.²⁷³

²⁶⁹ Staff Answer to NEC Petition at 4-5, summarizing Declaration of Dr. Joram Hopenfeld in Support of New England Coalition’s Motion to File a Timely New or Amended Contention on Entergy’s Fatigue Reanalysis (Apr. 22, 2009) (Hopenfeld Declaration I), at unnumbered pp. 5-12, appended as Exhibit A to NEC’s Motion to File Contention 2C.

²⁷⁰ 70 NRC at 48.

²⁷¹ *Id.*

²⁷² *Id.*

²⁷³ NEC Petition at 14-19.

NEC asks us first to appoint an independent panel of experts that would review the Board's findings of fact regarding metal fatigue, and then to hold a hearing on Contention 2C.²⁷⁴ We deny this request. Congress considers the Atomic Safety and Licensing Board to be a "panel of experts,"²⁷⁵ as do we.²⁷⁶ Even assuming that none of the three administrative judges in this proceeding is an expert in the specific subject matter of metal fatigue, this would not disqualify them. In our adjudications, issues may arise about which the presiding judges lack *specific* expertise.²⁷⁷ NEC is entitled to hearings by experts in law, science and/or engineering, and the three-judge Board here brings substantial legal, engineering, and scientific expertise to the contested matters. The Board is required to consider, probe, and understand the evidence submitted in the proceeding. NEC has not shown, nor do we find, that the Board failed to execute these duties in this case.

We turn now to NEC's contention admissibility arguments. Once Entergy had submitted its final CUF_{en} calculations for the core spray and reactor recirculation outlet nozzles on March 10, 2009, NEC proffered Contention 2C.²⁷⁸ According to NEC, Entergy had not performed its calculations in accordance with the ASME Code or the specified regulatory guidance.

²⁷⁴ *Id.* at 3, 19.

²⁷⁵ See *Zion*, ALAB-222, 8 AEC at 235. Cf. Atomic Energy Act of 1954, § 191(a), 42 U.S.C. § 2241(a).

²⁷⁶ *Entergy Nuclear Generation Co. (Pilgrim Nuclear Power Station)*, CLI-10-14, 71 NRC ___ (June 17, 2010) (slip op. at 22) (referring to "the full Board [as] including two technical experts"); *Louisiana Energy Services, L.P. (National Enrichment Facility)*, CLI-06-15, 63 NRC 687, 697 (2006) ("As is customary, the Board itself included two judges with technical expertise"); *Hydro Resources, Inc. (P.O. Box 15910, Rio Rancho, NM 87174)*, CLI-04-39, 60 NRC 657, 658 (2004) (referring to a "Presiding Officer, assisted by two judges with technical expertise").

²⁷⁷ Likewise, Article III judges regularly face issues and areas of law with which they are unfamiliar. See, e.g., *Indiana Lumbermens Mut. Ins. Co. v. Reinsurance Results, Inc.*, 513 F.3d 652, 658 (7th Cir.), *cert. denied*, ___ U.S. ___, 129 S.Ct. 249 (2008). And they, like our own administrative judges, use their training, experience, knowledge, and judgment to ask the right questions and reach sound decisions.

²⁷⁸ See text associated with note 268, *supra*.

Therefore, according to NEC, Entergy has failed to show that the core spray and reactor recirculation outlet nozzles will not fail during the 20-year period of extended operation because of metal fatigue,²⁷⁹ nor has Entergy shown that its new calculations and analyses for those nozzles are consistent with the intent of 10 C.F.R. § 54.21.²⁸⁰ NEC also argues that Entergy has failed to comply with the requirements in LBP-08-25.²⁸¹ In making these arguments on appeal, NEC does not challenge Entergy's calculations, but instead questions the scientific judgments underlying those calculations. NEC describes these as “new and erroneous scientific judgments . . . [that] are significantly different than those used in the feedwater nozzle analysis.”²⁸²

NEC's witness, Dr. Hopenfeld, provided two supporting declarations arguing that Entergy's analyses were flawed and insufficiently conservative. Consequently, according to Dr. Hopenfeld, the “analysis does not meet the NRC/ASME guidelines of how the fatigue analysis for plant life extension should be conducted.”²⁸³ As explained below, his concerns were “primarily with the lack of conservatism in the heat transfer calculations and the use of non[-]conservative oxygen concentrations in the analysis of the [core spray] and [reactor recirculation outlet] nozzles.”²⁸⁴

Dr. Hopenfeld acknowledged that the methodology used in Entergy's final CUF_{en} analyses for the core spray and reactor recirculation outlet nozzles was the same as that it had

²⁷⁹ NEC's Motion to File Contention 2C at 4.

