May 9, 2007

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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| In the Matter of | ) | |
| | ) | |
| ENTERGY NUCLEAR VERMONT YANKEE, LLC, and ENTERGY NUCLEAR OPERATIONS, INC. | ) | Docket No. 50-271-LR |
| | ) | |
| | ) | ASLBP No. 06-849-03-LR |
| | ) | |
| (Vermont Yankee Nuclear Power Station) | ) | |

NRC STAFF'S ANSWER IN SUPPORT OF
ENTERGY'S MOTION FOR SUMMARY DISPOSITION
OF NEW ENGLAND COALITION CONTENTION 3 (STEAM DRYER)

## INTRODUCTION

Pursuant to 10 C.F.R. §§ 2.323(c) and 2.1205(b), the NRC Staff ("Staff") herein answers "Entergy's Motion for Summary Disposition of New England Coalition's [NEC] Contention 3 (Steam Dryer)" ("Motion") filed by Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc. (collectively "Entergy") on April 19, 2007. For the reasons set forth below and in the attached affidavit of Jonathan G. Rowley, Kaihwa R. Hsu, and Thomas G. Scarbrough ("Staff Affidavit"), the Staff submits that there is no genuine dispute of material fact with respect to the issues raised by NEC in its Contention 3. Accordingly, in as much as these issues have been resolved, Entergy is entitled to a decision in its favor on this contention as a matter of law, and Entergy's Motion should be granted.

## BACKGROUND

On January 25, 2006, Entergy submitted its License Renewal Application ("LRA").[1] On May 26, 2006, NEC filed a timely Petition for Leave to Intervene, Request for Hearing and Contentions ("Petition"). One of NEC's proffered contentions was "Contention 3: Entergy's

[1] Vermont Yankee Nuclear Power Station, License Renewal Application, dated January 25, 2006 (Agency Document Access and Management System (ADAMS) Accession No. ML060300085 [LRA]).

License Renewal Application Does Not Include an Adequate Plan to Monitor and Manage Aging of the Steam Dryer During the Period of Extended Operation." Petition at 17. The NRC Staff and Entergy opposed admission of NEC Contention 3. *See* NRC Staff Answer to Request for Hearing of New England Coalition, dated June 22, 2006, at 12-13; Entergy Response to New England Coalition's Petition for Leave to Intervene, Request for Hearing, and Contentions, dated June 22, 2006 at 29-30.

On September 22, 2006, the Atomic Safety and Licensing Board ("Board") admitted Contention 3. Memorandum and Order (Ruling on Standing, Contentions, Hearing Procedures, State Statutory Claim, and Contention Adoption), *Entergy Nuclear Vermont Yankee, LLC* (Vermont Yankee Nuclear Power Station), LBP-06-20, 64 NRC 131, 191 (2006).[2] The Board found that Contention 3 was supported by Dr. Hopenfeld's First Declaration, specifically ¶18 and ¶19 of Dr. Hopenfeld's declaration,[3] and concluded that NEC had "identified sufficient ambiguity in Entergy's aging management plan . . . to meet the requirements for admissibility." *Id.* at 191. The Board struck all portions of Dr. Hopenfeld's Second Declaration concerning Contention 3, as well as the first paragraph on page 21 of NEC's June 30, 2006, "Reply to Entergy and NRC Staff Answers to Petition for Leave to Intervene, Request for Hearing, and Contention." *Id.*

On April 19, 2007, Entergy filed the instant Motion, seeking summary disposition of Contention 3. Entergy asserts that summary disposition is appropriate because the issues raised by Contention 3 are refuted by "indisputable matters of record." *See* Motion at 3. Attached to Entergy's Motion were: 1) Entergy's Statement of Material Facts Regarding NEC Contention 3 on Which No Genuine Dispute Exists ("Statement of Material Facts"); 2) the

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[2] Also in its September 22, 2006 Order, the Board granted NEC's and Vermont Department of Public Service's (DPS) notices of adoption of each other's contentions to the extent NEC's and DPS's contentions were admitted. *Id.* at 208.

[3] In paragraphs 18 and 19 of his First Declaration, Dr. Hopenfeld said that Entergy's proposed monitoring program was inadequate because it is not based on actual measurements of crack initiation and growth; rather, it is based on unproven computer models and moisture monitors which only indicate that the dryer is already damaged.

Declaration of John R. Hoffman in Support of Entergy's Motion for Summary Disposition of NEC Contention 3, dated April 18, 2007 ("Hoffman Affidavit"); 3) Exhibit 1: Statement of Professional Qualifications of John R. Hoffman; 4) Exhibit 2: Vermont Yankee License Amendment 229 Regarding Extended Power Uprate, dated March 2, 2006; 5) Exhibit 3: Vermont Yankee Operating Procedure 0631, Appendix F ("OP 0631"); 6) Exhibit 4: General Electric's Service Information Letter No. 644, Revision 1 ("GE-SIL-644"); 7) Exhibit 5: Vermont Yankee Off-Normal Procedure 3178 ("ON 3178"); and 8) Exhibit 6: Vermont Yankee Licensing Renewal Commitment List, Commitment 37.

