

June 30, 2006

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

DOCKETED  
USNRC

Before the Atomic Safety and Licensing Board

June 30, 2006 (2:37pm)

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

In the Matter of )

ENTERGY NUCLEAR VERMONT )  
YANKEE, LLC and ENTERGY )  
NUCLEAR OPERATIONS, INC. )  
(Vermont Yankee Nuclear Power Station) )

) Docket No. 50-271

) ASLBP No. 04-832-02-OLA  
) (Operating License Amendment)  
)

**ENTERGY'S ANSWER TO NEW ENGLAND  
COALITION'S REQUEST FOR LEAVE TO FILE A SUPPLEMENT  
TO ITS REQUEST FOR LEAVE TO FILE A NEW CONTENTION**

Pursuant to 10 C.F.R. § 2.323(c), Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.<sup>1</sup> (collectively, "Entergy") hereby submit this Answer in opposition to the New England Coalition's ("NEC") "Request For Leave to File a Supplement to New England Coalition's Request for Leave to File a New Contention," filed on June 23, 2006 ("June 23 Request"). The June 23 Request should be denied because (1) it does not comply with the requirements of 10 C.F.R. § 2.323(b) for filing motions, (2) it is untimely, and (3) the materials that it seeks to place on the record of this proceeding do not support the contention for which they are tendered.

**I. BACKGROUND**

The relevant background for the June 23 Request is largely set forth in Entergy's May 1, 2006 Response to the NEC's Request for Leave to File New Contentions (submitted on April 6,

<sup>1</sup> Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. are the licensees of the Vermont Yankee Nuclear Power Station ("VY").

2006) and in Entergy's Response to New England Coalition's Request for Leave to File a New Contention, submitted on May 25, 2006 ("Entergy's May 25 Response"). Briefly summarized, on September 10, 2003, Entergy filed an application to increase the maximum authorized power level from 1593 to 1912 megawatts thermal (extended power uprate or "EPU"). NEC filed a petition to intervene and request for a hearing with respect to the EPU application.<sup>2</sup> On November 22, 2004, the Board admitted two of NEC's proposed contentions. LBP-04-28, 60 NRC 548 (2004). Hearings on NEC's two contentions are scheduled for September and October 2006.

On April 20, 2006, NEC filed a request (the "April 20 Request") seeking the admission of a new contention ("the April 20 Contention"). The contention reads:

The failure of modeling, testing, and analysis, in support of extended power uprate (EPU), to detect or predict recent discovery of a 5 foot crack with multiple branches on the surface of the Quad Cities Unit 2 dryer indicates that the technical basis for ascension power testing at the Entergy Vermont Yankee Nuclear Power Station, largely based on the Quad Cities model and methodology, is flawed and cannot reliably predict steam dryer durability or performance under EPU conditions. Because a cracked or fractured steam dryer can result in an accident, prevent mitigation of an accident, or increase the consequences of an accident, with a major catastrophic effects on public health and safety, and because Vermont Yankee is proceeding in an unknown condition, the Atomic Safety and Licensing Board, (ASLB) must not permit Vermont Yankee to operate at the EPU conditions until such time as it can be definitively demonstrated that the ascension power testing program at Vermont Yankee has not been invalidated by the experience at Quad Cities.

April 20 Request at 2-3.

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<sup>2</sup> New England Coalition's Request for Hearing, Demonstration of Standing, Discussion of Scope of Proceeding and Contentions (Aug. 30, 2004).

On May 25, 2006 Entergy and the NRC Staff filed responses opposing admission of the April 20 Contention. One month later, NEC submitted its June 23 Request.

NEC's June 23 Request "petitions the presiding officer and the Atomic Safety and Licensing Board Panel convened in this proceeding for leave to supplement the New England Coalition Request of April 20, 2006." June 23 Request at 2. The supplementation that NEC seeks to accomplish is "to place before the Board" a document entitled "Prefiled Written Testimony of William Sherman" ("Sherman Testimony") prepared in support of a petition by the Vermont Department of Public Service to open an investigation before the Vermont Public Service Board ("PSB") into the reliability of the steam dryer and resulting performance of the Vermont Yankee Nuclear Power Station under uprate conditions. June 23 Request at 2. The Sherman Testimony alleges concerns with respect to the "reliable performance of the Vermont Yankee steam dryer," Sherman Testimony at 3, how dryer performance could adversely affect Vermont ratepayers, *id.* at 18-21, and how Vermont ratepayers could be financially protected, *id.* at 21-23. The Sherman Testimony clearly distinguishes between the safety of VY's operation – which it does not challenge ("[t]hus NRC is confident that there is reasonable assurance that nuclear safety will not be compromised," *id.* at 12) – and the cited reliability and economic concerns.

## **II. ARGUMENT**

### **A. The June 23 Request fails to Comply with the Requirements of 10 C.F.R. § 3.323(b)**

It is unclear for what purpose NEC wishes to "place before the Board" the Sherman Testimony. NEC states that it "does not believe that filing of this Request or this Supplemental

information constitutes an amended [sic] to its proposed contention because it does not seek to alter the substance of the contention or the inherent dispute with the licensee.” June 23 Request at 2. NEC appears to be asking the Board to amend the April 20 Contention to add some unspecified new basis supported by the Sherman Testimony. NEC states that it seeks that the Sherman Testimony “be incorporated for purposes of supplementing the basis of New England Coalition’s proposed new contention.” Id. at 3. However, neither the June 23 Request nor the accompanying “Declaration of Dr. Joram Hopensfeld Regarding New England Coalition’s Supplement to a Petition for Leave to File a New Contention” dated June 23, 2006 (“Hopensfeld Declaration”) indicate what basis is “supplemented” by the Sherman Testimony – which, as discussed below, is wholly unrelated to the basis proffered by NEC for the April 20 Contention.

Regardless of the purpose behind it, it is clear that NEC’s June 23 Request should have been submitted in a motion pursuant to 10 C.F.R. § 2.323(b). NEC does not claim that it is entitled as of right to supplement its April 20 Request. Nor is Entergy aware of any authority for allowing NEC to supplement its contention as of right. Therefore, NEC had to seek, and has sought, the Board’s leave to file such a supplement. The only mechanism for seeking a leave to file is by motion. NEC has failed to comply with the requirements for filing motions and, in particular, has failed to consult with Entergy (and presumably with the NRC Staff) prior to submittal of its June 23 Request. NEC’s filing does not include a certification that NEC “has made a sincere effort to contact other parties in the proceeding and resolve the issue(s) raised in the motion, and that [its] efforts to resolve the issue(s) have been unsuccessful.” 10 C.F.R. § 2.323(b). Accordingly, NEC’s June 23 Request “must be rejected.” Id.

**B. The June 23 Request is Untimely**

NEC seeks “to place before the Board” the entirety of the Sherman Testimony. NEC claims that the Sherman Testimony was “new information, information not previously available” because the testimony “only became available two days prior to this filing.” June 23 Request at 1, 3. While the Sherman Testimony may be new, the information it contains is not. The testimony discusses the Quad Cities steam dryer failures in June 2002 and May 2003, Sherman Testimony at 4; the Dresden steam dryer cracking in October-November, 2003, *id.* at 5; the modifications to the Dresden steam dryers in the Fall of 2003, *id.*; the cracking of the Quad Cities steam dryers in February 2004, *id.*; the claim that only one steam dryer design has proven susceptible to failure and that only Dresden, Quad Cities and VY have that design, *id.* at 6-7; the installation of the Quad Cities replacement steam dryers in November 2005, *id.* at 6; the inspections of the VY steam dryers in 2004 and 2005, *id.*; the January 2006 letter of the Advisory Committee on Reactor Safeguards (“ACRS”), *id.* at 10,<sup>3</sup> etc. None of this information is new.

The NEC’s June 23 Request also seeks to take credit for the Sherman Testimony’s “opinion” that “the ascension power tests performed at Vermont Yankee fail to provide adequate assurance that steam dryer structural failures, such as cracks, will not continue to increase under extended power uprate loadings.” June 23 Request at 2. That opinion is based on Mr. Sherman’s observation that “[i]n the power ascension tests, strain measurements [on the VY

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<sup>3</sup> The Sherman Testimony quotes the ACRS letter as stating that “the state of validation of these [steam dryer analysis] methods is poor,” *id.* at 10. The Sherman Testimony’s quote is misleading. The ACRS concluded that the steam dryer does not pose a safety issue (“[t]he monitoring that will be performed during ascension to uprate power provides adequate assurance that, if resonant vibrational modes are induced in the steam dryer, they will be identified prior to component failure.” ACRS letter at 1.)

steam lines] reached or exceeded the limit curves at 105% power, 112.5% power, 117.5% power and 120% power.” Sherman Testimony at 12, footnote omitted. According to Mr. Sherman, “[t]he fact that limit curves had to be recalculated three separate times demonstrates to me that steam line/steam dryer interactions are not well understood analytically.” *Id.* at 16.

