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RAS 12302

U.S. NUCLEAR REGULATORY COMMISSION
In the Matter of Entergy Nuclear Vermont Yankee, LLC
Docket No. 50-271 Official Exhibit No. Staff 10
OFFERED by: Applicant/Licensee Intervenor
NRC Staff Other
IDENTIFIED on 9/13/06 Witness/Panel Ennis, et al
Action Taken: ADMITTED REJECTED WITHDRAWN
Reporter/Clerk MAC

(10)

April 22, 2005

Docket No. 50-271
BVY 05-046
TAC No. MC0761

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ADJUDICATIONS STAFF

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PROD. & UTIL. FAC. 50-271-OLA

Subject: **Vermont Yankee Nuclear Power Station**
Technical Specification Proposed Change No. 263 – Supplement No. 28
Extended Power Uprate – Response to Request for Additional Information

References:
1) U.S. Nuclear Regulatory Commission (Richard B. Ennis) letter to Entergy Nuclear Operations, Inc. (Michael Kansler), "Request for Additional Information – Extended Power Uprate, Vermont Yankee Nuclear Power Station (TAC No. MC0761)," April 14, 2005

2) Entergy letter to U.S. Nuclear Regulatory Commission, "Vermont Yankee Nuclear Power Station, License No. DPR-28 (Docket No. 50-271), Technical Specification Proposed Change No. 263, Extended Power Uprate," BVY 03-80, September 10, 2003

This letter responds to NRC's request for additional information (RAI) of April 14, 2005, (Reference 1) regarding the application by Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy) for a license amendment (Reference 2) to increase the maximum authorized power level of the Vermont Yankee Nuclear Power Station (VYNPS) from 1593 megawatts thermal (MWt) to 1912 MWt.

Attachment 1 to this letter provides Entergy's response to the eleven individual RAIs contained in Reference 1.

Subsequent to the receipt of the RAI, discussions were held with the NRC staff to further clarify the RAIs. In certain instances the RAIs may have been modified based on clarifications and understandings reached during the telecons. The information provided herein is consistent with those understandings.

A001

Template =SECY-027

SECY-02

There are no new regulatory commitments contained in this submittal.

This supplement to the license amendment request provides additional information to clarify Entergy's application for a license amendment and does not change the scope or conclusions in the original application, nor does it change Entergy's determination of no significant hazards consideration.

If you have any questions or require additional information, please contact Mr. James DeVincentis at (802) 258-4236.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 22, 2005.

Sincerely,

Jay K. Thayer
Site Vice President
Vermont Yankee Nuclear Power Station

Attachment (1)

cc: Mr. Richard B. Ennis, Project Manager
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Mr. Samuel J. Collins
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Mr. David O'Brien, Commissioner
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Attachment 1

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 263 – Supplement No. 28

Extended Power Uprate

Response to Request for Additional Information

Total number of pages in Attachment 1 (excluding this cover sheet) is 23.

RAI SPLB-A-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.

Response to RAI SPLB-A-20

A conference call was held between NRC staff, Entergy, and GE on April 11, 2005 to clarify the RAI question. During the conference call the NRC staff clarified that the purpose of the RAI was to determine if any of the original VYNPS balance of plant (BOP) startup testing transient response criteria were affected by the full MSIV closure or generator load rejection transients

Initiated at EPU conditions. In accordance with that understanding, this response provides the information requested.

The functions important to safety associated with anticipated operational occurrences (AOOs) were evaluated as part of the VYNPS EPU analyses. BOP parameter data used in these analyses were integral to the evaluation of these functions. The effects of large transients on BOP systems were not specifically evaluated because the BOP systems do not constitute functions important to safety.

The ODYN code acceptability for modeling the reactor system response for pressurization transients, such as full main steam isolation valve (MSIV) closure and generator load rejections was previously approved in the NRC safety evaluations for the ODYN licensing topical report, NEDO-24154-A. The models and methods used in these analyses are described in and licensed for use by GE and Global Nuclear Fuels (GNF) in the GESTAR II topical report (NEDE-24011-P-A), which has been approved for this use by NRC. The use of these methods for EPU application was approved by the NRC in the safety evaluation for ELTR-1 and the constant pressure power uprate (CPPU) LTR.