## DISCUSSION

### I. Legal Standards Governing Motions for Summary Disposition

Pursuant to 10 C.F.R. § 2.1205(a), motions for summary disposition must be in writing, must include a written explanation of the basis of the motion, and must include affidavits to support statements of fact. In ruling on a motion for summary disposition, the presiding officer applies the standards for summary disposition set forth in § 2.710(d)(2). *See* 10 C.F.R. § 2.1205(c). A moving party is entitled to summary disposition of a contention as a matter of law if the filings in the proceeding, together with the statements of the parties and the affidavits, demonstrate that there is no genuine issue as to any material fact. *See* 10 C.F.R. §§ 2.1205 and 2.710(d)(2); *see also Advanced Medical Sys., Inc.* (One Factory Row, Geneva, Ohio), CLI-93-22, 38 NRC 98, 102-03 (1993); *Exelon Generation Co., LLC* (Early Site Permit for Clinton ESP Site), LBP-05-19, 62 NRC 134, 179-80 (2005).

A party seeking summary disposition bears the burden of demonstrating the lack of a genuine issue of material fact, and the evidence submitted must be construed in favor of the non-moving party. *See Sequoyah Fuels Corp. & Gen. Atomics Corp.* (Gore, Oklahoma Site Decontamination and Decommissioning Funding), LBP-94-17, 39 NRC 359, 361, *aff'd,* CLI-94-11, 40-NRC-55 (1994). Affidavits submitted in support of summary disposition must come from individuals qualified by "knowledge, skill, experience, training, or education"

and must be sufficiently grounded upon a factual basis. *Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-05-04, 61 NRC 71, 80-81 (citing Federal Rule of Evidence 702; *Bragdon v. Abbott*, 524 U.S. 624, 653 (1998) (stating that expert testimony must have a traceable, analytical basis in objective fact before it may be considered on summary judgment).

A party opposing a motion for summary disposition cannot rely on mere allegations or denials of the moving party's facts; rather, the non-moving party must set forth specific facts demonstrating a genuine issue of material fact. *See* 10 C.F.R. § 2.710(b); *Advanced Medical Sys., Inc.*, 38 NRC at 102. Bare assertions and general denials, even by an expert, are insufficient to oppose a properly supported motion for summary disposition. *Duke Cogema Stone & Webster*, LBP-05-04, 61 NRC at 81 (*citing Advanced Med. Sys., Inc.*, CLI-93-22, 38 NRC at 102; *Houston Lighting & Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-629, 13 NRC 75, 78 (1981). Although the burden is on the moving party to show there is no genuine issue of material fact, the non-moving party must controvert any material fact proffered by the moving party or that fact will be deemed admitted. *Advanced Medical Sys., Inc.*, 38 NRC at 102-03.

Admission of a party in a proceeding based on one acceptable contention neither precludes summary disposition nor guarantees a party a hearing on its contentions. *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Unit 1), ALAB-696, 16 NRC 1245, 1258 n.15 (1982) (citing *Houston Lighting & Power Co*. (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 550 (1980)). For the Board to find the existence of a genuine issue of material fact, "the factual record, considered in its entirety, must be enough in doubt so that there is a reason to hold a hearing to resolve the issue." *Cleveland Elec. Illuminating Co.* (Perry Nuclear Power Plant, Units 1 & 2), LBP-83-46, 18 NRC 218, 223 (1983).

II. Safety-Related Issues in License Renewal Proceedings

It is well established that the Commission's "[l]icense renewal reviews are not intended to 'duplicate the Commission's ongoing review of operating reactors.'" *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-01-17, 54 NRC 3, 7 (2001) (citing Final Rule, "Nuclear Power Plant License Renewal," 56 Fed. Reg. 64,943, 64,946 (Dec. 13, 1991)). In license renewal, the safety review process focuses on the "potential detrimental effects of aging that are not routinely addressed by ongoing regulatory oversight programs." *Id.* Issues involving the facility's current licensing basis are outside the scope of license renewal. *Id.* at 8-9.

License renewal applicants must "demonstrate how their programs will be effective in managing the effects of aging during the period of extended operation." *Id.* at 8 (citing 10 C.F.R. § 54.21(a)). Applicants are required to "identify any additional actions, i.e., maintenance, replacement of parts, etc., that will need to be taken to manage adequately the detrimental effects of aging." *Id.* (citing Final Rule, "Nuclear Power Plant License Renewal; Revisions," 60 Fed. Reg. 22,461, 22,479 (May 8, 1995)). Here, one of the findings the NRC must make in order to renew Entergy's operating license is to find that Entergy has demonstrated that the effects of aging on Vermont Yankee's steam dryer will be adequately managed so that the intended function will be maintained consistent with the current licensing basis during the period of extended operation, as required by 10 C.F.R. § 54.21(a)(3).

III. Entergy's Motion Should Be Granted

The Staff has carefully reviewed Entergy's Motion and supporting documentation, and agrees with Entergy that it is entitled to a decision as a matter of law on NEC Contention 3 because there is no genuine issue of material fact to litigate. NEC Contention 3 is based upon Dr. Hopenfeld's assertion that Entergy's aging management programs relies on unproven computer models and therefore is not adequate to detect crack propagation and growth. *See* Hopenfeld Decl. ¶18 and ¶19; LBP-06-20 at 190 (citing Hopenfeld Decl. ¶18 and ¶19). Entergy

is entitled to a decision as a matter of law on this issue because Entergy's steam dryer aging management program: 1) includes frequent monitoring of plant parameters indicative of potential dryer cracking and crack propagation, which are adequate to ensure that the effects of aging will be adequately managed during the license renewal period, and 2) does not rely on computer models.

