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July 9, 2008

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of)	
)	
Entergy Nuclear Vermont Yankee, LLC)	Docket No. 50-271-LR
and Entergy Nuclear Operations, Inc.)	ASLBP No. 06-849-03-LR
)	
(Vermont Yankee Nuclear Power Station))	

ENTERGY'S ANSWERS TO LICENSING BOARD QUESTIONS

Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.

(collectively "Entergy") hereby answer the questions posed by the Atomic Safety and Licensing Board in its Order dated June 27, 2008 ("Order").

I. RESPONSE TO ISSUES 1A AND 1B

The Board's questions 1A and 1B ask:

Issue 1A: Does a license condition that requires the performance of certain CUFen TLAAAs after the license renewal is issued comply with the law, particularly Part 54 and the requirement that the license application "contain . . . an evaluation of time-limited aging analyses" pursuant to 10 C.F.R. § 54.21(c)?

Issue 1B: Is it legally permissible under 10 C.F.R. § 54.29 to issue a license renewal even though certain of the TLAAAs have not been performed?

Order at 3. The answer to both questions is yes, for the reasons discussed below. Both questions, however, seem to assume that environmentally assisted fatigue ("EAF") is a new time-limited aging analysis ("TLAA") and that TLAAAs must be performed as part of the license renewal process. As explained below, TLAAAs as defined in the license renewal rule are existing analyses that are part of a plant's current licensing basis ("CLB"). EAF is not a TLAA per se, but rather an aging issue that is addressed as part of the Fatigue Monitoring Program credited in the license renewal application. Further, the license renewal rule does not require the "performance" of TLAAAs prior to issuance of a renewed license.

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A. REGULATIONS GOVERNING TLAA'S

TLAAs are defined in § 54.3 as follows:

Time-limited aging analyses, for the purposes of this part, are 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;
- (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 CLB.

10 C.F.R. § 54.3. As the reference to “those licensee calculations and analyses” and items (3) and (6) make clear, TLAAs are time-limited aging analyses that are part of a plant’s CLB.

A license renewal applicant is not required to perform TLAAs, but is required to include in the application “[a]n evaluation of time-limited aging analyses.” 10 C.F.R. § 54.21(c). 10 C.F.R. § 54.21(c)(1) defines the showing that must be made in this evaluation: The application must demonstrate that any one of three conditions is met with respect to each TLAA:

- (i) The analyses remain valid for the period of extended operation;
- (ii) The analyses have been projected to the end of the period of extended operation; or
- (iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

10 C.F.R. § 54.21(c)(1).

The Commission explained these three options as requiring the applicant to:

- (1) Justify that these analyses are valid for the period of extended operation;
- (2) Extend the period of evaluation of the analyses such that they are valid for the period of extended operation, for example, 60 years; or
- (3) Justify that the effects of aging will be adequately managed for the period of extended operation if an applicant cannot or chooses not to justify or extend an existing time-limited aging analysis.

60 Fed. Reg. 22,461, 22,480 (May 8, 1995) (emphasis added). The Commission has thus indicated that 10 C.F.R. § 54.21(c)(1) allows the applicant to choose how to evaluate an existing TLAA. None of the methods are superfluous, each method is a separate and independent means of evaluating TLAA's. Under the express terms of the regulation, justifying the validity of, or extending a TLAA is not required before the issuance of a license renewal. To the contrary, the applicant may choose "not to justify or extend an existing time-limited aging analysis" and instead justify that the effects of aging will be adequately managed. *Id.*

B. ENVIRONMENTALLY ASSISTED FATIGUE

The fatigue-related TLAA's that must be evaluated are those fatigue analyses that involve time-limited assumptions and are part of the CLB, as discussed above. An analysis of EAF is not part of the current licensing basis and therefore is not, per se, a TLAA. However, EAF is considered in an applicant's aging management program for fatigue pursuant to the resolution of Generic Safety Issue ("GSI") 190, which was closed out after the license renewal rule was promulgated. In promulgating the rule, the Commission indicated that designation of an issue as a GSI would not exclude the issue from the scope of the aging management review or time-limited aging analysis evaluation. 60 Fed. Reg. at 22,484. Rather, the Commission identified several options for addressing such an issue, including "develop[ing] an aging management program which, for that plant, incorporates resolution of the aging effects issue." *Id.* at 22,485. Subsequently, when the NRC staff closed out GSI-190, it stated:

