

From: Rick Ennis
To: Ronda Daflucas
Date: 4/6/05 7:07AM
Subject: EPU Draft SPLB RAIs

Ronda,

Attached are draft EPU RAIs from SPLB (Jim Tatum/Devender Reddy). Please let me know when we can have a conference call to discuss to ensure you understand the questions and establish an RAI response date so I can issue these via a formal letter.

thanks,

Rick
301-415-1420

CC: Brooke Poole; Devender Reddy; James Tatum; Jim DeVincentis; Steve Jones

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Subject: EPU Draft SPLB RAIs
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nrc.gov TWGWPO01.HQGWDO01 DKR2 CC (Devender Reddy)	Delivered	04/06/05 07:07AM
nrc.gov owf2_po.OWFN_DO JET1 CC (James Tatum)	Delivered	04/06/05 07:07AM
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REQUEST FOR ADDITIONAL INFORMATION
REGARDING PROPOSED LICENSE AMENDMENT
EXTENDED POWER UPRATE
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NO. 50-271

By letter dated September 10, 2003, as supplemented on October 1, and October 28 (2 letters), 2003, January 31 (2 letters), March 4, May 19, July 2, July 27, July 30, August 12, August 25, September 14, September 15, September 23, September 30 (2 letters), October 5, October 7 (2 letters), December 8, and December 9, 2004, and February 24, March 10, March 24, March 31, and April 5, 2005, (References 1 through 28), Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy or the licensee), submitted a proposed license amendment to the U.S. Nuclear Regulatory Commission (NRC) for the Vermont Yankee Nuclear Power Station (VYNPS). The proposed amendment, "Technical Specification Proposed Change No. 263, Extended Power Uprate" would allow an increase in the maximum authorized power level for VYNPS from 1593 megawatts thermal (MWT) to 1912 MWT.

The NRC staff is reviewing your Extended Power Uprate (EPU) amendment request and has determined that additional information is required to complete the review. The specific information requested is addressed in the following request for additional information (RAI).

Plant Systems Branch (SPLB)

Balance of Plant Section (SPLB-A)

Reviewer: Devender Reddy

14. Spent Fuel Pool Cooling and Cleanup System (Safety Evaluation (SE) Template Section 2.5.3.1)

The licensee's response to RAI SPLB-A-11, in the supplement dated February 24, 2005, provided information that indicates that the plant licensing basis related to the standby fuel pool cooling subsystem (SFPCS) will change following implementation of the proposed extended power uprate (EPU). In particular, Revision 18 of the Updated Final Safety Analysis Report (UFSAR) on page 10.5-9 it states: "These [SFPCS] heat exchangers are each sized to maintain the fuel pool water temperature below 150 °F after a normal refueling. Considering one train (one heat exchanger and one pump), this heat removal capability encompasses the normal maximum heat load from completely filling the pool with 3,353 spent fuel assemblies from the last normal discharge. The combined heat removal capability considering both trains (two heat exchangers and two pumps) operating encompasses a full core discharge heat load completely filling the pool with 3,353 spent fuel assemblies. This provides sufficient heat removal capacity to preclude any impact on plant operation due to insufficient spent fuel pool cooling." Additionally, on page 10.5-12 of the UFSAR it states: "At six days decay, a single train of SFPCS is able to remove the decay heat load. For a full-core discharge (abnormal operation)....two trains of SFPCS can remove the decay heat load at 10 days...." These statements are also supported by the information provided in Table 10.5.1, "Heat Removal Capacities," Table 10.5.3, "Comparison of Heat Loads to Heat Removal Capacities with SFP at Capacity," and Table 10.5.4, "Fuel Pool Cooling and Demineralizer System - System Specifications." Based on a review of the February 24, 2005, response to RAI SPLB-A-11, VYNPS will not be able to satisfy the current plant licensing basis as described in the UFSAR (and referred to above) following the proposed EPU. Please describe the changes that are being made to the plant licensing basis in this regard, explain why NRC review and approval is not required pursuant to 10 CFR 50.59 requirements, and provide a markup of UFSAR Sections 10.5.5 and 10.5.6 and UFSAR Tables 10.5.1, 10.5.3 and 10.5.4, that reflect the changes that are being made.

15. Station Service Water System (SE Template Section 2.5.3.2)

The information that was provided in several supplements (e.g., response to RAI questions SPLB-A-9 and SPSB-C-29 in supplement dated July 30, 2004) indicates that the maximum design-basis service water temperature limit is 85 °F, and this is the maximum temperature that is assumed in the accident analyses and decay heat removal calculations. However, UFSAR Section 10.6.5 describes a higher temperature limit of 88 °F under certain conditions. Explain how the evaluation supporting the UFSAR service water temperature limit of 88 °F was assessed for validity to EPU operation.