Entergy has committed to conduct regular, recurring monitoring of plant parameters potentially indicative of steam dryer cracking and crack propagation in accordance with GE-SIL-644 throughout the license renewal period. Staff Affidavit ¶11. GE-SIL-644 calls for weekly monitoring of moisture carryover. Motion, Exhibit 4. In Section 3.1.2.2.11 of its LRA, "Cracking due to Flow-Induced Vibration," Entergy stated that "[c]racking due to flow-induced vibration in the stainless steel steam dryers is managed by the BWR Vessel Internals Program," which presently "incorporates the guidance of GE-SIL-644, Revision 1." LRA at 3.1-7. Entergy also stated that it would evaluate BWRVIP-139: BWR Vessel and Internals Project Steam Dryer Inspection and Flaw Evaluation Guidelines Program-139 ("BWRVIP-139") "once it is approved by the Staff and either include [BWRVIP-139's] recommendations in the VYNPS BWR Vessel Internals Program or inform the Staff of VYNPS's exceptions." *Id.* Subsequent to admission of Contention 3, Entergy committed to "[c]ontinue inspections in accordance with the Steam Dryer Monitoring Program, Revision 3, in the event that the BWRVIP-139 is not approved prior to the period of extended operation." VY Licensing Renewal Commitment List, Commitment 37, dated August 22, 2006 (ML0639003420).

The Staff considered and addressed the issues raised by NEC Contention 3 in its SER. On the basis of its evaluation, the Staff concluded that Vermont Yankee's program to monitor the aging of the steam dryer during the license renewal period was adequate. *See* SER at 3-56 to 3-64, 3-189 to 3-190; Appendix A, Commitment 37; Staff Affidavit ¶11. Thus, the Staff agrees that Entergy's aging management program for the Vermont Yankee steam dryer consists of well-defined monitoring and inspection activities consistent with GE and BWR Vessel Internals

Program requirements (including frequent monitoring of moisture carryover) that will continue throughout the license renewal period. *See* Staff Affidavit ¶7, ¶8 (agreeing with Statement of Material Fact 11).

Further, while NEC and its expert, Dr. Hopenfeld, contend that computer code analyses are relied upon by Vermont Yankee's steam dryer monitoring program for license renewal, their assertion is incorrect. In this regard, the Staff agrees with Entergy that Vermont Yankee's steam dryer aging management program for license renewal does not depend on or use computer models or codes. Staff Affidavit ¶7, ¶8.

Finally, the Staff has reviewed Entergy's Statement of Material Facts, and has determined that those statements contained therein are correct, with certain minor clarifications noted by the Staff's affiants. *See* Staff Affidavit ¶9, ¶10, and ¶12. These minor clarifications address potential ambiguities in Entergy's Statement of Material Facts.[4] Nevertheless, none of these clarifications and corrections affect the Staff's conclusion that no genuine dispute of material fact exists with respect to Contention 3. Staff Affidavit ¶13. Thus, summary disposition is appropriate.

[4] With regard to Material Fact 13, the Staff agrees with Entergy, as stated above, that Vermont Yankee's steam dryer aging management program (which is based on frequent monitoring of plant parameters indicative of potential dryer cracking and crack propagation) is adequate. However, the Staff takes no position as to Entergy's assertion that "Entergy's steam dryer aging management plan does exactly what Dr. Hopenfeld would require" because the statement is argumentative. *See* Staff Affidavit ¶11.

## CONCLUSION

For the reasons discussed above, the Staff submits that Entergy is entitled to summary disposition as a matter of law, on NEC Contention 3.

Respectfully submitted,

***/RA/***

Mary C. Baty
Counsel for NRC Staff

Dated at Rockville, Maryland
this 9th day of May, 2007

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NUCLEAR REGULATORY COMMISSION

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

AFFIDAVIT OF JONATHAN G. ROWLEY, KAIHWA R. HSU AND
THOMAS G. SCARBROUGH CONCERNING NEC CONTENTION 3

Jonathan G. Rowley (JGR), Kaihwa R. Hsu (KRH), and Thomas G. Scarbrough (TGS),[1] do hereby state as follows:

1(a). (JGR) I am employed by the U.S. Nuclear Regulatory Commission ("NRC") as a Project Manager in the Office of Nuclear Reactor Regulation ("NRR"), Division of License Renewal. Since January 2006, I have served as the lead project manager for the NRC Staff ("Staff"), on the license renewal application ("LRA") for the Vermont Yankee Nuclear Power Station ("Vermont Yankee" or "VYNPS"). A statement of my professional qualifications is attached hereto.

1(b). (KRH) I am employed by the NRC as a Materials Engineer in NRR, Division of License Renewal. Since January 2006, I have served as an audit team member and audit team leader for the Staff, concerning the license renewal application for VYNPS. A statement of my professional qualifications is attached hereto.