The conclusion to close out this issue is based upon low core damage frequencies from fatigue failures of metal components estimated by technical studies making use of recent fatigue data developed on test specimens. The results of these probabilistic analyses and associated sensitivity studies led the staff to conclude that no generic regulatory action is required. However, calculations including environmental effects, that were performed to support resolution of this issue, and the nature of age-related degradation indicate the potential for an increase in the frequency of pipe leaks as plants continue to operate. Thus, the staff concludes that, consistent with the existing requirements in 10 CFR 54.21, licensees should address the effects of the coolant environment on component fatigue life as aging management programs are formulated in support of license renewal.

Memorandum from A. Thadani to W. Travers, "Closeout of Generic Safety Issue 190, 'Fatigue Evaluation of Metal Components for 60-Year Plant Life'" (Dec. 26, 1999) (Exh. E2-04-VY) (emphasis added).¹

The evaluation of TLAAAs related to metal fatigue is addressed in section 4.3 of the Vermont Yankee Nuclear Power Station ("VYNPS") License Renewal Application ("LRA"). As indicated therein, the effects of aging due to fatigue of Class 1 components are managed by the VYNPS Fatigue Monitoring Program, which tracks and evaluates the plant's operational cycles to ensure those cycles remain within allowable numbers and requires corrective actions if specified limits are approached. LRA at 4.3-3. This program is further described in Section B.1.11 of the LRA, which incorporates the aging management program recommended in Section X.M1 (Metal Fatigue of Reactor Coolant Pressure Boundary) of the Generic Aging Lessons Learned ("GALL") Report, NUREG-1801.² As part of this program, the effects of reactor water environment on fatigue life are considered as described in Section 4.3.3 of the LRA and the amplifying commitments in LRA Amendment 35 (Exh. E2-09-VY). Thus, the actions

¹ In connection with a predecessor issue (GSI-166), the NRC had determined that requiring a backfit of the environmental fatigue data to current operating licenses (i.e., to the initial operating terms) could not be justified. See SECY-95-245, Completion of the Fatigue Action Plan (Sept. 25, 1995) (ADAMS Accession No. ML031480210). Accordingly, the CLB of plants in their initial license term do not include EAF analyses.

² LRA Amendment 31 (Staff Exh. 22) eliminated the exceptions that were identified in Section B.1.11, making the Fatigue Management Program consistent with Section X.M1 of the GALL Report.

addressing EAF are part of a broader aging management program to be implemented under 10 C.F.R. § 54.21(c)(1)(iii).

C. ISSUE 1A: THE NRC'S PROPOSED LICENSE CONDITION REQUIRING FURTHER CONFIRMATORY ANALYSES PRIOR TO THE PERIOD OF EXTENDED OPERATION IS PERMISSIBLE UNDER THE NRC RULES

The consideration of the effects of reactor water environment on fatigue life is part of the VY Fatigue Monitoring Program, and hence part of an aging management program permissible under 10 C.F.R. § 54.21(c)(1)(iii). An aging management programs may consist of commitments by the applicant. Accordingly, it is clearly permissible for the NRC Staff to require such commitments through license conditions and for an applicant to reflect the commitments in the license renewal application. In promulgating the license renewal rule in 1991 (56 Fed. Reg. 64,943), the Commission accepted the use of new commitments to monitor, manage, and correct age-related degradation unique to license renewal. The Commission stated:

The licensing basis for a nuclear power plant during the renewal term will consist of the current licensing basis and new commitments to monitor, manage, and correct age-related degradation unique to license renewal, as appropriate. The current licensing basis includes all applicable NRC requirements and licensee commitments, as defined in the rule.

56 Fed. Reg. at 64,946. In 1995, the Commission again stated that commitments are acceptable:

In addition, the Commission concludes that, for the license renewal review, consideration of written commitments only need encompass those commitments that concern the capability of systems, structures, and components, identified in §54.21(a), integrated plant assessment and §54.21(c) time-limited aging analyses, to perform their intended functions, as delineated in § 54.4(b).

60 Fed. Reg. at 22,473.

Reliance upon applicant commitments does not deny public review or frustrate public scrutiny. No matter which approach permitted by 10 C.F.R. § 54.21(c)(1) an applicant selects, a member of the public may contend that the selected approach fails to provide reasonable

assurance that activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis.