16. Reactor Auxiliary Cooling Water Systems
(SE Template Section 2.5.3.3)

The cooling function of the alternate cooling system (ACS) is relied upon in the event that the service water system becomes unavailable due to a failure of the Vernon Dam, or due to a fire or flooding in the intake structure. With respect to the response to RAI SPLB-A-9(a), in the supplement dated July 30, 2004, additional information is needed in order to fully demonstrate the capability of the ACS to perform its function for EPU conditions:

- a. Describe the extent of changes in the assumptions and methodology used to evaluate the ACS performance at EPU conditions relative to the existing design basis analysis.
- b. Confirm that the limiting parameters that were originally assumed relative to cooling tower performance (temperature, humidity, wind, etc.) continue to be "worst-case" based on trending of the meteorological conditions that have existed at VYNPS since original plant licensing.

17. Condensate and Feedwater System (CFS)
(SE Template Section 2.5.4.4)

Given the reduction in margin of the CFS for EPU conditions (e.g., use of three reactor feedwater pumps (RFPs) rather than two), explain what impact the EPU will have on the reliability of the CFS.

18. CFS
(SE Template Section 2.5.4.4)

Describe the extent of post-modification testing that will be completed to demonstrate acceptable performance for the reactor recirculation system runback modification and the RFP suction pressure trip modification.

19. Emergency Diesel Engine Fuel Oil Storage and Transfer System
(SE Template Section 2.5.6.1)

Explain how the limiting emergency diesel generator fuel oil consumption rate and duration that were established for the current licensed power level will remain bounding for EPU operation.

20. Power Ascension and Testing
(SE Template Section 2.12)

The licensee's response to RAI SPLB-A-10, in the supplement dated February 24, 2005, indicated that analyses of anticipated operational occurrences have been performed by General Electric for VYNPS using the NRC-approved ODYN code, which models the direct cycle boiling water reactor, including the turbine-generator system and the feedwater system functions. Additional information is required to explain in detail how the balance-of-plant (BOP) transient response to postulated events and anticipated operational occurrences was evaluated and determined, including:

- a. a discussion of the BOP transient response criteria that are important for assuring reactor safety and for minimizing challenges to plant safety systems;
- b. the nature, capability, applicability, accuracy, and sensitivity of the analytical modeling and methods that were used, including limitations and restrictions that apply, and sensitivities and uncertainties associated with extrapolating the use of these methods to encompass EPU conditions;
- c. measures that have been taken to confirm and assure that the analytical models and methods accurately represent the BOP transient response and a description of how well predicted performance compares with actual performance, including to what extent analytical models and methods have been updated and corrected to reflect VYNPS behavior following plant transients that have occurred, the extent that BOP features are actually modeled and an explanation for why this is sufficient, and consideration of plant modifications and setpoint adjustments that have been made subsequent to plant transients that have occurred such that the effects of these changes are not represented by the existing plant response data;
- d. the impact of plant modifications, setpoint adjustments and parameter changes that are planned on the validity, accuracy, sensitivity, and uncertainty of the analytical methods being used;
- e. a comparison of the analytical results (as adjusted to account for uncertainties in the analytical modeling and analyses) to the acceptance criteria that have been established for BOP transient performance; and
- f. measures that are included in the power ascension test program that will confirm the validity, accuracy, and sensitivity of the analytical results.

21. Power Ascension and Testing
(SE Template Section 2.12)

As discussed in the licensee's response to RAI SPLB-A-10, in the supplement dated February 24, 2005, the performance criteria that were established for the main steam isolation valve closure event and the turbine load reject and turbine trip without bypass both included: a) reactor pressure shall be maintained below 1230 psig; and b) maximum reactor pressure should be 35 psi below the first safety valve setpoint. Additional information is required demonstrating that these criteria will continue to be satisfied for EPU operation, including a discussion of how these determinations were made, uncertainties that are inherent in the analyses that were completed, and how these uncertainties were accounted for in demonstrating acceptable results.

22. Power Ascension and Testing
(SE Template Section 2.12)

The licensee indicated in the response to RAI SPLB-A-10, in the supplement dated February 24, 2005, that: "Operation of three RFPs at VYNPS during uprated conditions is addressed in FWLCS [feedwater level control system] operation to ensure the margins for vessel level overshoot are maintained." Additional information is required to explain specifically how FWLCS operation for uprated conditions will assure the margins for vessel level overshoot are maintained, including the need for any adjustments and how they were determined, and how FWLCS modeling and tuning for VYNPS differs from Dresden such that FWLCS performance in accordance with predictions is assured.