²⁸⁰ *Id.*

²⁸¹ *Id.*

²⁸² *New England Coalition's Reply to NRC Staff and Entergy Oppositions to NEC's Motion to File a Timely New Contention* (May 26, 2009), at 3.

²⁸³ Hopenfeld Declaration I at unnumbered p. 2, Answer 4,

²⁸⁴ *Id.* at unnumbered p. 3, Answer 5.

used in its earlier CUF_{en} analysis for the feedwater nozzle.²⁸⁵ Dr. Hopenfeld, however, believed that the methodology that Entergy used in the CUF_{en} analysis for the feedwater nozzle should have differed from the methodology that Entergy used for the CUF_{en} analysis for the core spray and reactor recirculation outlet nozzles.²⁸⁶ He claimed that Entergy should have used a different methodology to analyze the latter two types of nozzle because they differ from the feedwater nozzle in “materials, . . . geometries, and . . . environments of stress, temperature, and chemistry.”²⁸⁷ Dr. Hopenfeld concluded, overall, that “[e]ach component must be examined individually” and that “it is incorrect to claim that the approach that was previously used for the determination of heat transfer coefficients and oxygen concentrations may be universally applied across all the variations of specific local conditions.”²⁸⁸

The Board addressed the admissibility of Contention 2C in LBP-09-9, where it concluded that NEC had failed “to show that the Final CUF_{en} Analyses were not performed in accordance with the approach used by Entergy in its analysis of the [feedwater] nozzle.”²⁸⁹ The Board also found both that NEC had “for the first time, raised new arguments concerning technical assumptions and judgments that have not changed since 2007” and that, contrary to the Board’s explicit direction, NEC had nonetheless “rehashed old arguments” already addressed and resolved in LBP-08-25.²⁹⁰

²⁸⁵ *Id.* at unnumbered pp. 3-4, Answer 6.

²⁸⁶ *Id.* at unnumbered p. 4, Answer 7. See also Declaration of Dr. Joram Hopenfeld in Support of New England Coalition’s Reply to NRC Staff and Entergy Oppositions to NEC’s Motion to File a Timely New Contention at 2, 13-14 (May 26, 2009) (Hopenfeld Declaration II), attached to *New England Coalition’s Reply to NRC Staff and Entergy Oppositions to NEC’s Motion to File a Timely New Contention* (May 26, 2009).

²⁸⁷ NEC Petition at 15-16.

²⁸⁸ Hopenfeld Declaration I at unnumbered p. 4, Answer 7.

²⁸⁹ LBP-09-9, 70 NRC at 48.

²⁹⁰ *Id.*

In addition, the Board ruled that NEC had failed to meet the requirements for new contentions under 10 C.F.R. § 2.309(f)(2)(i)-(iii). According to the Board, the assumptions and approach underlying the March 10, 2009 confirmatory CUF_{en} analyses for the core spray and reactor recirculation outlet nozzles that NEC was seeking to challenge in Contention 2C were the same as those Entergy had used in its 2007 and 2008 analyses.²⁹¹ The Board observed that NEC had been given the opportunity to litigate those 2007 and 2008 analyses in the 2008 evidentiary hearing, and that “the Board had rejected each of NEC’s challenges (with the exception of the challenge to the use of the simplified Green’s function methodology).”²⁹²

In its petition for review, NEC claims that the Board’s contention admissibility decision must be reversed because NEC’s “proposed new contention argues and provides expert testimony to the effect that the standards and criteria of regulation and guidance are not met [and] that Entergy’s assumptions and input selections are technically indefensible; hence any assertion that CUF_{en} s are less than unity [i.e., 1.0] cannot be validly supported by the analyses.”²⁹³ NEC’s appellate argument relates to the Board’s two instructions to Entergy in LBP-08-25. The Board instructed Entergy to calculate the CUF_{en} s for the core spray and reactor recirculation outlet nozzles in accordance with the approach used to perform the confirmatory CUF_{en} analysis for the feedwater nozzle – that is, the new calculations must “contain no significantly different scientific or technical judgments” from those used in the feedwater nozzle analysis.²⁹⁴ The second instruction directed Entergy to calculate the CUF_{en} s

²⁹¹ *Id.* at 48-49.