D. ISSUE 1B: IT IS PERMISSIBLE TO ISSUE A RENEWED LICENSE WITHOUT REANALYSIS OF A TLAA

10 C.F.R. § 54.29, “Standards for Issuance of a Renewed License,” provides in relevant part that a renewed license may be issued if: “[a]ctions have been identified and have been or will be taken with respect to [time-limited aging analyses that have been identified to require review under § 54.21(c)] such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB. . . .” By its own express terms, this rule does not require that the identified actions be completed prior to license renewal. Thus, 10 C.F.R. § 54.29 is fully consistent with the Commission’s statements accepting commitments as licensing basis for a renewed license. 56 Fed. Reg. at 64,946.

In the same vein, 10 C.F.R. § 54.21(c) does not require that TLAAs be reanalyzed (*i.e.*, extended for the period of extended operation) prior to issuance of a renewed license. To the contrary, 10 C.F.R. § 54.21(c)(1)(iii) specifically allows an applicant not to justify or extend an existing TLAA, but to instead demonstrate that the effects of aging will be adequately managed for the period of extended operation. Interpreting the rule as requiring reanalysis prior to issuance of a renewed license would improperly render 10 C.F.R. § 54.21(c)(1)(iii) ineffective.

Entergy has chosen the approach specified in 10 C.F.R. § 54.21(c)(1)(iii) with respect to fatigue of critical reactor components. Entergy has addressed TLAAAs related to metal fatigue by establishing a Fatigue Monitoring Program consistent with Section X.M1 of the GALL Report, as discussed in the Section 4.3 and Section B.1.11 of the LRA and the amendments thereto. EAF is addressed in this aging management program.

Section X.M1 of the GALL Report provides an acceptable program for managing metal fatigue of the reactor coolant pressure boundary, including the effects of the coolant environment on component fatigue life:

The AMP [aging management program] addresses the effects of the coolant environment on component fatigue life by assessing the impact of the reactor coolant environment on a sample of critical components for the plant. Examples of critical components are identified in NUREG/CR-6260. The sample of critical components can be evaluated by applying environmental life correction factors to the existing ASME Code fatigue analyses. Formulae for calculating the environmental life correction factors are contained in NUREG/CR-6583 for carbon and low-alloy steels and in NUREG/CR-5704 for austenitic stainless steels.

GALL Report, Vol. 2, Rev. 1 at X M-1. The program provides for corrective actions to prevent the usage factor from exceeding the code design limit, which may include repair, replacement or “a more rigorous analysis of the component to demonstrate that the design code limit will not be exceeded during the period of extended operations.” *Id.* at X M-1 to X M-2. As the GALL Report states, “this is an acceptable option for managing metal fatigue for the reactor coolant pressure boundary, considering environmental effects,” and thus “no further evaluation is recommended for license renewal if the applicant selects this option under 10 CFR § 54.21(c)(1)(iii) to evaluate metal fatigue for the reactor coolant pressure boundary.” *Id.*

Entergy’s commitments, which are amplified in Amendment 35 to the LRA (Exh. E2-09-VY, Att. 3, Commitment 27), follow this guidance. These commitments are a permissible means of satisfying 10 C.F.R. §§ 54.21(c)(1)(iii) and 54.29(a).

In sum, neither 10 C.F.R. §54.29(a) nor §54.21(c)(1) requires TLAAAs to be performed or to be projected. It is perfectly acceptable under the regulations to include license conditions that require performance of certain actions (e.g., executing an aging management program) after the renewed license is issued.

E. WHETHER 10 C.F.R. § 54.21(C) REQUIRES THE PERFORMANCE OF CONFIRMATORY CALCULATIONS BEFORE THE LICENSE RENEWAL IS ISSUED IS OUTSIDE THE SCOPE OF CONTENTIONS 2A AND 2B

Neither NEC Contention 2A, NEC Contention 2B nor their bases involve an assertion that 10 C.F.R. § 54.21(c) requires the performance of confirmatory calculations before the renewed license is issued. Entergy respectfully submits that any attempt to conclude to the contrary would be an impermissible collateral attack on the Commission's regulations at 10 C.F.R. § 54.21(c)(1). See 10 C.F.R. § 2.335; Potomac Electric Power Co. (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-218, 8 A.E.C. 79, 89 (1974).