1(c). (TGS) I am employed by the NRC as a Senior Mechanical Engineer in the Division of Engineering, in the Office of New Reactors ("NRO"). During the NRC Staff's review

[1] In this Affidavit, the identity of the affiant(s) who support each numbered paragraph is indicated by the notation of their initials in parentheses. Where all of the affiants support a numbered paragraph, no parenthetical notation of their initials is provided.

of the proposed extended power uprate ("EPU") license amendment request for Vermont Yankee, dated September 10, 2003 (ML032580089), as supplemented, I served as a technical reviewer of that application in the Division of Engineering and the Division of Component Integrity in the Office of Nuclear Reactor Regulation. A statement of my professional qualifications is attached hereto.

2(a). (JGR) As part of my official responsibilities as the lead project manager for the Staff's safety review of the Vermont Yankee license renewal application, I serve as the principal point of contact in NRR for activities related to the Vermont Yankee LRA. In addition, I coordinated the Staff's review of the Vermont Yankee LRA and preparation of the Staff's "Safety Evaluation Report with Confirmatory Items Related to the License Renewal of Vermont Yankee Nuclear Power Station," dated March 2007 (ML070870378) ("LRA SER").

2(b). (KRH) As part of my official responsibilities as an audit team member for the license renewal safety audit at Vermont Yankee, I served as technical lead for activities related to the Vermont Yankee LRA. I also reviewed portions of the Vermont Yankee LRA including the following aging management programs: B.1.4, "BWR Penetrations;" B.1.5, "BWR Stress Corrosion Cracking;" B.1.6, "BWR Vessel ID Attachment Welds;" B.1.7, "BWR Vessel Internals;" and B.1.29, "Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel." In this regard, I participated in preparation of Section 3.0.3 of the LRA SER, dated March 2007. In addition, I reviewed the Time-Limited Aging Analysis and prepared Sections 4.1, 4.3 and portions of Section 4.7 of the LRA SER.

2(c). (TGS) As part of my official responsibilities, I participated in the review of potential adverse flow effects on nuclear power plant components (including the steam dryer) from the proposed operating conditions for the Vermont Yankee EPU license amendment request. In this regard, among other responsibilities, I assisted in preparing Section 2.2.6, "Additional Review Area - Potential Adverse Flow Effects," of the Staff's Safety Evaluation ("EPU SE") issued on March 2, 2006 (ML060050028).

3. This Affidavit is prepared in response to "Entergy's Motion for Summary Disposition of New England Coalition's Contention 3 (Steam Dryer)" ("Motion"), filed by Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (collectively, "Entergy" or "Applicant") on April 19, 2007, and the "Statement of Material Facts Regarding NEC Contention 3 on Which No Genuine Dispute Exists" ("Statement of Material Facts") attached thereto.

4. NEC Contention 3 alleges that Entergy's License Renewal Application does not include an adequate plan to monitor and manage aging of the steam dryer during the period of extended operation. We have read Contention 3 and the bases submitted in support thereof, presented in NEC's "Petition for Leave to Intervene, Request for Hearing and Contentions," dated May 26, 2006, as admitted in the Licensing Board's "Memorandum and Order (Ruling on Standing, Contentions, Hearing Procedures, State Statutory Claim, and Contention Adoption)," *Entergy Nuclear Vermont Yankee, LLC* (Vermont Yankee Nuclear Power Station), LBP-06-20, 64 NRC 131, 191 (2006).

5. We have reviewed the Applicant's Motion, in which Entergy seeks summary disposition of NEC Contention 3, Statement of Material Facts Regarding NEC Contention 3 On Which No Genuine Dispute of Material Fact Exists ("Statement of Material Facts"), and the Declaration of John R. Hoffman in Support of Entergy's Motion For Summary Disposition of NEC Contention 3 ("Hoffman Declaration") attached thereto. In this Affidavit, we present our views with respect to the issues addressed within our separate areas of review. Specifically, issues concerning the VY Extended Power Uprate ("EPU") license amendment and operation under the EPU, insofar as those matters are raised in NEC Contention 3 and the Applicant's motion for summary disposition, are addressed by Mr. Scarbrough;[2] issues concerning

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[2] Mr. Scarbrough did not participate in the Staff's review of the VY license renewal application, and he therefore takes no position with respect to issues involving the license renewal application. In particular, Mr. Scarbrough takes no position with respect to Material

Entergy's license renewal application are addressed herein by Messrs. Rowley and Hsu, who participated in the Staff's review of Entergy's license renewal application. Accordingly, Material Facts 1-8, 10, 15, and portions of 14 and 16 (as they relate to the EPU), are addressed herein by Mr. Scarbrough, while Material Facts 9, 11-13, and portions of Material Facts 14 and 16 (as they relate to license renewal) are addressed herein by Messrs. Rowley and/or Hsu, as indicated below. As stated in paragraph 11 below, no position is expressed herein with respect to one statement in Material Fact 13.

6. (TGS) Based on my review of the Applicant's EPU application and supplements thereto, the Staff's EPU SE issued on March 2, 2006 (ML060050028), NEC Contention 3, the Board's decision in LBP-06-20, and the Applicant's Motion and Statement of Material Facts, I am satisfied (a) that Material Facts 1-8, 10 and 15 are correct, except as modified or clarified below; and (b) Material Facts 14 and 16 are correct as they relate to the EPU (*see* fn. 2 above)

7. (JGR) Based on my review of the Applicant's license renewal application and supplements thereto, the Staff's LRA SER issued in March 2007, NEC Contention 3, the Board's decision in LBP-06-20, and the Applicant's Motion and Statement of Material Facts, I am satisfied that Material Facts 9 and 11-13 are correct, except as modified or clarified below.