The information on the use of measured strains on the VY steam lines during the EPU ascension power tests to estimate loadings on the steam dryer is also not new. NEC has been aware for many months of the details of the EPU ascension power testing program. Indeed, the Board has already ruled that NEC knew of Entergy’s plan to monitor steam dryer loadings during power ascension as of November 2005, five months before the filing of the April 20 Contention and seven months before the June 23 Request. See Memorandum and Order (Ruling on the Admissibility of Three Additional Contentions), LBP-06-14, 63 NRC \_\_\_ (2006), slip op. at 25. Numerous documents containing information on the progress of power ascension testing, including strain measurements on the steam power lines, have been submitted by both Entergy and the NRC Staff and have long been available to NEC on ADAMS.<sup>4</sup> These documents include

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<sup>4</sup> The docketed information on the VY power ascension testing during implementation of the EPU includes: (1) NRC Memorandum “Staff Technical Basis for Continued Power Ascension of Vermont Yankee Nuclear Power Station up to 110% Original Licensed Thermal Power (TAC NO. MD0263)” dated April 5, 2006, ADAMS Accession No. ML060970111 (entered into ADAMS on April 11, 2006); (2) NRC Memorandum “Staff Technical Basis for Continued Power Ascension of Vermont Yankee Nuclear Power Station up to 115% Original Licensed Thermal Power (TAC NO. MD0263)” dated April 28, 2006, ADAMS Accession No. ML061370708 (entered into Adams on May 23, 2006); (3) Entergy letter to the NRC dated March 26, 2006 enclosing Revision 1 to the Steam Dryer Monitoring Plan (“SDMP”), Adams Accession No. ML 060930689 (entered into ADAMS on April 12, 2006); (4) Entergy letter to the NRC dated April 20, 2006 enclosing Revision 2 to the SDMP, ADAMS Accession No. ML061150267 (entered into Adams on May 3, 2006); (5) Entergy letter to the NRC dated May 4, 2006 enclosing Revision 3 to the SDMP, ADAMS Accession No. ML 061290566 (entered into ADAMS on May 17, 2006); (6) letter dated May 5, 2006 from NRC to Entergy enclosing NRC Integrated Inspection Report 05000271/2006002, ADAMS Accession No. ML061290083 (entered into ADAMS on May 16, 2006); (7) letter dated March 8, 2006 from Senators Patrick Leahy and James M. Jeffords and Representative Bernard Sanders to NRC, ADAMS Accession No. ML060690087 (entered into ADAMS on April 19, 2006); (8) letter dated April 5, 2006 from NRC to Senator James M. Jeffords, ADAMS Accession No. ML060730085 (entered into Adams on April 12, 2006).

two evaluations by the NRC Staff that describe the strain measurement results and sign off on the power increase to the next level in the upgrade sequence.<sup>5</sup> In addition, the local press reported often and in detail on the progress of the power ascension program, including the strain measurements that required the testing program to be halted repeatedly. See Exhibits 3-5 hereto (newspaper press clippings from the periods March 6-9, March 28-April 8 and April 23-May 6, 2006, during which power ascension testing was conducted).

NEC was aware of the power uprate testing developments as they related to the steam dryer. On April 7, 2006, NEC filed a request for an expedited decision by the PSB on NEC's appeal of the PSB's approval of the VY EPU. NEC's basis for seeking an expedited decision was the steam line strain levels ("vibrations") measured during power ascension testing. See "NEC's Request for Expedited Decision on Motion for Injunction Pending Appeal" ("Expedited Decision Request"), Exhibit 6 hereto. NEC argued: "Yesterday's detection of vibrations in the Vermont Yankee plant's steam system demonstrates that uprate operation places the plant at an immediate risk of major component or system failure that would result in significant to complete loss of reliability. Attachment 1, Supplemental Affidavit of Arnold Gundersen." Expedited Decision Request at 1, emphasis in original.

The Supplemental Affidavit of Arnold Gundersen filed by NEC in support of its Expedited Decision Request also makes specific reference to the steam line strains measured during power ascension testing as an indicator of steam dryer loadings:

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<sup>5</sup> See NRC Memorandum "Staff Technical Basis for Continued Power Ascension of Vermont Yankee Nuclear Power Station up to 110% Original Licensed Thermal Power (TAC NO. MD0263)" dated April 5, 2006, ADAMS Accession No. ML060970111, copy attached as Exhibit 1 hereto, and NRC Memorandum "Staff Technical Basis for Continued Power Ascension of Vermont Yankee Nuclear Power Station up to 115%

Footnote continued on next page

2. I understand that NRC has frozen the Vermont Yankee uprate at 112.5 percent of design capacity, after a measurement taken on Thursday, April 6, 2006 recorded vibrations in the steam system, indicating stress on the plant's steam dryer, which exceeded acceptable levels.

\* \* \*

5. Specifically, the stress on the plant's steam dryer detected on April 6, 2006 suggests that a failure or even disintegration of the steam dryer under uprate conditions is a real possibility. Steam dryers have failed under uprate conditions at several other nuclear plants during the past four years. A failure of the steam dryer may damage other plant systems.

Supplemental Affidavit of Arnold Gundersen dated April 7, 2006, Exhibit 1 to NEC's Expedited Decision Request at 1. Thus, there can be no doubt that NEC knew of the matters described in the Sherman Testimony well over two months before that testimony was filed. Indeed, NEC knew about those matters several weeks before filing the April 20 Contention, but made no mention of them in the April 20 Request.

Therefore, the claims against the steam dryer monitoring program raised in the June 23 Request through incorporation of the Sherman Testimony are not new and are impermissibly late. Trying to take advantage of old information repackaged in a new document fails to meet the test for good cause for late filing. NRC case law has long reflected the principle that an intervenor cannot claim that the recent availability of a document provides good cause for late filing where the underlying information in that document has been reasonably available prior to that time. See, e.g., Private Fuel Storage, LLC, (Independent Spent Fuel Storage Installation),

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Footnote continued from previous page

Original Licensed Thermal Power (TAC NO. MD0263)" dated April 28, 2006, ADAMS Accession No. ML061370708, copy attached as Exhibit 2.

LBP-00-27, 52 NRC 216, 221-24 (2000); Cleveland Electric Illuminating Co. (Perry Nuclear Power Plant, Units 1 & 2), LBP-82-104, 16 NRC 1626, 1627 (1982); Cleveland Electric Illuminating Co. (Perry Nuclear Power Plant, Units 1 & 2), LBP-82-79, 16 NRC 1116, 1117-18 (1982).

**C. The Sherman Testimony does not Support the April 20 Contention and is Irrelevant to the Issues Raised in the Contention**

The April 20 Contention charges: “New England Coalition contends that NRC Staff and Entergy Nuclear Vermont Yankee cannot demonstrate reasonable assurance of public health and safety, nor satisfy license commitments, while continuing to rely on failed Quad Cities 2 modeling and methodology to monitor Vermont Yankee steam dryer performance.” April 20 Request at 8, emphasis added. However, the Sherman Testimony has nothing to do with “reasonable assurance of the public health and safety” or with “satisfy[ing] license commitments.” Instead, the Sherman Testimony explicitly and solely addresses the *reliability* of the steam dryer, the possibility that a steam dryer problem could result in a *derate* of the plant’s output, and the *economic* impact on Vermont ratepayers that steam dryer performance might have. The Sherman Testimony recognizes that EPU operation does *not* create any public health and safety issues relating to a potential failure of the steam dryer. Mr. Sherman explains the reasons for that conclusion as follows:

Overall, the power ascension tests were successful and NRC was satisfied that catastrophic failure of the steam dryer would not occur. Operation at 120% power is considered acceptable because any failure of the steam dryer is expected to be detected by measuring moisture carryover, and power would be reduced if necessary to a known, safe operating range. Thus, NRC is confident that there is reasonable assurance that nuclear safety will not be compromised.

Id. at 12. The Sherman Testimony makes no attempt to, and does not, provide anything to undermine the NRC's reasonable assurance finding. Mr. Sherman carefully distinguishes between the NRC's health and safety role and the economic impact of derating VY:

Q. Has the NRC Staff concluded from its review that derates will not occur?

A. No. NRC is concerned with safety and does not try to guarantee reliable operation at full 120% uprate power.

Id. at 18. Thus, the Sherman Testimony does not support, but actually contradicts, the safety claims raised in the April 20 Contention.

