February 18, 2004

MEMORANDUM TO: Darrell J. Roberts, Acting Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: Richard B. Ennis, Senior Project Manager, Section 2 ***/RA/***
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION, DRAFT REQUEST FOR ADDITIONAL INFORMATION (TAC NO. MC0253)

The attached draft request for information (RAI) was transmitted on February 18, 2004, to Ms. Ronda Daflucas of Entergy (the licensee). This information was transmitted to facilitate an upcoming conference call in order to clarify the licensee's amendment request for Vermont Yankee Nuclear Power Station (VYNPS) dated July 31, 2003, as supplemented on October 10, November 7 (2 letters), December 11 (2 letters), December 30, 2003, and February 10, 2004. The proposed amendment would revise the VYNPS licensing basis by incorporating full scope application of an Alternative Source Term methodology.

This memorandum and the attachment do not convey or represent an NRC staff position regarding the licensee's request.

Docket No. 50-271

Attachment: Draft RAI

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DRAFT REQUEST FOR ADDITIONAL INFORMATION

RELATED TO ALTERNATIVE SOURCE TERM AMENDMENT REQUEST

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

By letter dated July 31, 2003, as supplemented on October 10, November 7 (2 letters), December 11 (2 letters), December 30, 2003, and February 10, 2004, Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy or the licensee) submitted an amendment request for Vermont Yankee Nuclear Power Station (VYNPS). The proposed amendment would revise the VYNPS licensing basis by incorporating full scope application of an Alternative Source Term (AST) methodology.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information the licensee provided that supports the proposed amendment and would like to discuss the following issues to clarify the submittals:

The licensee proposes to credit control of the pH in the suppression pool following a loss-of-coolant accident (LOCA) by means of injecting sodium pentaborate into the reactor core with the standby liquid control (SLC) system. The SLC system design was not previously reviewed for this safety function (pH control post-LOCA). To demonstrate that the SLC system is capable of performing the safety function assumed in the AST LOCA dose analysis, please address how the VYNPS SLC system meets the following guidelines. If the information was previously submitted to support the license amendment request to implement AST, you may refer to where that information may be found in the documentation.

1. The SLC system should be classified as a safety-related system as defined in 10 CFR 50.2, and satisfy the regulatory requirements for such systems.

   If the SLC system is not classified as safety-related, provide information to show that the SLC system is comparable to a system classified as safety-related. A SLC system meeting items (a)-(e) below would result in its acceptance in support of a 10 CFR 50.67 request even if the system is not classified as safety-related.

   (a) The SLC system should be provided with standby AC power supplemented by the emergency diesel generators.

   (b) The SLC system should be seismically qualified in accordance with Regulatory Guide (RG) 1.29 and Appendix A to 10 CFR Part 100 (or equivalent used for original licensing).

   (c) The SLC system should be incorporated into the plant's American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) inservice inspection (ISI) and inservice test (IST) Programs based upon the plant's Code of record (10 CFR 50.55a).

ATTACHMENT

(d) The SLC system should be incorporated into the plant's Maintenance Rule program consistent with 10 CFR 50.65.

(e) The SLC system should meet 10 CFR 50.49 and Appendix A to 10 CFR 50 (General Design Criterion (GDC) 4, or equivalent used for original licensing).

2. The licensee should have plant procedures for injecting the sodium pentaborate using the SLC system.

(a) Have the SLC activation steps been placed in a safety-related plant procedure? Provide the procedure for staff review.

(b) Are the steps activated by parameters that are symptoms of imminent or actual core damage?

(c) Does the instrumentation relied upon to provide this indication meet the quality requirements for a Type E variable as defined in RG 1.97 Tables 1 and 2?

(d) Will plant personnel receive initial and periodic refresher training in the procedure?

(e) Will other plant procedures (e.g., Emergency Response Guidelines (ERGs)/Severe Accident Guidelines (SAGs)) that call for termination of SLC as a reactivity control measure be appropriately revised to enable SLC injection for pH control?

3. A sufficient concentration and quantity of sodium pentaborate should be available for injection into the reactor vessel to control pH in the suppression pool. The licensee has previously provided this information in its July 31, 2003 submittal, as supplemented.

The source term analysis is tied to the plant's design basis accident, which is the large break LOCA, a break of a recirculation pipe. Demonstrate that within 24 hours there is adequate recirculation between the suppression pool and the reactor vessel through flow out the break to provide transport and mixing, consistent with the assumptions in the chemical analyses.

4. The SLC system should not be rendered incapable of performing its AST function due to a single failure of an active component. For this purpose the check valve is considered an active device for AST since the check valve must open to inject sodium pentaborate for suppression pool pH control.

If the SLC system can not be considered redundant with respect to its active components, this lack of redundancy may be offset by providing information in (a) or (b) or (c) below:

(a) Show acceptable quality and reliability of the non-redundant active components and/or compensatory actions in the event of failure of the non-redundant active components.

If you choose this option, provide the following information to justify the lack of redundancy of active components in the SLC system:

(1) Identify the non-redundant active components in the SLC system and provide their make, manufacturer, and model number.

(2) Provide the design-basis conditions for the component and the environmental and seismic conditions under which the component may be required to operate during a design-basis accident. Environmental conditions include design-basis pressure, temperature, relative humidity and radiation fields.

(3) Indicate whether the component was purchased in accordance with Appendix B to 10 CFR Part 50. If the component was not purchased in accordance with Appendix B, provide information on the quality standards under which it was purchased.

(4) Provide the performance history of the component both at the licensee's facility and in industry databases such as EPIX and NPRDS.

(5) Provide a description of the component's inspection and testing program, including standards, frequency, and acceptance criteria.

(6) Indicate potential compensating actions that could be taken within an acceptable time period to address the failure of the component. An example of a compensating action might be the ability to jumper a switch in the control room to overcome its failure. The staff reviewer will consider the availability of compensating actions and the likelihood of successful injection of the sodium pentaborate where non-redundant active components fail to perform their intended functions.

OR

(b) Provide for an alternative success path for injecting chemicals into the suppression pool.

If you choose to address the SLC system's susceptibility to single failure by selecting an alternative injection path, the alternative path must be capable of performing the AST function noted above and all components which make up the alternative path should meet the same quality characteristics required of the SLC system (described in Items 1(a)-1(e), 2 and 3 above). Provide a description of the alternative injection path, its capabilities, and quality characteristics.

If the use of an alternate path is part of the Emergency Operating Procedures (EOPs), then the license amendment request needs to address the following items: (1) Does the alternate injection path require actions in areas outside the control room? (2) How accessible will these areas be? (3) What additional personnel will be required?

OR

(c) Show that 10 CFR 50.67 and Appendix A, GDC 19 doses are met even if pH is not controlled.

You may choose to demonstrate, through dose calculations, that 10 CFR 50.67 and GDC 19 (or equivalent used in original licensing) doses are met even if pH is not controlled. The re-evolution of iodine in the particulate form from the water in the suppression pool to the elemental form for airborne iodine must be incorporated into the calculation. The calculation may take credit for the mitigating capabilities of other equipment, for example the standby gas treatment system (SGTS), if such equipment would be available. If you choose this option, please provide the dose calculations (including all inputs and assumptions) and any supporting calculations on re-evolution of iodine.