II. RESPONSE TO ISSUE 2

The Board also requested that parties brief the following issue:

Issue 2: Does a renewal application that contains a short written description of an aging management program that lacks content or details but instead states that it is "comparable to" and "based on" the relevant section of NUREG-1801 or EPRI NSAC-202L, "demonstrate that the effects of aging will be adequately managed" as required by 10 C.F.R. §§ 54.21(a)(3) and 54.21(c)(1)(iii)?

Order at 5.

As with the issues 1A and 1B, issue 2 was not raised by NEC in the text of NEC Contention 4 or any of the bases asserted in support of the contention. Indeed, NEC's bases focused on whether CHECWORKS requires 10-15 years of data for "benchmarking." See LBP-06-20, 64 N.R.C. 131, 192-93 (2006). NEC Contention 4 did not challenge the LRA's compliance with NUREG-1801 or EPRI NSAC-202L, or the incorporation by reference of those standards into the LRA. Nor has NEC raised any objection to the specificity of the description of the flow-accelerated corrosion ("FAC") program in its contention. Entergy therefore respectfully submits that the appropriateness or sufficiency of the reference in the LRA to these guidance documents is outside the scope of the admitted contention.

A. INCORPORATION BY REFERENCE IS APPROPRIATE

The LRA may properly adopt the program descriptions in NUREG-1801 and NSAC-202L to establish an acceptable aging management program according to NRC rules:

An application may incorporate by reference information contained in . . . reports filed with the Commission, provided that the references are clear and specific.

10 C.F.R. § 54.17(e). Moreover, as discussed below, the guidance in the GALL Report was specifically developed to improve the efficiency of license renewal proceedings by allowing an applicant to reference a program previously determined to be adequate.

The LRA specifically identifies whether any exceptions are taken to the programs established in the GALL Report. Thus, the reference to a program “comparable to” the GALL Report program does not (and is not intended to) signify any inconsistency. Each of the sections in Appendix B of the LRA has a specific statement regarding consistency with the GALL Report and expressly identifies any exceptions or enhancements to the program incorporated by reference from the guidance. Thus, for example, Section B.1.13 explicitly states, [t]he Flow-Accelerated Corrosion Program at VYNPS is consistent with the program description in NUREG-1801, Section XI.M17, Flow-Accelerated Corrosion” and specifically identifies the exceptions and enhancements as “None.” LRA at B-47.

B. ADOPTION OF A PROGRAM CONSISTENT WITH THE GALL REPORT IS EVIDENCE THAT THE REQUIRED DEMONSTRATION HAS BEEN MADE

The Order seeks briefing on whether compliance with the GALL Report is sufficient to demonstrate that the effects of aging will be adequately managed, as required by 10 C.F.R. §§ 54.21(a)(3) and 54.21(c)(1)(iii). The short answer to the Board’s question is that compliance with NRC guidance is substantial evidence of compliance with the NRC’s regulatory requirements and, although it is subject to challenge in a hearing if raised as a contention, it was

not so challenged in NEC Contention 4. Even though guidance documents, such as NUREGs or the Standard Review Plan, do not have the force of legally binding regulations, Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), CLI-01-22, 54 N.R.C. 255, 264 (2001), “[w]here the NRC develops a guidance document to assist in compliance with applicable regulations, it is entitled to special weight.” Id. (citation omitted).

The GALL Report (referenced as the technical basis document for NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants") is entitled to particularly significant weight. It identifies aging management programs that have been determined by the NRC to be acceptable programs to manage the effects of aging on systems, structures and components within the scope of license renewal as required by 10 C.F.R. Part 54. The GALL Report is based on a systematic compilation of plant aging information and the evaluation of program attributes for managing the effects of aging on systems, structures and components for license renewal. GALL Report at 1-3.

The NRC Staff developed the GALL Report at the direction of the Commission to provide a basis for evaluating the adequacy of aging management programs for license renewal. See GALL Report at 1, 4. See also Memorandum from A Vietti-Cook to W. Travers, “Staff Requirements - SECY-99-148 - Credit for Existing Programs for License Renewal” (Aug. 27, 1999) (ADAMS Accession No. ML003751930).