Dr. Hopenfeld acknowledges that the Sherman Testimony is inconsistent with the April 20 Contention: "I take an exception to a single point in Mr. Sherman's testimony, that is, his unsupported conclusive statement that the steam dryer is not likely to fail catastrophically." Hopenfeld Declaration at ¶ 8.<sup>6</sup> Accordingly, NEC may not claim it as an additional basis in support of the contention's admission. See Yankee Atomic Elec. Co. (Yankee Nuclear Power Station), LBP-96-2, 43 NRC 61, 90 n.30, rev'd in part on other grounds CLI-96-7, 43 NRC 235 (1996).

In addition, the Sherman Testimony is irrelevant to NEC's April 20 Contention. To the extent that it presents information not covered by NEC's prior pleadings, the Sherman Testimony relates entirely to the potential reliability concerns that Mr. Sherman alleges are raised by what transpired during the power ascension program conducted by Entergy. The April 20 Contention, on the other hand, is based upon the discovery of a "5 foot crack with multiple branches on the

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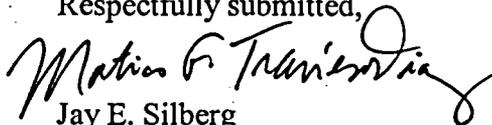
<sup>6</sup> Other than disagreeing with Mr. Sherman's conclusion that steam dryer performance does not raise a safety issue, Dr. Hopenfeld's Declaration sets forth no independent facts or analysis that would lend support to NEC's June 23 Request. It can, and should, be ignored. While Dr. Hopenfeld criticizes as "unsupported" and "conclusive" Mr. Sherman's statement that the steam dryer will not fail catastrophically, Dr. Hopenfeld's Declaration is at least as "unsupported" and "conclusive."

surface of the Quad Cities Unit 2 dryer” and its alleged implications for “the technical basis for ascension power testing.” Because of its entirely different scope and emphasis, the Sherman’s Testimony has no relevancy to this proceeding or to NEC’s April 20 Contention.

### III. CONCLUSION

The June 23 Request is yet another attempt by NEC to introduce into this proceeding an untimely steam dryer contention. For the reasons discussed above and in Entergy’s May 25, 2006 Response, the June 23 Request should be denied.<sup>7</sup>

Respectfully submitted,



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<sup>7</sup> NEC in its June 26 Motion in Limine requests that the Board “consider extending the schedule for filing additional supporting information until Adjust [sic] 1, 2006.” Entergy will address this aspect of NEC’s Motion in Limine in its response to that motion.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	Docket No. 50-271
ENERGY NUCLEAR VERMONT	)	
YANKEE, LLC and ENERGY	)	ASLBP No. 04-832-02-OLA
NUCLEAR OPERATIONS, INC.	)	(Operating License Amendment)
(Vermont Yankee Nuclear Power Station)	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "Entergy's Answer to New England Coalition's Request for Leave to File a Supplement to its Request for Leave to File a New Contention" 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 30th day of June, 2006.

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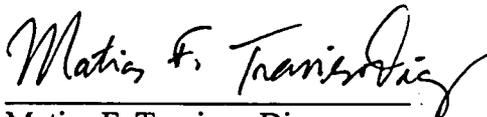
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Matias F. Travieso-Diaz

April 5, 2006

MEMORANDUM TO: Darrell J. Roberts, Chief  
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Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

FROM: Kamal A. Manoly, Chief */RA/*  
Engineering Mechanics Branch  
Division of Engineering  
Office of Nuclear Reactor Regulation

SUBJECT: STAFF TECHNICAL BASIS FOR CONTINUED POWER ASCENSION  
OF VERMONT YANKEE NUCLEAR POWER STATION UP TO  
110% ORIGINAL LICENSED THERMAL POWER (TAC NO. MD0263)

Introduction

On March 2, 2006, the U.S. Nuclear Regulatory Commission (NRC) approved the request by Entergy Nuclear Operations, Inc. (Entergy) to increase the maximum authorized power level for Vermont Yankee Nuclear Power Station (Vermont Yankee) from 1593 Megawatts thermal (MWt) to 1912 MWt as an extended power uprate (EPU) equivalent to 120% of the original licensed thermal power (OLTP). During the subsequent power ascension at Vermont Yankee, plant instrumentation reached an initial administrative limit that required the licensee to evaluate the plant data before continuing the power ascension. On March 26, Entergy submitted its justification for continued power ascension at Vermont Yankee up to 110% OLTP. The NRC staff has reviewed the licensee's justification for continued power ascension at Vermont Yankee. Entergy will need to justify power ascension beyond 110% OLTP based on its review of plant data collected up to that power level. A narrative of the NRC staff's review of the licensee's justification for continued power ascension at Vermont Yankee is provided below.

Background

Following receipt of the EPU license amendment, Entergy began to slowly increase reactor power above OLTP on March 4, 2006, at Vermont Yankee in accordance with its power ascension test procedure. The EPU amendment included a license condition that provides for monitoring, evaluating, and taking prompt action in response to potential adverse flow effects as a result of power uprate operation on structures, systems, and components (including verifying the continued structural integrity of the steam dryer) at Vermont Yankee.

CONTACT: Thomas G. Scarbrough, DCI/CPTB  
301-415-2794

The Vermont Yankee power ascension procedure specifies that (1) the power ascension rate be no more than 16 MWt per hour; (2) steam dryer performance data be monitored hourly and compared to acceptance criteria; (3) power level be held for 4 hours at each 40 MWt step (2.5% OLTP) to obtain and evaluate additional plant performance data; and (4) power level be held for 96 hours at each 80 MWt plateau (5% OLTP) to conduct plant walkdowns and to perform steam dryer analysis with NRC staff review. Entergy has made a regulatory commitment to not increase power at Vermont Yankee if the NRC staff identifies a safety concern during its evaluation of the plant data.

As part of the plant data evaluation, Entergy collects Main Steam Line (MSL) strain gage data to monitor pressure fluctuations within the main steam flow. The licensee inputs the MSL strain gage data into an acoustic circuit model (ACM) to calculate pressure loads on the steam dryer and the resulting stress in steam dryer components using a finite element model (FEM). The Vermont Yankee Steam Dryer Monitoring Plan (SDMP) establishes a Level 1 limit curve for the MSL strain versus frequency spectra based on the American Society of Mechanical Engineers (ASME) *Boiler & Pressure Vessel Code* (Code) fatigue stress limit of 13,600 pounds per square inch (psi), and a Level 2 limit curve based on 80% of that fatigue limit. If the Level 2 limit curve is reached, the SDMP specifies that power ascension be suspended until an engineering evaluation concludes that further power ascension is justified. If the Level 1 limit curve is reached, the licensee must reduce power until the curve is not exceeded.

On March 5, Entergy notified the NRC staff that the MSL strain gage data from the "A" MSL at Vermont Yankee had reached the Level 2 limit at 105% OLTP. Entergy's evaluation of the MSL strain gage and accelerometer data concluded that it was acceptable to maintain plant operation at 105% OLTP while the engineering evaluation was performed. The NRC staff independently evaluated the 105% OLTP data, and concluded that continued plant operation at 105% OLTP was reasonable and acceptable.

#### Licensee Justification for Power Ascension up to 110% OLTP

On March 26, 2006, Entergy completed its engineering evaluation of the Vermont Yankee steam dryer and its justification for continued power ascension to 110% OLTP. The engineering evaluation used (1) an improved ACM that is more bounding of actual steam dryer loads with reduced uncertainty; (2) an updated FEM that refines the assessment of the gusset shoe area that was of concern in a similar steam dryer at the Dresden nuclear power plant; (3) a more precise MSL strain gage data acquisition system designed to reduce the measurement uncertainty in the acoustic signals; and (4) MSL strain gage data collected at 105% OLTP.

Entergy verified that the stress in the Vermont Yankee steam dryer components remains significantly below the ASME Code fatigue stress limit of 13,600 psi at 105% OLTP. Further, the reduced uncertainty in the ACM and the MSL strain gage data acquisition system allowed Entergy to raise the limit curve for the MSL strain gage measurements while maintaining the resulting stress in the steam dryer below the ASME Code fatigue stress limit. The new limit curve has been incorporated into a revision of the Vermont Yankee SDMP.

Based on its engineering evaluation, Entergy has determined that continued power ascension to 110% OLTP will not cause stress exceedance in the steam dryer components that would challenge the structural integrity of the dryer.

#### NRC Staff Evaluation

The NRC staff, with support from its consultants from Argonne National Laboratory, has reviewed Entergy's engineering evaluation consisting of multiple analyses, data, and figures. The staff's review of the licensee's generic application of uncertainty assumptions for the revised ACM and improved MSL strain gage instrumentation is continuing. At this time, the staff has evaluated the licensee's basis for continued power ascension at Vermont Yankee up to 110% OLTP, including the calculation of the stresses on the steam dryer components at 105% OLTP and the establishment of new limit curves for MSL strain gage data in support of operation up to 110% OLTP.