REFERENCES

- 1) Entergy letter (BVY 03-80) to NRC dated September 10, 2003, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Extended Power Uprate"
- 2) Entergy letter (BVY 03-90) to NRC dated October 1, 2003, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 1, Extended Power Uprate - Technical Review Guidance"
- 3) Entergy letter (BVY 03-95) to NRC dated October 28, 2003, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 2, Extended Power Uprate - Grid Impact Study"
- 4) Entergy letter (BVY 03-98) to NRC dated October 28, 2003, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 3, Extended Power Uprate - Updated Information"
- 5) Entergy letter (BVY 04-009) to NRC dated January 31, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 4, Extended Power Uprate - NRC Acceptance Review"
- 6) Entergy letter (BVY 04-008) to NRC dated January 31, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 5, Extended Power Uprate - Response to Request for Additional Information"
- 7) Entergy letter (BVY 04-025) to NRC dated March 4, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 6, Extended Power Uprate - Withholding Proprietary Information"
- 8) Entergy letter (BVY 04-050) to NRC dated May 19, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 7, Extended Power Uprate - Confirmatory Results"
- 9) Entergy letter (BVY 04-058) to NRC dated July 2, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 8, Extended Power Uprate - Response to Request for Additional Information"
- 10) Entergy letter (BVY 04-071) to NRC dated July 27, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 9, Extended Power Uprate - Revised Containment Overpressure Envelope"
- 11) Entergy letter (BVY 04-074) to NRC dated July 30, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 10, Extended Power Uprate - Response to Request for Additional Information"

- 12) Entergy letter (BVY 04-081) to NRC dated August 12, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 11, Extended Power Uprate - Response to Request for Additional Information"
- 13) Entergy letter (BVY 04-086) to NRC dated August 25, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 12, Extended Power Uprate - Revised Grid Impact Study"
- 14) Entergy letter (BVY 04-097) to NRC dated September 14, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 13, Extended Power Uprate - Response to Steam Dryer Action Items"
- 15) Entergy letter (BVY 04-098) to NRC dated September 15, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 14, Extended Power Uprate - Response to Request for Additional Information"
- 16) Entergy letter (BVY 04-100) to NRC dated September 23, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 15, Extended Power Uprate - Response to Steam Dryer Action Item No. 2"
- 17) Entergy letter (BVY 04-101) to NRC dated September 30, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 16, Extended Power Uprate - Additional Information Related to Request for Additional Information EMEB-B-5"
- 18) Entergy letter (BVY 04-107) to NRC dated September 30, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 17, Extended Power Uprate - Response to Request for Additional Information related to 10 CFR 50 Appendix R Timeline"
- 19) Entergy letter (BVY 04-106) to NRC dated October 5, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 18, Extended Power Uprate - ECCS Pump Net Positive Suction Head Margin"
- 20) Entergy letter (BVY 04-109) to NRC dated October 7, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 19, Extended Power Uprate - Initial Plant Test Program"
- 21) Entergy letter (BVY 04-113) to NRC dated October 7, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 20, Extended Power Uprate - Meeting on Steam Dryer Analysis"
- 22) Entergy letter (BVY 04-129) to NRC dated December 9, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 21, Extended Power Uprate - Steam Dryer Power Ascension Testing"
- 23) Entergy letter (BVY 04-131) to NRC dated December 8, 2004, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 22, Extended Power Uprate - 10 CFR 50 Appendix R Timeline Verification"

- 24) Entergy letter (BVY 05-017) to NRC dated February 24, 2005, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 23, Extended Power Uprate - Response to Request for Additional Information"
- 25) Entergy letter (BVY 05-024) to NRC dated March 10, 2005, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 24, Extended Power Uprate - Response to Request for Additional Information"
- 26) Entergy letter (BVY 05-030) to NRC dated March 24, 2005, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 25, Extended Power Uprate - Station Blackout and Appendix R Analyses"
- 27) Entergy letter (BVY 05-034) to NRC dated March 31, 2005, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 26, Extended Power Uprate - Steam Dryer Analyses and Monitoring"
- 28) Entergy letter (BVY 05-038) to NRC dated April 5, 2005, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 27, Extended Power Uprate - Dryer Acoustic Load Methodology Benchmark"