8. (KRH) Based on my review of the Applicant's license renewal application and supplements thereto, the Staff's LRA SER issued in March 2007, NEC Contention 3, the Board's decision in LBP-06-20, and the Applicant's Motion and Statement of Material Facts, I am satisfied that Material Facts 11, 13, and portions of 14 and 16 (as they relate to the LRA) are correct, except as modified or clarified below.

9. (TGS) Material Fact 3 is correct with the following modification:

> As an independent confirmation of the structural integrity of the steam dryer during operation at uprate levels, VY instituted a

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Facts 9, 11-13, the last sentence of Material Fact 14, and the last 14 words of Material Fact 16, inasmuch as those statements pertain to license renewal issues. Those statements are addressed herein by Mr. Rowley and/or Mr. Hsu.

> program of dryer monitoring and inspections to provide assurance that the structural loadings under EPU conditions did not result in the formation or propagation of vibration-induced cracks on the dryer (such as would generate loose parts, or cracks or tears in the steam dryer that would result in excessive moisture carryover). Id., ¶ 14.

This addition to Material Fact 3 clarifies that the VY steam dryer monitoring and inspections provide confidence that the generation of loose parts, or cracks or tears in the steam dryer that would result in excessive moisture carryover is not occurring, consistent with Entergy's definition of unacceptable steam dryer performance. *See* EPU Application Supplement 33, Attachment 6, page 1, dated September 14, 2005 (ML052650122); *see also* EPU SE at p. 46.

10. (TGS) Material Fact 7 is correct with the following modification:

> As required by the VY operating license, VY is operating under a program that provides for long-term monitoring of plant parameters potentially indicative of steam dryer failure, plus inspections at three consecutive refueling outages, all in accordance with GE-SIL-644. Id., ¶ 18. The monitoring that has been performed under the EPU program, and the inspections conducted to date (i.e. prior to the inspections to be conducted under the Steam Dryer Monitoring Plan), confirm that fatigue-induced cracking of the VY steam dryer such as would generate loose parts, or cracks or tears that would result in excessive moisture carryover is not occurring. Id.

This modification to Material Fact 7 is proposed (a) to clarify that scheduled inspections under the Steam Dryer Monitoring Plan, following the initiation of EPU operation, have not yet commenced, and (b) to be consistent with the definition of unacceptable performance of the VY steam dryer as discussed in the modification of Material Fact 3 above.

11. (JGR, KRH) In Material Fact 13, the Applicant addresses Dr. Hopenfeld's assertion that "existing dryer cracks must be continuously monitored and assessed by a competent engineer," and the Applicant states that its "steam dryer aging management plan does what Dr. Hopenfeld requires...." In this regard, we note that the Applicant conducts regular, recurring monitoring of the facility, in accordance with GE-SIL-644, to detect potential dryer cracking and crack propagation, and it has committed to continue this monitoring

throughout the license renewal period. *See* VY License Renewal Commitment No. 37, LRA SER Appendix A. The adequacy of Vermont Yankee's aging management program for the steam dryer, raised by NEC Contention 3, was considered and addressed by the Staff in its SER for the license renewal application, issued in March 2007. On the basis of its evaluation, the Staff concluded that Vermont Yankee's program to monitor the aging of the steam dryer during the period of extended operation, with the commitments made by the Applicant, is adequate. *See* LRA SER pages 3-56 to 3-64 and 3-189 to 3-190. We concur with that determination. Further, we agree with Entergy's Material Fact 13, except insofar as the Applicant states that its "steam dryer aging management plan does what Dr. Hopenfeld requires." We consider that statement to be argumentative and we express no opinion with respect thereto.

12. (KRH) I agree with Entergy's Statement of Material Facts, Material Fact 16, with the following modification to the last sentence therein:

> . . . The plant parameter monitoring and inspection program does not rely on the analyses performed during the implementation of the EPU and is sufficient to <u>detect potential degradation of the steam dryer, and thereby</u> ensure satisfactory steam dryer performance during the license renewal period. <u>Id.</u>, ¶ 30.

This modification clarifies that the plant parameter monitoring and inspection program will indicate potential degradation of the steam dryer. Monitoring and inspection, alone, do not ensure satisfactory steam dryer performance, but they do allow the identification and completion of timely corrective actions, thus ensuring that the component continues satisfactorily to perform its intended function.

13. Notwithstanding the modifications and clarifications to Entergy's Statement of Material Facts set forth above, we are satisfied that the concerns raised in NEC Contention 3

are being addressed satisfactorily by Entergy, and by the Staff's oversight of Entergy's activities related to VY steam dryer performance.

14. (JGR) I declare under penalty of perjury that my statements set forth above and in my statement of professional qualifications attached hereto are true and correct to the best of my knowledge, information and belief.