The Vermont Yankee steam dryer analysis indicates that the steam dryer gusset shoe area is the most limiting stress location on the Vermont Yankee steam dryer for EPU operation. The stress on this component at 105% OLTP is calculated to be 2321 psi from the ACM and 599 psi from the Computational Fluid Dynamics (CFD) analyses. If the MSL strain gage measurements increase up to the new Level 1 limit curve in all four steam lines, the stress at this location is projected to be 9866 psi. This stress is about 40% less than the ASME Code fatigue limit of 13,600 psi. The Vermont Yankee SDMP provides additional margin in that power ascension must be halted and the collected data evaluated if any portion of the measured MSL strain-frequency spectra reaches the Level 2 limit (80% of the 13,600 psi limit) for any of the four steam lines.

As part of its review, the staff compared the Vermont Yankee MSL strain gage limit curves established for initial power ascension to the new limit curves based on the revised ACM and more accurate MSL strain gage data. Although the new limit curves permit a higher MSL strain gage signal than the initial curves, the allowed MSL strain levels continue to be low. Higher strain peaks at the resonance frequencies experienced at 105% OLTP were acceptable to be included in the limit curve based on their insignificant contribution to the total resulting stress. Since the only instrumented steam dryer among the operating U.S. boiling water reactors is that at Quad Cities Unit 2 and the original steam dryers at Quad Cities were the only dryers at U.S. plants that have experienced severe damage under EPU conditions, the revised Level 1 limit curve for Vermont Yankee was compared to the MSL data measured at Quad Cities Unit 2. The comparison indicated that the Vermont Yankee revised Level 1 limit was significantly below the MSL data measured at Quad Cities Unit 2. Further, the Vermont Yankee SDMP will require the licensee to halt power ascension if any acoustic signal from the Vermont Yankee MSL strain gage data in any MSL reaches the Level 2 limit curve, which is 80% of the Level 1 limit curve. With respect to the low-frequency regions of MSL strain gage data, the staff will ensure that Entergy closely monitors those low frequency areas during future power ascension where the Vermont Yankee Level 1 limit curve is above the measured Quad Cities Unit 2 MSL data.

The NRC staff is reviewing the recently identified cracking in the skirt region of the steam dryer at Quad Cities Unit 2. The Quad Cities licensee has initiated an extensive effort to determine the cause of the cracking. Prior to the current outage, Quad Cities Unit 2 operated at up to 117% of the original licensed power for about 6 months with substantial high-frequency acoustic loads on the steam dryer. Entergy has evaluated the applicability of the Quad Cities Unit 2 information to Vermont Yankee. The staff reviewed Entergy's evaluation of the applicability of the Quad Cities Unit 2 steam dryer cracking to Vermont Yankee. Entergy applied a more conservative damping assumption in its assessment of the steam dryer skirt at Vermont Yankee than that used at Quad Cities. Even with this more conservative damping assumption, the stress in the skirt region of the Vermont Yankee steam dryer is calculated to be less than 1000 psi at 105% OLTP. Therefore, there is considerable margin in the stress analysis for the skirt region at Vermont Yankee to account for damping and other assumptions. The staff does not consider the cracking in the skirt region of the Quad Cities Unit 2 steam dryer to raise a safety concern with power ascension at Vermont Yankee up to 110% OLTP.

#### Conclusion

Based on its review of the Entergy's engineering evaluation, the NRC staff concludes that the licensee has provided a reasonable basis for continuing power ascension up to 110% OLTP at Vermont Yankee, including (1) plant performance limit curves that maintain MSL strain gage data far lower than the Quad Cities data in the high-frequency acoustic range; (2) frequent monitoring of plant performance data, including hourly collection of the MSL strain gage data; and (3) plant procedures that halt power ascension if any portion of the measured MSL strain vs. frequency spectra reach the Level 2 limit curve for any Vermont Yankee MSL. On March 31, 2006, the NRC staff informed Entergy that the staff did not object to the continued power ascension process at Vermont Yankee up to 110% OLTP. The staff will continue to discuss the steam dryer analysis and its assumptions with Entergy as part of the review of the revised ACM for generic use at Vermont Yankee and other nuclear power plants. The staff will ensure that Entergy closely monitors the MSL strain gage data for any increases toward the limit curves during the power ascension at Vermont Yankee. The staff will review Entergy's justification for continued power uprate operation, including further power ascension, based on the plant data collected during this next power ascension step.

The NRC staff is reviewing the recently identified cracking in the skirt region of the steam dryer at Quad Cities Unit 2. The Quad Cities licensee has initiated an extensive effort to determine the cause of the cracking. Prior to the current outage, Quad Cities Unit 2 operated at up to 117% of the original licensed power for about 6 months with substantial high-frequency acoustic loads on the steam dryer. Entergy has evaluated the applicability of the Quad Cities Unit 2 information to Vermont Yankee. The staff reviewed Entergy's evaluation of the applicability of the Quad Cities Unit 2 steam dryer cracking to Vermont Yankee. Entergy applied a more conservative damping assumption in its assessment of the steam dryer skirt at Vermont Yankee than that used at Quad Cities. Even with this more conservative damping assumption, the stress in the skirt region of the Vermont Yankee steam dryer is calculated to be less than 1000 psi at 105% OLTP. Therefore, there is considerable margin in the stress analysis for the skirt region at Vermont Yankee to account for damping and other assumptions. The staff does not consider the cracking in the skirt region of the Quad Cities Unit 2 steam dryer to raise a safety concern with power ascension at Vermont Yankee up to 110% OLTP.

### Conclusion

Based on its review of the Entergy's engineering evaluation, the NRC staff concludes that the licensee has provided a reasonable basis for continuing power ascension up to 110% OLTP at Vermont Yankee, including (1) plant performance limit curves that maintain MSL strain gage data far lower than the Quad Cities data in the high-frequency acoustic range; (2) frequent monitoring of plant performance data, including hourly collection of the MSL strain gage data; and (3) plant procedures that halt power ascension if any portion of the measured MSL strain vs. frequency spectra reach the Level 2 limit curve for any Vermont Yankee MSL. On March 31, 2006, the NRC staff informed Entergy that the staff did not object to the continued power ascension process at Vermont Yankee up to 110% OLTP. The staff will continue to discuss the steam dryer analysis and its assumptions with Entergy as part of the review of the revised ACM for generic use at Vermont Yankee and other nuclear power plants. The staff will ensure that Entergy closely monitors the MSL strain gage data for any increases toward the limit curves during the power ascension at Vermont Yankee. The staff will review Entergy's justification for continued power uprate operation, including further power ascension, based on the plant data collected during this next power ascension step.

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April 28, 2006

MEMORANDUM TO: Darrell J. Roberts, Chief  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

FROM: Kamal A. Manoly, Chief */RA/*  
Engineering Mechanics Branch  
Division of Engineering  
Office of Nuclear Reactor Regulation

SUBJECT: STAFF TECHNICAL BASIS FOR CONTINUED POWER ASCENSION  
OF VERMONT YANKEE NUCLEAR POWER STATION UP TO  
115% ORIGINAL LICENSED THERMAL POWER (TAC NO. MD0263)

Introduction

On March 2, 2006, the U.S. Nuclear Regulatory Commission (NRC) approved the request by Entergy Nuclear Operations, Inc. (Entergy) to increase the maximum authorized power level for Vermont Yankee Nuclear Power Station (Vermont Yankee) from 1593 Megawatts thermal (MWt) to 1912 MWt as an extended power uprate (EPU) equivalent to 120% of the original licensed thermal power (OLTP). During the initial power ascension at Vermont Yankee, plant instrumentation reached an administrative limit at 105% OLTP that required the licensee to evaluate the plant data before continuing the power ascension. As documented in a staff memorandum dated April 5, 2006, the licensee justified continued power ascension at Vermont Yankee. Upon achieving 112.5% OLTP (1791 MWt) on April 6, Entergy informed the staff that plant instrumentation at Vermont Yankee had again reached an administrative limit that required evaluation. On April 20, Entergy submitted its evaluation to justify continued power ascension beyond 112.5% OLTP. On April 21, the staff informed Entergy that it did not object to the continued power ascension of Vermont Yankee up to 115% OLTP. A narrative of the NRC staff's review of the licensee's justification for continued power ascension at Vermont Yankee is provided below.

Background

Following receipt of the EPU license amendment, Entergy began to slowly increase reactor power at Vermont Yankee above OLTP on March 4, 2006, in accordance with its power ascension test procedure. The EPU amendment included a license condition that provides for monitoring and evaluating plant data at Vermont Yankee, and taking prompt action in response to potential adverse flow effects as a result of power uprate operation on structures, systems, and components (including verifying the continued structural integrity of the steam dryer).