The original VYNPS startup test program for full MSIV closure testing and generator load rejection did not have any acceptance criteria for the BOP transient response. This continues to be the case for these large transients analyzed at EPU conditions. The BOP response is a second or third order effect in pressurization events and the predicted performance is not critical to the results. As such, there were no Level 1 or Level 2 acceptance criteria for BOP system performance during original plant startup large transient tests. BOP performance was validated during system checkout and other power ascension tests (e.g. recirculation pump trip and feedwater pump trip).

The analyses of AOOs performed by GE model some BOP systems or component actions (e.g., feedwater level control, pressure regulator performance, stop valve closure) as inputs to the analysis of safety system performance. The BOP input assumptions are modeled to assure reactor safety and not to evaluate BOP response to AOOs.

The VYNPS EPU will be done at constant pressure per the CPPU LTR. Because there are no significant operating system pressure changes, no new thermal-hydraulic phenomena are introduced.

For any setpoint changes made as a result of power uprate, verification of setpoints will be conducted per plant design procedures. Monitoring of BOP systems and component performance (e.g., monitoring and verification of feedwater level control within reactor vessel water level limits, monitoring and verification of pressure regulator performance within primary and secondary limits) will be performed during EPU power ascension testing to ensure that systems and components are operating per design.

RAI SPLB-A-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 to demonstrate 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.

Response to RAI SPLB-A-21

The original VYNPS startup tests performed for the main steam isolation valve closure (MSIV) closure, turbine trip, and generator load reject events, applied a Level 1 acceptance criterion of reactor pressure vessel (RPV) peak pressure less than or equal to 1230 psig to ensure the safety valves did not open during testing. At that time, the opening setpoint for the first safety valve was 1230 psig. A Level 2 startup test acceptance criterion was established to ensure the peak pressure was at least 35 psi (30 psi for turbine trip test) below the safety valve setpoint, or 1195 psig (1200 psig for turbine trip test), and was meant as margin to prevent safety valve leakage or weeping. It should be noted that the original turbine trip and generator load reject startup tests allowed operation of the turbine bypass valves. Generator load reject without bypass and turbine trip without bypass events were not simulated during startup testing.

Prior to extended power uprate operation, cycle-specific reload analyses were performed confirming at least 25 psi margin to unpiped spring safety valve (SSV) lift for infrequent events. The infrequent events, which are expected to occur less than once during plant life, include the generator load reject without bypass and turbine trip without bypass events.

Beginning with EPU, consistent with industry practice, it was decided to change the analysis basis to maintain a 60 psi margin to unpiped SSV lift for the more realistic moderate frequency events. Moderate frequency events are those events with an expected frequency of more than once in plant life. The 60 psi margin, relative to the current nominal SSV lift setpoint of 1240 psig leads to an analysis objective of ensuring pressure remains less than or equal to 1180 psig during moderate frequency events. This value is more stringent than the acceptance criterion associated with the initial startup tests. The limiting moderate frequency event with regard to margin to unpiped SSV lift is the main steam isolation valve closure with direct scram (MSIVD) event.

As noted in PUSAR Section 3.1, the MSIVD event was analyzed for EPU conditions. The results show that there is an 88.9 psi margin to the lifting of unpiped SSVs—greater than the recommended margin of 60 psi. The analysis was performed for a representative EPU core, assuming one safety relief valve (SRV) out-of-service with the remaining SRVs assumed to lift at their nominal setpoints plus 3% uncertainty. The SRV that is assumed to be out-of-service is the one with the lowest nominal setpoint. The analysis is reperformed for each fuel cycle.

For comparison purposes, the Cycle 23 core analysis of the MSIVD event at the original licensed thermal power of 1593 MWt, resulted in a 97.3 psi margin to unpiped SSV lift, while the Cycle 24 core analysis at the EPU licensed thermal power of 1912 MWt, showed a margin of 84 psi to SSV lift. (Note: VYNPS is currently in Cycle 24).