In this Staff Requirements Memorandum, the Commission approved the staff's recommendation to focus staff review guidance in the standard review plan on areas where existing programs should be augmented, as described in SECY-99-148, to provide credit for existing programs for license renewal. In directing the staff to proceed with the development of the GALL Report, the Commission stated:

The GALL report should receive the benefit of the experience from the staff members who conducted the review of the license renewal applications. The staff should ensure that lessons learned on the initial license renewal applications are incorporated in these documents and should provide them to the Commission for information when they are released for public comment. The staff should ensure that regulatory guidance is clear and understandable to stakeholders so that the license renewal process is stable and predictable for future applicants.

The staff should seek stakeholders' participation in the development of the GALL report, SRP, and regulatory guide and should inform the Commission of any significant issues that may arise from this process.

- a. When the GALL report and SRP are issued in draft for public comment, workshops should be held to bring all interested stakeholders up to date.
- b. Hold focused public meetings between the staff and stakeholders to resolve comments on individual issues.
- c. Hold a Commission briefing after the comment period and the staff's initial evaluation of the comments.

The final GALL report and final SRP should be submitted to the Commission for approval prior to publication.

Id. at 1.

Consistent with these instructions from the Commission, the NRC Staff submitted the SRP and GALL Report to the Commission for approval in April 1991. Id. at 2-4. SECY-01-0074, Memorandum from W. Travers to Commissioners, "Approval to Publish Generic License Renewal Guidance Documents" (Apr. 26, 2001) (ADAMS Accession No. ML010990201). As reflected in SECY-01-0074, this generic guidance was developed with the assistance of the Office of Nuclear Regulatory Research, the Argonne and Brookhaven National Laboratories, and extensive public involvement. SECY-01-0074 further stated:

It is the staff's expectation that future license renewal applicants will realize resource savings in preparing their applications if they choose to use the GALL report and RG 1.188. Applying the GALL report will reduce the need to review plant-specific aging management programs. In addition, when applicants state that their aging management programs are bounded by the GALL programs, the staff's review will shift from reviewing each program in detail to verifying the applicant's assertion. This will significantly reduce staff review resources and

increase the efficiency of the review. The staff believes that the improved license renewal guidance documents will increase the stability and predictability of the license renewal review process because they describe the framework for a disciplined process that clearly articulates the evaluation criteria. They also provide a clear and sound technical basis to support the staff's conclusion that (1) actions have been identified and have been or will be taken with respect to managing the effects of aging during the period of extended operation for structures, systems, and components within the scope of the license renewal rule, (2) and that actions have been identified and have been or will be taken with respect to time-limited aging analysis that are required to be reviewed in accordance with the license renewal rule. These documents should also increase public confidence in the license renewal review process because the public was involved in developing them, and the public's comments were considered and incorporated, and because the documents will make the staff's license renewal reviews more predictable.

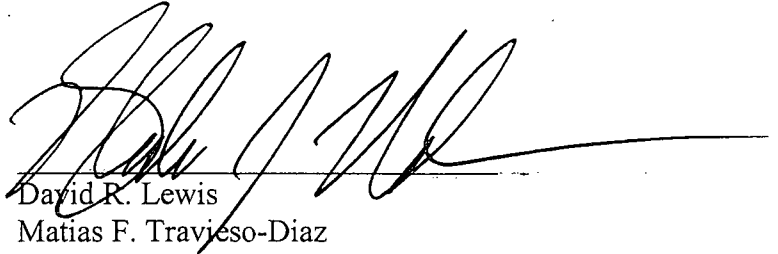
Id. at 4-5 (emphasis added).

The Commission then approved the issuance of this guidance. Memorandum from A. Vietti-Cook to W. Travers, "Staff Requirements - SECY-01-0074 – Approval to Publish Generic License Renewal Guidance Documents (July 2, 2001) (ADAMS Accession No. ML011860168). The Commission commended the staff for its outstanding efforts in developing these license renewal guidance documents, and stated "These documents should serve to enhance the predictability, consistency, and efficiency of the NRC reviews of license renewal applications."

Id.