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The Vermont Yankee power ascension procedure specifies that (1) the power ascension rate be no more than 16 MWt per hour; (2) steam dryer performance data be monitored hourly and compared to acceptance criteria; (3) power level be held for 4 hours at each 40 MWt step (2.5% OLTP) to obtain and evaluate additional plant performance data; and (4) power level be held for 96 hours at each 80 MWt plateau (5% OLTP) to conduct plant walkdowns and to perform steam dryer analysis whose results would be examined by the NRC staff. Entergy made a regulatory commitment to not increase power at Vermont Yankee if the NRC staff identified a safety concern during its evaluation of the plant data.

As part of the plant data evaluation, Entergy collects Main Steam Line (MSL) strain gage data to monitor pressure fluctuations within the main steam flow. The licensee inputs the MSL strain gage data into an acoustic circuit model (ACM) to calculate pressure loads on the steam dryer and the resulting stress in steam dryer components using a finite element model (FEM). The Vermont Yankee Steam Dryer Monitoring Plan (SDMP) establishes a Level 1 limit curve for the MSL strain versus frequency spectra based on the American Society of Mechanical Engineers (ASME) *Boiler & Pressure Vessel Code* (Code) fatigue stress limit of 13,600 pounds per square inch (psi), and a Level 2 limit curve based on 80% of that fatigue limit. If the Level 2 limit curve is reached, the SDMP specifies that power ascension be suspended until an engineering evaluation concludes that further power ascension is justified. If the Level 1 limit curve is reached, the licensee must reduce power until the curve is not exceeded.

On March 5, Entergy notified the NRC staff that the MSL strain gage data from the "A" MSL at Vermont Yankee had reached the Level 2 limit at 105% OLTP. On March 26, Entergy completed its engineering evaluation of the Vermont Yankee steam dryer and its justification for continued power ascension to 110% OLTP. Entergy verified that the stress in the Vermont Yankee steam dryer components remained significantly below the ASME Code fatigue stress limit of 13,600 psi at 105% OLTP. Based on its engineering evaluation, Entergy determined that continued power ascension to 110% OLTP would not cause stress exceedance in the steam dryer components that would challenge the structural integrity of the dryer. The NRC staff reviewed the licensee's justification for continued power ascension at Vermont Yankee beyond 105% OLTP. The NRC staff informed Entergy on March 31 that it did not have a safety concern with power ascension up to 110% OLTP, and documented its decision in a memorandum dated April 5, 2006. Subsequently, the licensee continued the power ascension at Vermont Yankee, and achieved 110% OLTP with the collected data remaining within the acceptance criteria. The staff reviewed the plant data, and did not object to continued power ascension up to 115% OLTP.

#### Licensee Justification for Power Ascension up to 115% OLTP

During further power ascension at Vermont Yankee, Entergy informed the NRC staff on April 6 that plant instrumentation at Vermont Yankee had reached an administrative limit at 112.5% OLTP that required evaluation. In particular, the licensee reported that the MSL strain gage data from the "A" MSL reached the Level 2 limit at a frequency resonance peak of 143 Hz. The licensee provided the specific plant data that supported its decision to remain at 112.5% OLTP while evaluating the data. The staff reviewed the plant data and held telephone discussions regarding the data with the licensee. Based on its review, the staff did not object to Vermont Yankee remaining at 112.5% OLTP while the licensee evaluated the plant data.

On April 20, Entergy submitted its evaluation of the plant data to justify continued power ascension at Vermont Yankee beyond 112.5% OLTP. The licensee recalculated the stress on the steam dryer using the plant data from 112.5% OLTP and its current version of the ACM. As part of its analysis, the licensee adjusted the uncertainty associated with the ability of the ACM to match the frequency spectra from 15% to 25%. The licensee then recalculated the Level 1 and Level 2 limit curves for the MSL strain gage data using plant data from 112.5% OLTP and the updated uncertainty values. The licensee incorporated the new limit curves into a revision of the Vermont Yankee SDMP. Based on its engineering evaluation, Entergy determined that continued power ascension to 115% OLTP would not cause stress exceedance in the steam dryer components that would challenge the structural integrity of the dryer.

#### NRC Staff Evaluation

The NRC staff, with support from its consultants from Argonne National Laboratory, reviewed Entergy's engineering evaluation consisting of multiple analyses, data, and figures. The staff's evaluation focused on the licensee's basis for continued power ascension at Vermont Yankee up to 115% OLTP. For example, the staff reviewed the calculation of the stresses on the steam dryer components at 112.5% OLTP, and the establishment of new limit curves for MSL strain gage data in support of operation up to 115% OLTP.

The Vermont Yankee steam dryer analysis indicates that the steam dryer gusset shoe area is the most limiting stress location on the Vermont Yankee steam dryer for EPU operation. The stress on this component at 112.5% OLTP was calculated to be 2688 psi from the ACM and 599 psi from the Computational Fluid Dynamics (CFD) analyses. If the MSL strain gage measurements increase up to the new Level 1 limit curve in all four steam lines, the stress at this location is projected to be 9514 psi. This stress is about 30% less than the ASME Code fatigue limit of 13,600 psi. The Vermont Yankee SDMP provides additional margin in that power ascension must be halted and the collected data evaluated if any portion of the measured MSL strain-frequency spectra reaches the Level 2 limit (80% of the 13,600 psi limit) for any of the four steam lines.

As part of its review, the staff compared the Vermont Yankee MSL strain gage limit curves from 105% OLTP to the new limit curves established at 112.5% OLTP. The 112.5% limit curves have a lower baseline limit resulting from the increased ACM uncertainty, but permit higher MSL strain gage signals at the resonance frequencies experienced at 112.5% OLTP. The higher resonance peaks are allowed to be included in the new limit curve based on their small contribution to the total resulting stress on the steam dryer. Also, the Vermont Yankee Level 1 limit remains below the MSL data measured in the high-frequency range of interest at Quad Cities Unit 2, which experienced severe steam dryer damage under EPU conditions. Further, the Vermont Yankee SDMP will require the licensee to halt power ascension if any acoustic signal from the Vermont Yankee MSL strain gage data in any MSL reaches the Level 2 limit curve, which is 80% of the Level 1 limit curve. With respect to the low-frequency regions of MSL strain gage data, the staff will ensure that Entergy closely monitors those low frequency areas during future power ascension.

Conclusion

Based on its review of the Entergy's engineering evaluation, the NRC staff concluded that the licensee provided a reasonable basis for continuing power ascension up to 115% OLTP at Vermont Yankee. The staff's conclusion is based on: (1) the calculated stress on the most limiting component of the Vermont Yankee steam dryer at 112.5% OLTP is significantly below the ASME Code fatigue limit; (2) plant performance limit curves maintain MSL strain gage data lower than the Quad Cities data in the high-frequency acoustic range; (3) frequent monitoring of plant performance data, including hourly collection of the MSL strain gage data, during power ascension; and (4) plant procedures halt power ascension if any portion of the measured MSL strain vs. frequency spectra reach the Level 2 limit curve for any Vermont Yankee MSL. On April 21, 2006, the NRC staff informed Entergy that the staff did not object to the continued power ascension process at Vermont Yankee up to 115% OLTP. The staff will ensure that Entergy closely monitors the MSL strain gage data for any increases toward the limit curves during the power ascension at Vermont Yankee. The staff will review Entergy's justification for continued power uprate operation, including further power ascension, based on the plant data collected during the next power ascension step. Further, the staff notes that a license condition requires that Entergy resolve the steam dryer analysis uncertainties within 90 days of issuance of the EPU license amendment.

Conclusion

Based on its review of the Entergy's engineering evaluation, the NRC staff concluded that the licensee provided a reasonable basis for continuing power ascension up to 115% OLTP at Vermont Yankee. The staff's conclusion is based on: (1) the calculated stress on the most limiting component of the Vermont Yankee steam dryer at 112.5% OLTP is significantly below the ASME Code fatigue limit; (2) plant performance limit curves maintain MSL strain gage data lower than the Quad Cities data in the high-frequency acoustic range; (3) frequent monitoring of plant performance data, including hourly collection of the MSL strain gage data, during power ascension; and (4) plant procedures halt power ascension if any portion of the measured MSL strain vs. frequency spectra reach the Level 2 limit curve for any Vermont Yankee MSL. On April 21, 2006, the NRC staff informed Entergy that the staff did not object to the continued power ascension process at Vermont Yankee up to 115% OLTP. The staff will ensure that Entergy closely monitors the MSL strain gage data for any increases toward the limit curves during the power ascension at Vermont Yankee. The staff will review Entergy's justification for continued power uprate operation, including further power ascension, based on the plant data collected during the next power ascension step. Further, the staff notes that a license condition requires that Entergy resolve the steam dryer analysis uncertainties within 90 days of issuance of the EPU license amendment.