²⁹² *Id.* at 49.

²⁹³ NEC Petition at 16.

²⁹⁴ LBP-08-25, 68 NRC at 832.

"for the [core spray and reactor recirculation outlet] nozzles, in accordance with the ASME Code, NUREG-6583, NUREG-5704, and all other regulatory guidance."²⁹⁵

NEC asserts on appeal that Entergy failed to follow either instruction. According to NEC, Entergy applied the feedwater nozzle CUF_{en} methodology to totally different situations involving the core spray and reactor recirculation outlet nozzles – “different materials, different geometries, and different environments of stress, temperature, and chemistry.”²⁹⁶ NEC asserts that Entergy, in so doing, used “significantly different scientific or technical judgments” in contravention of the Board’s first instruction.²⁹⁷ NEC interprets the Board’s requirement broadly to mean Entergy was required to “use the same considerations in weighing each element for the individual application and not simply weigh each element as you did the last time.”²⁹⁸

Moreover, according to NEC, Entergy also failed to comply with the second instruction. NEC and its witness, Dr. Hopfenfeld, go into great detail to explain how Entergy’s scientific or technical judgments are incompatible with the ASME Code and Commission guidance documents.

Finally, NEC addresses the Board’s warning that any new contention must not “rehash or renew any technical challenges that have already been raised and resolved in this proceeding (e.g., dissolved oxygen, heat transfer coefficients, etc.), but rather must specifically state how the new analyses are not consistent with the legal requirement and the calculations performed for the feedwater nozzle.”²⁹⁹ NEC argues that, while Entergy’s “‘basic approach’ [to the analyses] remains the same,” Entergy has failed “to appropriately adjust inputs according to

²⁹⁵ *Id.*, 68 NRC at 831.

²⁹⁶ NEC Petition at 16 (emphases omitted).

²⁹⁷ *Id.* at 15-16.

²⁹⁸ *Id.* at 16.

²⁹⁹ *Id.* (quoting LBP-08-25, 68 NRC at 832 n.95).

changing circumstances.”³⁰⁰ Consequently, according to NEC, Entergy’s latest analyses are (to use the Board’s words) “not consistent with the legal requirement and the calculations performed for the feedwater nozzle.”³⁰¹

As we explained *supra*, a successful challenge to a contention admissibility ruling must demonstrate that the ruling either constitutes “clear error” or reflects an “abuse of discretion.”³⁰² NEC has not made this demonstration. We agree with the Board that NEC has simply rehashed old arguments in Contention 2C and that, to the extent its arguments supporting Contention 2C differ from those old arguments, NEC was tardy in presenting them.³⁰³ Moreover, NEC has not shown good cause for their late presentation.³⁰⁴

The scientific and technical judgments underlying Entergy’s calculations regarding dissolved or depleted oxygen and heat transfer coefficients were at issue prior to the Board’s issuance of LBP-08-25, and NEC had ample opportunity at that time to draw its current distinctions between the feedwater nozzle and the other two types of nozzle and to make its arguments regarding dissolved or depleted oxygen and heat transfer coefficients.

To a considerable extent, NEC took advantage of that opportunity, presenting to the Board in 2007 and 2008 many of the same arguments that it later offered in support of Contention 2C in 2009. For instance, NEC’s argument regarding dissolved or depleted oxygen

³⁰⁰ *Id.* at 17.

³⁰¹ *Id.* at 16 (quoting LBP-08-25, 68 NRC at 832 n.95).

³⁰² *Levy County*, CLI-10-2, 71 NRC __ (slip op. at 2 & n.4).

³⁰³ LBP-09-9, 70 NRC at 49 (“NEC’s challenges to the assumptions made by Entergy are, in essence, challenges that either were made previously and already rejected by the Board, or were not made before and are now not timely”).