***Original Signed By***

Jonathan G. Rowley

Executed at Rockville, Maryland
this 9th day of May, 2007

14. (KRH) I declare under penalty of perjury that my statements set forth above and in my statement of professional qualifications attached hereto are true and correct to the best of my knowledge, information and belief.

***Original Signed By***

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Kaihwa R. Hsu

Executed in Burlington, KS
this 9th day of May, 2007

14. (TGS) I declare under penalty of perjury that my statements set forth above and in my statement of professional qualifications attached hereto are true and correct to the best of my knowledge, information and belief.

***Original Signed By***

Thomas G. Scarbrough

Executed in Germantown, Maryland
this 9th day of May, 2007

**Jonathan G. Rowley**
**Statement of Professional Qualifications**

## CURRENT POSITION:

Project Manager — Division of License Renewal, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Rockville, MD

## EDUCATION:

B.S., Virginia Polytechnic Institute and State University, 1993, Materials Science and Engineering

M.S., University of Texas at Arlington, 2003, Materials Science and Engineering

## SUMMARY:

Over 14 years of experience in materials science and engineering and over 3 years of experience in the nuclear reactor regulation. Significant experience in the following areas:

- Materials Engineering
- License Renewal

## EXPERIENCE:

### U.S. Nuclear Regulatory Commission, 08/03/2003 - Present

10/01/2006 to present – Project Manager, Division of License Renewal, Office of Nuclear Regulatory Research

- Lead Project Manager for the safety review of the Vermont Yankee Nuclear Power Station license renewal application

08/03/2003 to 10/01/2006 - General Engineer, Division of License Renewal, Office of Nuclear Regulatory Research

- Lead Project Manager for the safety review of the Donald C. Cook Nuclear Plant license renewal application

- Back-up Project Manager for the safety review of the R.E. Ginna license renewal application

### Iowa Beef Processors. Assistant Laboratory Manager, 1993 – 2000:

Responsible for oversight of nine junior laboratory employees and day-to-day operations of the laboratory

**Kaihwa R. Hsu**
**Statement of Professional Qualifications**

## CURRENT POSITION:

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| Materials Engineer | Division of License Renewal, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Rockville, MD |

## EDUCATION:

B.S., Chung Yuan Christian College, 1975, Civil Engineering
M.S., University of South Carolina, 1981, Civil Engineering in Structural Mechanics

## SUMMARY:

Over 25 years of experience in the nuclear power industry, including 22 years as a principal engineer for Westinghouse Electrical Company. Significant experience in the following areas:

- Reactor Vessel, Steam generator, Pressurizer design & analyses
- Reactor Coolant Pump, Heat exchanger design & analyses
- Stress corrosion cracking, corrosion erosion
- Fracture mechanics evaluation
- Fatigue crack growth prediction and Flaw assessment
- Fatigue evaluation and leak before break demonstration
- ASME Code Section III and XI design analyses
- License Renewal aging management

## EXPERIENCE:

### U.S. Nuclear Regulatory Commission, 10/2003 - Present

10/2003 to Present - Materials Engineer, Division of License Renewal, Office of Nuclear Regulatory Research

- Audit Team Leader for the license renewal safety audit at the Palisades and Vermont Yankee Plants
- Backup Audit Team Leader for the license renewal safety audit at the Milestone Units 2 and 3 , Nine Mile Point Units 1 and 2, and Shearon Harris plants
- Audit Team Member for the license renewal safety audit at the Oyster Creek, Wolf Creek, D.C. Cook, Arkansas Nuclear One - Unit 2 Plants

### Westinghouse Electrical Co. 1981 – 2003

Principal Engineer the following divisions of Westinghouse

- **1998-2003, Structural Material Technology**
  - Primary water stress corrosion cracking (PWSCC) issue in reactor vessel (RV)

  - Performed all the analytical work which generated the proposed Westinghouse resolutions to plant specific problems in this area. The activities included:
    - RV CRDM/CEDM Penetration Alloy 600 Cracking & Penetration Weld Cracking
    - RV Nozzle Safe End Alloy 82/182 Butt Weld Cracking.
    - Structural Integrity Evaluation
    - Embedded Flaw Repair Technique and Procedure
    - Technical Justification for Continued Operation (JCO).
    - Alloy 82/182 Butt Weld Safety Assessment Report (EPRI MRP-44)
    - Participation in ASME Section XI Activities

- **February 1997- March 1998, Millstone Unit 3**: areas of work included
  - 10 CFR 50.54(f) program – Specific System Review
  - Resolution of Unresolved/Open Item
  - FSAR Review and Preparation of FSARCR
  - 10 CFR 50.59 Safety Evaluation for FSARCR

- **1993 – January 1997, Structural Material Technology**: areas of work included:
  - ASME Section XI Class 1 Component Finite Element Analysis.
  - Flaw Assessment per ASME Section XI
  - Inspection Procedure, Material Purchasing, and Scheduling of the steam generator replacement program
  - Pre-Operational Walk-down and Testing
  - Inspections during Refueling Outage
  - Fracture Mechanics and Structure Integrity
  - Piping Stress Qualification
  - Leak-Before-Break Demonstration
  - Fatigue Crack Growth Prediction
  - Time History Dynamic Analysis for AP600 Reactor Coolant Loop Piping
  - Steam Generator Tube Plugging
  - Transient Monitoring for Tech Specification Compliance