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## **Vibration causes Yankee to put hold on power boost**

By Ross Sneyd

Associated Press

March 6, 2006

MONTPELIER, Vt. --Vibrations detected in the steam system at the Vermont Yankee nuclear power plant have prompted Entergy Nuclear to hold off on further increases in the plant's energy production.

The company had completed a 5 percent boost in its electrical output during the weekend when analysis required by the Nuclear Regulatory Commission concluded that additional increases should be delayed so the vibrations could be further evaluated.

"There's one monitor that the vibration there requires more analysis than the others," said Yankee spokesman Robert Williams. "That's built into the plan and the NRC is overseeing this."

A regional Nuclear Regulatory Commission spokeswoman generally agreed with Williams' characterization of the issue.

"If (the vibration) met certain criteria, it caused Entergy to hold the reactor power ascension until their own engineers concluded they could go further," said Diane Scenci. "It's safe for them to stay at their current power level. They'll be completing that further analysis."

Entergy won NRC and state permission just last week to boost the amount of power Vermont Yankee can produce by 20 percent. But the federal regulators put in requirements for a series of evaluations and analyses as the plant's power production increased in 5 percent increments.

Plant operators were required to send the analyses and engineering data to the NRC and hold at 105 percent of Yankee's previous power output for at least 96 hours as additional analysis was conducted, Scenci said.

The NRC received word Sunday that Vermont Yankee had reached 105 percent and that one of those criteria on vibrations had been met, she said.

Williams said the power boost began on Saturday.

"The plan calls for several days holding there while the vibration levels are analyzed," Williams said. "The extent of analysis that is required is based on the amount of vibration level at each of these monitors. ... This will go on for several weeks at each power level."

The vibrations were not detected in the part of the plant where the nuclear reaction takes place. Vermont Yankee is a boiling water reactor. The nuclear reaction creates steam that turns the electricity-generating turbine. It was in a steam line leading to the turbine that the vibration was noted, Williams and Scenci said.

Neither could say how long the plant would have to hold at its current power level before increasing to 110 percent of its previous output.

"That's part of what the engineering analysis that they're doing now is," she said. "They'll look at what it means."

## **Entergy clears up reasons for calling halt to 'uprate'**

March 08, 2006

By BOB AUDETTE

Brattleboro Reformer

BRATTLEBORO -- Vibrations were discovered along a steam line at Vermont Yankee in the days since plant engineers boosted power output there, but company officials insisted Tuesday those vibrations weren't the reason why the so-called "uprate" was halted this week.

For 96 hours, plant engineers and federal regulators are evaluating data received from the first step in the Vernon reactor's 20 percent increase in power. While they do that, the plant will run at 105 percent of its old capacity, which is 87 percent of its new allowable capacity -- and the uprate will effectively be put on hold.

Entergy Nuclear, owners of the plant, said plant officials made the call to suspend power increase, and that it was not an order by federal regulators.

State and federal regulators approved the controversial power uprate last week. On Saturday, engineers began increasing power.

Jay Thayer, site vice president for Vermont Yankee, said that the 96-hour hold is part of the process to achieving the new power uprate, and was not a result of the vibration.

"The hold is not [U.S. Nuclear Regulatory Commission]-imposed," said Thayer. "We're doing that. After 96 hours, if there are no problems, there's nothing prohibiting us from going to the next level."

However, as part of the uprate approval, the NRC did impose a number of conditions on Entergy, including one that required engineers to stop at various points to check data.

Neil Sheehan, spokesman for the NRC, said the data received so far, despite the vibration in the steam line, indicated the plant is running fine.

Thayer said there has been some concern that the vibration, a result of acoustics caused by steam passing through a valve, can cause physical damage to the plant's steam dryer, which extracts moisture from the steam before it is forwarded to the turbine.

In reactors of similar design, plates in the steam dryer have been damaged by the stresses of the system.

The Quad Cities Generating Station in Illinois, which is a boiling water reactor like Vermont Yankee, was granted a 17.5 percent uprate by the NRC in 2002. Since then, the steam dryer has failed twice because of cracking. In one instance, a piece of the dryer broke off and damaged other components of the reactor. The plant has been shut down a number of times to try to fix the problem.

"If (the sound) gets high enough, it could transfer into a mechanical force on the plate," said Thayer, about Vermont Yankee. "It goes into resonance and at some point will fail."

"They need to evaluate that data and determine what it means to ensure it's okay to move on to the next plateau," said Sheehan. "We are doing our own independent evaluation of the data as well. This is a process that needs to play out."

"Before the next increase, we will understand everything about the dryer and the overall performance of the plant," said Thayer.

Sheehan said the NRC's concern about problems in similar power plants prompted them to design the uprate process in phases, so data can be evaluated at each designated uprate.

"The issues with the steam dryers have been a great concern to us, which was one of the reasons it took so long to approve the uprate," said Sheehan. "Other plants that have gone to extended power uprates have gotten these signs, but as they raise the power, they go away."

Thayer said the data from the first phase of the uprate was not unexpected.

"This is exactly what we were looking for," he said. "It did not take us by surprise. Our experts say that noise at that frequency won't affect the dryer. We have no concerns about the structural integrity of the dryers. We think our dryers will operate fine at 120 percent."

Thayer said modifications had been made to the steam dryer to reinforce its structural integrity. Thayer said the work was based on work done on reactors with similar steam dryers. Thayer also said that the steam is passing through pipes that are over 30 years old, but he had no concerns about their structural integrity.

"But you have to pay attention to it," said Thayer.

Thayer said since the uprate to 105 percent, Vermont Yankee has increased its power output by 26 megawatts, from 515 to 541, by increasing the flow of water through the reactor with the recirculation pumps. Thayer said that increase in production is enough energy to power 26,000 homes.

Thayer said actual steam pressure remains the same in the plant, but the flow and amount of steam passing through the turbine has increased, thus increasing the power production

of the plant. Thayer said the steam was moving up to 20 percent faster than at the old rating.

Thayer said 55 percent of the power produced by Vermont Yankee is provided to Vermont utilities. He said the other 45 percent is distributed around New England.

Thayer said the plant would be running at 105 percent for at least the next four days to analyze data from sensors placed throughout the reactor vessel. He said the next three uprate phases could take the plant at least 20 days to reach its new maximum capacity of 120 percent.

## Plant 'noise' part of process

By PETER J. CLEARY

Keene Sentinel

March 9, 2006

VERNON, Vt. -There's no safety concern related to a snag in the power boost at Vermont Yankee power plant, according to company officials, but further noise issues like the one the plant is currently experiencing could recur as plant operators continue to increase power.

The power boost did cause noise within the plant's steam pipes to exceed a limit outlined in the monitoring plan the company filed with the Nuclear Regulatory Commission as part of the power increase approval, both company and NRC officials confirmed this morning. Last weekend Vermont Yankee completed the first stage of a plan to boost power production by 20 percent. After the initial 5 percent increase, the monitoring plan required the company to pause for at least 96 hours before continuing with the boost.

During the pause, operators learned the plant had exceeded a limit for noise within the pipes, said Jay K. Thayer, vice president of Entergy Nuclear Northeast, which operates Vermont Yankee. That limit was set in an NRC-reviewed monitoring plan, and exceeding it warrants a deeper analysis, but it doesn't require Vermont Yankee to reduce power production. The noise is likely caused by steam in the main pipe rushing by a side pipe, Thayer said. It's similar to what happens when you blow air across the top of a soda bottle and make music. And here's why it's an issue: Noise is essentially vibrations of gas particles. When you're listening to your favorite Jessica Simpson song, the particles vibrating are the air around you. In the steam pipes, it's the steam that's vibrating.

This noise within the steam pipes can travel back up the pipes, Thayer said, and the noise can transfer from the steam gas to the steel plates, which are 30 to 40 feet from the pipe causing the noise. That causes vibrations in the plates. If the noise is great enough, he said, vibration in the plates could cause structural damage.

Steam dryers cracked following power boosts at the Dresden and Quad Cities nuclear power plants in Illinois, according to the NRC. And cracks in the steam dryer can result in loose parts that could affect safety and reactor operation.

The noise level at Vermont Yankee is well below the point where it's causing excessive vibrations in the plates, Thayer said. Vermont Yankee recently strengthened and reinforced the steel plates in the steam dryer, he said. If the power boost hadn't been anticipated, he added, the plates may not have been upgraded.

There are two thresholds regarding noise in the pipes during a power boost, said NRC spokeswoman Diane Screnci. The higher threshold requires the company to lower power production while it figures out what's going on. The lower requires further analysis, but no change in power production during that analysis.