³⁰⁴ “Good cause” is the factor given the greatest weight when ruling on motions for leave to submit late-filed contentions. See 10 C.F.R. § 2.309(c)(1)(i); *Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-08-8, 67 NRC 193, 197 & n.26 (2008).

is identical to the one which the Board had rejected in LBP-08-25³⁰⁵ and to which the Board specifically referred when instructing NEC not to rehash old arguments.³⁰⁶ Likewise, NEC's Contention 2C arguments regarding heat transfer coefficients are mere reiterations of ones made at the hearing³⁰⁷ and already rejected by the Board in LBP-08-25.³⁰⁸

Finally, NEC had the opportunity in its petition for review to challenge the appropriateness of the limitations that the Board had imposed on its final contention – that is, no rehashing of old issues and no raising of new issues that could have been presented earlier. NEC did not avail itself of this opportunity. Rather, it argued that the Board, by declining to admit Contention 2C for litigation, improperly overlooked Entergy's asserted failure to follow the Board's directives regarding its analysis of record for the core spray and reactor recirculation outlet nozzles – specifically, the Board's instructions that the calculations must be “in

³⁰⁵ LBP-08-25, 68 NRC at 807-09.

³⁰⁶ *Id.* at 832 n.95. Compare, e.g., Hopenfeld Declaration I at unnumbered pp. 3 (Answer 5), 4 (Answer 7), 10-11 (Answers 18, 22-23) with Tr. 959-1013 (July 22, 2008). Dr. Hopenfeld likewise had raised more general arguments regarding oxygen content. See Sixth Declaration of Dr. Joram Hopenfeld (Aug. 31, 2007), at 12, appended as Attachment 2 to *New England Coalition, Inc.'s (NEC) Motion to File a Timely New or Amended Contention* (Sept. 4, 2007); Dr. Joram Hopenfeld's "Review of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. ('Entergy') Analyses of the Effects of Reactor Water Environment on Fatigue Life of Risk-significant Components During the Period of Extended Operation" (Apr. 21, 2008), at 16-17 (ML081280294).

³⁰⁷ For example, compare Hopenfeld Declaration I at unnumbered pp. 8-9 (Answer 14) with Tr. 1108-09 (July 22, 2008) (regarding whether it is inappropriate to use a single heat transfer coefficient for natural convection flow). Also, regarding heat transfer, compare Hopenfeld Declaration I at unnumbered p. 4 (Answer 7) and unnumbered p. 5 (Answer 9) with Sixth Declaration of Dr. Joram Hopenfeld, *supra* note 306, at 10-11, and with Dr. Joram Hopenfeld's "Review," *supra* note 306, at 12-15, and with Tr. 1118-22 (July 22, 2008). For pre-Contention 2C arguments regarding heat transfer coefficients, see generally Tr. 1096-1128 (July 22, 2008).

³⁰⁸ LBP-08-25, 68 NRC at 815-16.

accordance with the ASME Code, NUREG 6583 and 5704, and all other regulatory guidance.³⁰⁹

For all the reasons set forth above, we reject NEC's arguments that Contention 2C should have been admitted for litigation.

VI. CONCLUSION

For the reasons set forth above, we

- (i) *deny* as moot NEC's motion to stay the proceeding,
- (ii) *deny* NEC's motion to suspend the proceeding,
- (iii) *grant*, in part, the Staff's petition for review of LBP-08-25,
- (iv) *grant* New York's petition for leave to submit brief *amici curiae*,
- (v) *reverse* the Board's rulings in LBP-08-25 regarding NEC's Contentions 2A and 2B insofar as those rulings relate to the calculation of the CUF_{en} for the core spray and reactor recirculation outlet nozzle,
- (vi) *grant*, in part, NEC's petition for review of LBP-09-9, and
- (vii) *remand* the proceeding for the limited purpose of giving NEC the opportunity to submit a revised Contention 2.

³⁰⁹ NEC Petition for Review at 15 (quoting LBP-08-25). See *generally* NEC Petition for Review at 14-19.

IT IS SO ORDERED.³¹⁰

For the Commission

[NRC SEAL]

/RA/

Annette L. Vietti-Cook
Secretary of the Commission

Dated at Rockville, Maryland,
this 8th day of July, 2010.

³¹⁰ Commissioner Apostolakis did not participate in this matter.