- **1990 – 1992, Piping Design and Qualification**: areas of work included:
  - Piping Stress Analysis
  - Equipment Qualification.
  - Thermal Stratification Analysis (IEB 88-08 and 88-11)
  - Fatigue Crack Growth Prediction
  - Computer Codes Development for the cycle monitoring system by using the Green function to perform stress and fatigue analysis
  - Nuclear Plant Records and Data Review to define operating transients

- **1988-1989, Structural Material Engineering**: areas of work included
  - Finite Element Analysis of PWR Component
  - Piping Stress Analysis
  - Fatigue Crack Growth Prediction
  - Thermal Stratification Analysis (IEB 88-08 and 88-11)
  - Computer Code Development for the Erosion and Corrosion Monitoring System

- **1983-1988, Piping Analysis and Design at Vogtle Plant Site**: areas of work included:
  - ASME Section III Piping Stress Analysis and Design
  - ANSI B31.1 Piping Stress Analysis and Design
  - Equipment Qualification
  - Instrument Tubing Design
  - Pre-Operational Walkdown and Testing

- **1981-1982, Stress Analysis at Westinghouse Tampa Division**: areas of work included:
  - Equipment Qualification, Stress Analysis and Stress Report for Model F Steam Generator

**Thomas G. Scarbrough**
**Statement of Professional Qualifications**

## CURRENT POSITION:

Senior Mechanical Engineer
Component Integrity, Performance, and Testing Branch II (CIB2)
Division of Engineering (DE)
Office of New Reactors (NRO)
U.S. Nuclear Regulatory Commission (NRC)
Rockville, MD

## EDUCATION:

Bachelor of Arts in Physics, Rollins College, 1976
Bachelor of Nuclear Engineering, Georgia Institute of Technology, 1977
Master of Science in Mechanical Engineering, University of Maryland, 1988

## PROFESSIONAL:

Registered Professional Engineer (Maryland #14453))

Member of American Nuclear Society

Member of American Society of Mechanical Engineers (ASME) Subgroup on Motor-Operated Valves for the ASME *Code for Operation and Maintenance of Nuclear Power Plants*

Member of ASME Subcommittee on Qualification of Valve Subassemblies for the ASME QME-1 Standard, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants"

## SUMMARY:

I have almost 30 years of technical experience in the field of nuclear engineering. In 1977, I began my career as an associate engineer at the Naval Reactor Facility in Idaho Falls, ID. In 1978, I joined the NRC and served in the Office of Standards Development and subsequently the Office of Nuclear Regulatory Research. In 1981, I was appointed as Special Technical Advisor to the Atomic Safety and Licensing Appeal Panel (ASLAP) for the restart of the Three Mile Island (TMI) Unit 1 nuclear power plant and, later, was appointed as Technical Advisor to the ASLAP. In 1989, I transferred to the Mechanical Engineering Branch in the NRC Office of Nuclear Reactor Regulation (NRR), and was assigned as principal engineer for the NRC staff review of the implementation of Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." In that assignment, I participated in numerous reviews and inspections of motor-operated valve (MOV) programs at operating nuclear power plants. Following the failure of the steam dryer at Quad Cities Unit 2 in 2002, I was assigned to participate in the review of potential adverse flow effects on plant components during power uprate operation. Since then, I have participated in the review of the power uprate requests for the Vermont Yankee, Browns Ferry, Hope Creek, Susquehanna, and other nuclear power plants with regard to potential adverse flow effects. In February 2007, I was assigned to the Component Integrity, Performance, and Testing Branch II in the NRC Office of New Reactors where I review component issues for proposed new reactors, and provide assistance to NRR on potential adverse flow effects for power uprates at operating nuclear power plants.

**EXPERIENCE**:

Senior Mechanical Engineer, NRC/NRO/DE/CIB2, February 2007 to Present

In February 2007, I was assigned to the Component Integrity, Performance, and Testing Branch II in the Division of Engineering of the NRC Office of New Reactors. In this position, I am responsible for the review of the functional design, qualification, and inservice testing (IST) programs for pumps and valves that will perform safety functions in new reactor designs to be certified and new reactors to be licensed under the NRC regulations. In addition, I review potential adverse flow effects for new reactor designs and proposed reactors that might affect pumps, valves, and other plant equipment (including steam dryers in boiling water reactors). I have assisted in the revision of the NRC Standard Review Plan and Regulatory Guide 1.20 to incorporate lessons learned from adverse flow effects on plant equipment for the review of new reactor design certifications, operating licenses, and power uprates. In providing assistance to the NRC Office of Nuclear Reactor Regulation, I am participating in the review of potential adverse flow effects for proposed power uprates at the Browns Ferry, Hope Creek, and Susquehanna nuclear power plants.