That lower level threshold for noise in the pipes is what Vermont Yankee exceeded during the initial power boost, she said. It's 80 percent below the threshold that would require plant operators to lower power, and Screnci said the company can change the lower threshold without NRC approval. That's not something Vermont Yankee is looking

at doing, said company spokesman Robert Williams. And operating at the current level is fine, Thayer said. "I don't think this is a problem," he added.

Screnci said the NRC agrees.

The NRC is confident the mathematical model represents what is actually happening on the dryer plates, Screnci said. The noise limits are set conservatively, she added, well below the level where problems would occur. And the noise may go away when the company further increases power, Thayer said. There are no issues in other parts of the plant, Williams said this morning. But Raymond G. Shadis of the New England Coalition, said the noise is not a good indication, especially in light of what happened at the Quad Cities plant. "It's not a pretty picture," he said.

The New England Coalition, an anti-nuclear group, worked to block the boost. Shadis said he's also concerned that the noise could cause further problems for small cracks that already exist in dryer plates. The cracks are on interior dryer plates, Thayer said, adding that there are no cracks on the plates adjacent to the steam pipes.

The company does want to look at the noise carefully, though, because of problems with vibration II on dryer plates at a midwest plant, he said. And, Screnci said the NRC will independently review the analysis of changes associated with the boost. The independent analysis would have occurred even if the noise threshold had not been exceeded, she added. Following the first stage of the power boost, Vermont Yankee is generating 26 more megawatts for the New England electrical grid. That's enough to provide power to about 26,000 homes, according to Williams.

## **Yankee holds at 105% while it studies noise**

March 9, 2006

By Susan Smallheer

Rutland Herald

BRATTLEBORO — Vermont Yankee nuclear power plant will hold its power increase to 5 percent for the foreseeable future as its owners analyze a potentially harmful high-frequency noise coming from one of the plant's steam lines.

Entergy Nuclear is concerned about the potential for damage to a component called the steam dryer, which removes moisture from the highly pressurized steam before it is piped to the electrical turbines. The dryer has been a source of significant problems at four Midwest reactors that are similar in design to Vermont Yankee and underwent similar power increases.

The Nuclear Regulatory Commission approved the 20 percent power boost for Vermont Yankee last week after more than two years of study. But the NRC made the approval dependent upon a detailed testing protocol as the 33-year-old reactor increases power.

Neither the company nor the NRC could say Wednesday when the power increase will resume.

On Saturday, only four hours after the plant started the higher flow of water in the reactor speeding up the nuclear reaction, plant technicians detected a noise coming from a monitor on one of the plant's main steam lines.

That noise could be compared to the proverbial opera singer, whose high pitch shatters the crystal glass, according to Entergy site vice president Jay Thayer.

He said the acoustic problem wasn't completely unexpected, adding that Entergy expected there might be other problems in the weeks ahead as the plant gradually ramped up power production to 120 percent of its original licensed rate, to 650 megawatts.

Thayer said data collected from dozens of small sensors on the steam lines at the reactor had been sent to General Electric in North Carolina for analysis. Vermont Yankee is a GE-designed reactor.

He said the data would be run through a computer model for four days to determine whether the noise could mean problems for the plant.

Meanwhile Wednesday, the anti-nuclear group New England Coalition filed an appeal with the Vermont Supreme Court and the state Public Service Board, saying the PSB violated its own procedures when it signed off on the power boost last week.

Raymond Shadis, senior technical advisor for NEC, said his group was seeking an injunction to stop the uprate because the detailed engineering studies promised in its state permit were never fully performed.

"Maybe this injunction will take root and we will put a stop to this experiment on the Connecticut (River) until a real diagnostic, reality-based inspection can be done," Shadis

said. "Our job is defending the people of the region and the environment from nuclear pollution."

Entergy spokesman Robert Williams said the appeal wasn't warranted.

"The NRC's work was reviewed by the Advisory Committee on Reactor Safeguards, which found that the uprate would be safe," he said.

"We're very confident that the Vermont Supreme Court will affirm the board's decision, coming as it did on the heels of this unprecedented safety review," he said.

William Sherman, the state nuclear engineer with the Department of Public Service, said the company was doing "additional calculations to investigate the consequences of this."

"We need to watch these tests carefully because of potential concerns," he said, noting that the department had recently reached a memorandum of understanding with the company on potential problems with the steam dryer.

"I know this sounds like a platitude, but we are watching this very carefully," Sherman said.

The state is concerned that the steam dryer could lead to reliability problems, which in turn would lead to higher electrical costs for Vermont consumers. Vermont Yankee provides one-third of all the electricity used in the state.

Thayer said that the problem at the plant wasn't due to a traditional vibration such as shaking of pipes, which is another long-standing concern at Vermont Yankee.

He said the acoustic vibration reached an administrative limit set by Entergy. That limit is 20 percent below the NRC regulatory limit, he noted.

He said the force of the high-pressure steam rushing through the plant's piping system created noise similar to blowing on a flute. And he said the company believed the unexpected noise was coming from a small line off one of the main steam lines.

Entergy downplayed the significance of maintaining the hold beyond the NRC-protocol of 96 hours, which expired Wednesday, saying there was no safety problem and that federal regulators said it was OK to remain at the elevated power level.

Thayer said he was pleased the company was already generating 29 additional megawatts of power for the regional power market.

## **Power boost halted at 5 percent indefinitely**

**Boston Globe** March 9, 2006

BRATTLEBORO, Vt. --The federal Nuclear Regulatory Commission said yes, the state Public Service Board said yes, but a 33-year-old nuclear plant part called a steam dryer may be saying no.

The Vermont Yankee nuclear plant last week cleared the final regulatory hurdles to increase its power output by 20 percent. But it was told to do so in 5 percent increments, pausing after each to take readings from new instruments designed to read stresses on the plant's steam lines.

Officials at the plant, in Vermont's southeastern corner, said Wednesday that the planned 96-hour pause after the first 5 percent increment had been lengthened indefinitely while computer models are run to determine the possible effects of vibrations picked up by the steam dryer monitoring system.

The steam dryer, which takes much of the moisture out of high pressure steam before it is sent to the plant's electrical turbines, has been the source of problems at four Midwestern nuclear plants of similar design to Vermont Yankee that have tried to boost their power output.

Site Vice President Jay Thayer, the top official with plant owner Entergy Nuclear in Vermont, said the new measuring devices had picked up a noise from high-pressure steam blowing through a pipe. He likened it to the sound produced by a flute.

But it wasn't music to the ears of Yankee engineers.

Thayer said the acoustic vibration hit a limit set by Entergy, which is still 20 percent below the limit set by the NRC.

Meanwhile Wednesday, a nuclear watchdog group filed an appeal with the Vermont Supreme Court saying the Public Service Board erred when it gave final approval for the power boost last week.

The New England Coalition argues in court papers that a key condition contained in the March 2004 conditional approval it gave for the power boost had not been met. That condition called for the NRC to do an independent engineering analysis at the plant.

In issuing its final approval last week, the board acknowledged that the NRC had not done exactly what it had asked, but said the federal agency's review was sufficient.

Entergy spokesman Robert Williams also argued that the NRC review was thorough, and said the appeal was without merit.

## **Entergy Nuclear to move ahead on power boost**

March 28, 2006

By Susan Smallheer

Rutland Herald

BRATTLEBORO — Entergy Nuclear said Monday that it has determined the source of the mystery sound that had halted the power boost at the Vermont Yankee nuclear power plant, and the plant is safe to move to the next power plateau.

However, the Nuclear Regulatory Commission said it would need a couple of days to evaluate Entergy's studies and data before giving the go-ahead to boost power by another 5 percent.

Robert Williams, spokesman for Entergy, said the source of the acoustic vibration was the force of the steam traveling across a side steam line in the plant.

Williams said Jay Thayer, Entergy site vice president, had earlier compared the sound to the blowing of a flute across an open key.

"After extensive evaluation of the data gathered at this plateau, our conclusion is that the plant can be safely raised to the next plateau, and we've forwarded the results to the NRC," Williams said.

Williams said the company would wait for the NRC to review the information and see if the regulator had any questions.

"We will now evaluate the submittal, something we expect to take several days to a week," said Neil Sheehan, spokesman for the NRC, via e-mail.

After almost three years of study, Entergy received final permission from the NRC March 2, but the plant ran into immediate problems after it boosted power by 5 percent two days later.

The nuclear reactor has permission to increase power production by 20 percent.

## **VY boost continues**

By KRISTI CECCAROSSI

Brattleboro Reformer

Saturday, April 1, 2006

BRATTLEBORO -- Vermont Yankee owners will move forward with the uprate this weekend, after federal regulators ruled Friday the plant was ready for another 5 percent boost in power.

