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June 2, 2005

Docket No. 50-271
BVY 05-061
TAC No. MC0761

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

Subject: **Vermont Yankee Nuclear Power Station**
Technical Specification Proposed Change No. 263 – Supplement No. 29
Extended Power Uprate – Steam Dryer Computational Fluid Dynamics

- References:
- 1) 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
 - 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, Supplement No. 26 – Steam Dryer Analyses and Monitoring," BVY 05-034, March 31, 2005

This letter provides additional information regarding the application by Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy) for a license amendment (Reference 1) to increase the maximum authorized power level of the Vermont Yankee Nuclear Power Station (VYNPS) from 1593 megawatts thermal (MWt) to 1912 MWt.

In Reference 2, Entergy submitted the VYNPS steam dryer analysis, including an assessment of flow induced vibration derived by conservatively combining hydrodynamic loads with acoustic loads from the VYNPS acoustic circuit model. The basis for the hydrodynamic loads was a computational fluid dynamics (CFD) analysis performed at 100% of currently licensed thermal power (CLTP) and summarized in Reference 2.

The CFD analysis is a compressible large eddy simulation (LES) that is a state-of-the-art tool. The CFD model provides additional insight into the fluid dynamics in the reactor dome. As requested by the staff, Attachment 1 to this letter provides the details of the CFD methodology used in the analysis of the VYNPS steam dryer. Attachment 1 contains additional analyses, beyond those reported in Reference 2, that were subsequently performed to simulate hydrodynamic loads at 120% of CLTP.

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The following aspects of the analysis are noteworthy:

- Hydrodynamic pressure fluctuations on the steam dryer face adjacent to the steam nozzles have a frequency less than 30 Hz. Complex flow structures and vortices in the plenum near the main steam nozzles account for these pressure fluctuations.
- The CFD model time step and modeling parameters were developed to accurately simulate hydrodynamic effects. Because the LES simulation included compressibility, acoustic effects are also captured. It was found that pressure fluctuations with frequencies greater than 30 Hz are dominated by acoustic effects.
- A comparison of the CFD flow simulation for CLTP and extended power uprate (EPU) does not show significant changes in the flow characteristics or dryer loading that would structurally challenge the modified VYNPS dryer.

The results of the analyses performed to evaluate pressure loads on the steam dryer, together with steam dryer monitoring, provide reasonable assurance that the steam dryer will maintain its structural integrity at EPU conditions.

There are no new regulatory commitments contained in this submittal.

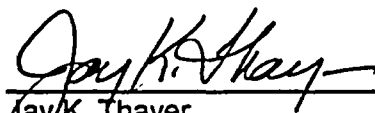
This supplement to the license amendment request provides additional information to clarify Entergy's application for a license amendment and does not change the scope or conclusions in the original application, nor does it change Entergy's determination of no significant hazards consideration.

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 June 2, 2005.

Sincerely,



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

Attachment (1)

cc: (see next page)

cc: Mr. Richard B. Ennis, Project Manager
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Attachment 1

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 263 – Supplement No. 29

Extended Power Uprate

Steam Dryer Computational Fluid Dynamics

Total number of pages in Attachment 1
(excluding this cover sheet) is 98.

**EXTENDED POWER UPRATE
VERMONT YANKEE NUCLEAR POWER STATION**

ACRONYMS

$\Delta p/DP$	differential pressure
CFD	computational fluid dynamics
EPU	extended power uprate
FFT	fast Fourier transform
ITA	iterative time-advancing
LES	large-eddy simulation
NIST	National Institute of Standards and Technology
NITA	non-iterative time advancing
p	pressure
PSD	power spectral density
RANS	Reynolds-averaged Navier-Stokes
sg/SG	strain gage
UFD	user-defined function
URANS	unsteady Reynolds-averaged Navier-Stokes
VY	Vermont Yankee Nuclear Power Station