Senior Mechanical Engineer, NRC/NRR/Division of Engineering and Division of Component Integrity, June 1989 to February 2007

In June 1989, I joined the Mechanical Engineering Branch in NRR/DE and was assigned as principal engineer for the review of MOV performance issues at nuclear power plants. In this assignment, I coordinated the NRC staff review of the implementation of GL 89-10 at operating nuclear power plants. In addition to several supplements to GL 89-10, I was the principal contributor for GL 96-05, “Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves.” I reviewed submittals from nuclear power plant licensees in response to these generic letters and participated in NRC inspections of MOV programs at nuclear power plants. I have represented the NRC staff at numerous public meetings and conferences to discuss MOV performance issues. Following the failure of the steam dryer at Quad Cities Unit 2 in 2002, I was assigned to participate in the NRC staff review of potential adverse flow effects at nuclear power plants operating at power uprate conditions or requesting power uprate operation. In this assignment, I have been a principal technical reviewer for the NRC staff’s evaluation of the acoustic resonance issue at Quad Cities with participation at technical meetings at the NRC offices, licensee’s offices, steam dryer manufacturing facility, steam dryer assembly facility, and licensee contractor’s small scale test facility. I have worked closely with the NRC contractors from Argonne National Laboratory and its subcontractors from Pennsylvania State University and McMaster University in evaluating potential adverse flow effects at nuclear power plants. In response to the EPU license amendment request by the licensee of the Vermont Yankee nuclear power plant, I served as a principal technical reviewer of potential adverse flow effects on plant equipment, including the steam dryer. In this assignment, I participated in the review of information provided by the Vermont Yankee licensee in support of the EPU request as well as the results of technical evaluations performed by NRC contractors. In addition, I led an NRC staff audit of the initial steam dryer analysis for Vermont Yankee in 2004 at the General Electric (GE) offices and the GE small scale test facility in Palo Alto, CA. I also participated in meetings with the Vermont Yankee licensee and at NRC staff audits of technical documentation of the Vermont Yankee steam dryer analysis. I was a principal contributor for the documentation of the NRC staff review of potential adverse flow effects, and pumps and valves, in the NRC safety evaluation on the EPU license amendment for Vermont Yankee. Before the Advisory Committee on Reactor Safeguards, I coordinated the

discussion by the NRC staff and its contractors of the results of the NRC staff review of potential adverse flow effects for the Vermont Yankee EPU license amendment. Following issuance of the Vermont Yankee EPU license amendment on March 2, 2006, I participated in the NRC staff review of plant data from Vermont Yankee during power ascension up to EPU conditions. With the reorganization of NRR in 2005, I was transferred into the Component Performance and Testing Branch in the new Division of Component Integrity with the same technical assignments.

Technical Advisor, Atomic Safety and Licensing Appeal Panel, 1981 to 1989

In 1981, I was appointed as Special Technical Advisor for the restart of the TMI Unit 1 nuclear power plant for the Atomic Safety and Licensing Appeal Panel. In this position, I reviewed technical information provided by the TMI licensee and NRC staff to assist the administrative judges of the ASLAP in the review of the Atomic Safety and Licensing Board decision on the restart of TMI Unit 1. Subsequently, I was appointed as Technical Advisor to the ASLAP. In that assignment, I provided assistance to the ASLAP administrative judges on a wide variety of nuclear engineering issues, including the review of Atomic Safety and Licensing Board decisions on the licensing of nuclear power plants.

Mechanical Engineer, NRC Offices of Standards Development and Nuclear Regulatory Research, 1978 to 1981

In 1978, I joined the NRC in the Office of Standards Development where I participated in the development and revision of NRC regulatory guides related to mechanical engineering activities at nuclear power plants. The Office of Standards Development was subsequently incorporated into the NRC Office of Nuclear Regulatory Research.

Associate Engineer, Naval Reactor Facility, Idaho Falls, ID, 1977 to 1978

At the Naval Reactor Facility, I participated in a program to develop nuclear power engineers to assist in the training of Navy personnel in the design, operation, and maintenance of nuclear reactors.

**ROTATIONAL ASSIGNMENTS AND TRAINING:**

I have performed rotational assignments in the NRC Region I office in King of Prussia, PA (on two occasions) and NRC Region II office in Atlanta, GA, in section chief management positions in the reactor safety division. In addition, I assisted the NRC resident inspectors during preparation for the startup of the Comanche Peak Unit 2 nuclear power plant. I have completed numerous training opportunities at the NRC including MOV design and operation, pump design, pressurized and boiling water reactor systems, safety relief valve operation, NRC inspector performance, and radiation protection.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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| In the Matter of | ) | |
| | ) | |
| ENTERGY NUCLEAR VERMONT YANKEE, LLC, and ENTERGY NUCLEAR OPERATIONS, INC. | ) | Docket No. 50-271-LR |
| | ) | |
| | ) | ASLBP No. 06-849-03-LR |
| | ) | |
| (Vermont Yankee Nuclear Power Station) | ) | |

CERTIFICATE OF SERVICE

I hereby certify that copies of NRC STAFF'S ANSWER TO ENTERGY'S MOTION FOR SUMMARY DISPOSITION OF NEW ENGLAND COALITION CONTENTION 3 and AFFIDAVIT OF JONATHAN G. ROWLEY, KAIHWA R. HSU AND THOMAS G. SCARBROUGH CONCERNING NEC CONTENTION 3 in the above-captioned proceeding have been served on the following by electronic mail with copies by deposit in the NRC's internal mail system or, as indicated by an asterisk, by electronic mail, with copies by U.S. mail, first class, this 9th day of May, 2007.

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Administrative Judge
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***/RA/***

Mary C. Baty
Counsel for the NRC Staff