Thus, it is appropriate that compliance with guidance documents, such as the Gall Report, other NUREGs, or the Standard Review Plan, that are developed by the NRC to assist licensees or applicants to comply with applicable regulations, be afforded special weight. Private Fuel Storage, L.L.C., CLI-01-22, 54 N.R.C. at 264. Such deference is particularly appropriate with respect to the GALL Report because it was developed at the Commission's direction with considerable public involvement and its issuance was approved by the Commission. Indeed, the procedures used in developing this guidance were essentially the same as those typically employed in rulemaking proceedings.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "D.R. Lewis", written over a horizontal line.

David R. Lewis

Matias F. Travieso-Diaz

Blake J. Nelson

PILLSBURY WINTHROP SHAW PITTMAN LLP

2300 N Street, NW

Washington, DC 20037-1122

Tel. (202) 663-8000

Counsel for Entergy

Dated: July 9, 2008

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

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CERTIFICATE OF SERVICE

I hereby certify that copies of "Entergy's Answers to Licensing Board Questions" were served on the persons listed below by deposit in the U.S. Mail, first class, postage prepaid, and where indicated by an asterisk by electronic mail, this 9th day of July, 2008.

*Administrative Judge
Alex S. Karlin, Esq., Chairman
Atomic Safety and Licensing Board
Mail Stop T-3 F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
ask2@nrc.gov

*Administrative Judge
William H. Reed
1819 Edgewood Lane
Charlottesville, VA 22902
whrcville@embarqmail.com

*Office of Commission Appellate Adjudication
Mail Stop O-16 C1
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
OCAAmail@nrc.gov

*Administrative Judge
Dr. Richard E. Wardwell
Atomic Safety and Licensing Board
Mail Stop T-3 F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
rew@nrc.gov

*Secretary
Att'n: Rulemakings and Adjudications Staff
Mail Stop O-16 C1
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
secy@nrc.gov, hearingdocket@nrc.gov

Atomic Safety and Licensing Board
Mail Stop T-3 F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

*Lloyd Subin, Esq.
*Mary Baty, Esq.
* Jessica A. Bielecki, Esq.
*Susan L. Uttal, Esq.
Office of the General Counsel
Mail Stop O-15-D21
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
LBS3@nrc.gov; mcb1@nrc.gov;
jessica.bielecki@nrc.gov; susan.uttal@nrc.gov

*Anthony Z. Roisman, Esq.
National Legal Scholars Law Firm
84 East Thetford Road
Lyme, NH 03768
aroisman@nationallawfirm.com

*Peter L. Roth, Esq.
Office of the New Hampshire Attorney General
33 Capitol Street
Concord, NH 03301
Peter.roth@doj.nh.gov

*Lauren Bregman, Law Clerk
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Mail Stop: T-3 F23
Washington, D.C. 20555-0001
Lauren.Bregman@nrc.gov

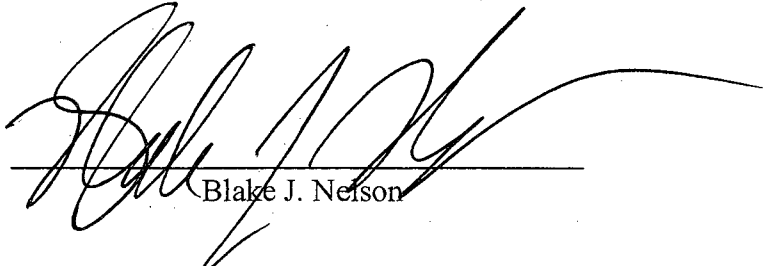
* Matthew Brock
Assistant Attorney General
Office of the Attorney General
One Ashburton Place, 18th Floor
Boston, MA 02108
Matthew.Brock@state.ma.us

*Sarah Hofmann, Esq.
Director of Public Advocacy
Department of Public Service
112 State Street – Drawer 20
Montpelier, VT 05620-2601
Sarah.hofmann@state.vt.us

*Ronald A. Shems, Esq.
*Karen Tyler, Esq.
Shems, Dunkiel, Kassel & Saunders, PLLC
9 College Street
Burlington, VT 05401
rshems@sdkslaw.com
ktyler@sdkslaw.com

*Marcia Carpenter, Esq.
Atomic Safety and Licensing Board Panel
Mail Stop T-3 F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
mxc7@nrc.gov

*Diane Curran, Esq.
Harmon, Curran, Spielberg, & Eisenberg,
L.L.P.
1726 M Street N.W., Suite 600
Washington, D.C. 20036
dcurran@harmoncurran.com



Blake J. Nelson