The U.S. Nuclear Regulatory Commission acknowledged that vibrations detected in one of the plant's steam lines could be dangerous, but not so much that plant owners couldn't proceed with boosting the nuclear reactor's power output.

In the beginning of March, Entergy Nuclear, owners of Vermont Yankee, won federal approval for the uprate -- a controversial plan to raise the plant's power by 20 percent. Plant engineers were to conduct the uprate in 5 percent increments.

But within days of the first power boost, vibrations were found in a steam line. That's a component that has been problematic in other "uprated" plants. Entergy suspended the uprate to analyze the vibrations. The NRC studied them, too.

Nearly a month later, both are saying they are satisfied with the results.

In the analyses, the NRC and Entergy tried to gauge how the vibrations would affect plant components in the long term. To be clear, Entergy conducted the analysis of the vibrations. The NRC reviewed Entergy's results.

Right now, explained Neil Sheehan, spokesman for the NRC, the vibrations are within allowable levels for stress on the plant's steam system.

Rob Williams, spokesman for Entergy, said the next 5 percent increase could happen as soon as this weekend. It depends on when plant staff is prepared.

After the reactor output is raised, engineers will have to hold it there for at least 96 hours to make sure the plant is still operating safely. That waiting period was spelled out in the NRC's approval of the uprate.

Vermont Yankee is 33 years old and one of the oldest operating reactors in the country. The many critics of the uprate -- local people, state politicians and nuclear watchdog groups -- have raised questions about Vermont Yankee's ability to withstand an uprate.

Despite this opposition, the uprate plan has cleared every regulatory hurdle.

There is but one stage left in which concerns about the uprate's safety will be debated.

The New England Coalition and the state's Department of Public Service have also brought arguments to the Atomic Safety and Licensing Board, a quasi-judicial arm of the NRC.

The Atomic Safety and Licensing Board could reverse the NRC's endorsement of the uprate. Short of that, the Atomic Safety and Licensing Board could put more restrictions on terms of the uprate.

This is the first uprate that's ever been brought to that board for review.

A formal set of hearings before that board has been set for September. The board will also hold a public hearing in Brattleboro to collect testimony from local people.

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## **Half-way to full power boost, nuke plant feels 110 percent**

By David Gram

Associated Press

April 2, 2006

MONTPELIER, Vt. --The Vermont Yankee nuclear plant appeared to be performing well Sunday, one day after the reactor was brought up to 110 percent of the power output for which it was originally designed, a spokesman said.

"We started increasing power at 8:30 yesterday (Saturday) morning," plant spokesman Robert Williams said. That came a day after getting approval from federal regulators to do so.

Williams said the 34-year-old plant had reached 110 percent of its original capacity at 6:30 p.m. Saturday -- that's halfway to the 20 percent power increase for which state and federal regulators gave final approval in February.

Williams said the plant appeared to be operating without problems. "So it's going very well."

The nuclear plant, in Vernon in Vermont's southeast corner, won permission to increase its power output from a rated capacity of 540 megawatts to 650 megawatts.

In approving the 20 percent power increase, the federal Nuclear Regulatory Commission agreed with plant owner Entergy Nuclear's plan to perform the increase in four increments of 5 percent each, with at least four days of testing and systems checks between each one.

After the plant reached 105 percent of original capacity on March 4, instruments picked up new sounds from a steam line coming off the reactor. That prompted concerns that Vermont Yankee might be heading for the sort of trouble that some other nuclear plants that have tried to increase power have experienced.

That problem is cracking in a key plant component called the steam dryer, which removes moisture from the steam the plant makes before it is sent to the turbines that generate electricity.

Rather than a four-day halt in the power increase process, plant and NRC personnel took four weeks to study what the sounds being made by the steam line might mean.

Plant officials said last week that they had satisfied themselves that the sounds were not a cause for major concern. The NRC concurred on Friday and gave its permission for Vermont Yankee to take the next step in the power increase process, pushing the plant from 105 percent to 110 percent of original capacity.

"At this current plateau, the plant is producing an additional 53 megawatts for the New England electrical grid," Williams said in a prepared statement issued Saturday evening. "The 53 megawatts is enough to power approximately 53,000 homes."

He said Sunday that if all goes well, Vermont Yankee should be ready to be ratcheted up to 115 percent of its original capacity by Wednesday evening. That could put it on track to achieve its new full power limit by Sunday, April 9.

## **Yankee ramps up power output to 110 percent**

April 2, 2006

Staff Report

Rutland Herald

BRATTLEBORO — The owner of the Vermont Yankee nuclear power plant announced late Saturday that it had reached the second plateau of its power output boost, and was now generating half of its planned increase of 110 megawatts.

Entergy Nuclear spokesman Robert Williams said the reactor had reached "a second milestone" or a second increment of 5 percent, by 6:30 p.m. Saturday. The plant had started ramping up power production from 105 percent of its original license Saturday morning.

The plant will stay at 110 percent level for at least the next four days, Williams said, for testing, data gathering and analysis, as part of the testing protocol established by the Nuclear Regulatory Commission.

Vermont Yankee ran into some trouble last month with its first 5 percent increment, and spent four weeks determining the safety ramification of an acoustic vibration on the plant's steam dryer. Testing and analysis by the company and Entergy showed that the sound posed no problem to the steam dryer and the NRC gave Entergy the green light to increase power by another 5 percent on Friday.

Williams said that the reactor is now generating an additional 53 megawatts of power for the New England electrical grid. That is enough to power 53,000 homes.

## Vermont Yankee given green light to continue power increase

By David Gram, Associated Press Writer  
Boston Globe | April 5, 2006

MONTPELIER, Vt. --Federal regulators on Wednesday gave Vermont Yankee the go-ahead to increase its power output from 110 to 115 percent of historic levels, as the plant continued on a phased-in power increase of 20 percent.

"We've reviewed all the information they gathered at the 110 percent power level and have not identified any anomalies or reasons to prevent them from going to the next higher power level," said Neil Sheehan, spokesman for the Nuclear Regulatory Commission's regional office for the Northeast.

Vermont Yankee won permission in late February to increase its power output by 20 percent, from a rated capacity of 540 megawatts to 650 megawatts of electricity.

The plant's plan, approved by the NRC, called on it to achieve the increase in increments of 5 percent of its original output, pausing at 105, 110 and 115 percent, and then taking four days at each level to check plant systems and run tests to assure all was going well.

The plant brought its power level up to 105 percent on March 4, but instruments designed to measure pressure on reactor components picked up a new vibration. That caused a pause in the power increase process not of four days, but four weeks, as plant engineers ran computer models that they and the NRC said ended up providing assurance that the vibrations were not a cause for worry.

Vermont Yankee got clearance from the NRC to increase its power level to 110 percent last Friday and did so over the weekend. "The plant is performing well," Robert Williams, spokesman for plant owner Entergy Nuclear, said Wednesday.

Sheehan said the vibration picked up at 105 percent had not become a larger issue at 110 percent.

"The acoustic signal that resulted in the extended hold at the 105-percent plateau remained at approximately the same level as power was increased to 110 percent," he said in an e-mail. "The current magnitude of the signal is not expected to have any significant impact on steam dryer integrity. In other words, the reviews indicate the signal won't pose any problems during the rest of the power ascension."

Williams said preparations would take place Wednesday night and into Thursday, with the next stage of the power increase scheduled to start Thursday.

He said the preparations for the next increase would involve "ensuring that the operators are briefed and that the ... power ascension test program is fully in place."

Sheehan said the plant was given permission to go from 110 percent to 115 percent of original power after several benchmarks were met, including:

-- The plant has been monitoring its steam dryer, a key component that removes moisture before steam is sent to the generating turbines, and had to assure that test criteria were met.

-- There had to be minimal changes in gages designed to measure strain on plant components.

-- There were no new significant adverse trends in plant operations.

## **Yankee: Another 5 percent OK'd**

April 6, 2006

By Susan Smallheer

Rutland Herald

BRATTLEBORO — Federal regulators gave the owners of Vermont Yankee nuclear power plant another green light Wednesday to jump up power production another 5 percent.

Entergy Nuclear had been in a four-day holding pattern, doing tests and analysis, a requirement of its new federal license, which allows it to boost power production by 20 percent. To date, Vermont Yankee is halfway toward its goal.

Yankee had increased power early Saturday morning, but as a condition of its license it had to wait 96 hours for testing and analysis before increasing power another 5 percent.

"We could be increasing power as early as Thursday. That depends on how well the preparations go overnight," said Robert Williams, spokesman for Entergy Nuclear.

Williams said the company staff needed to make sure that the technical oversight for the next phase of power was in place, as well as the test program.

Neil Sheehan, spokesman for the Nuclear Regulatory Commission, said technical staff had reviewed data gathered by Entergy at the 110 percent power level.

"All steam dryer monitoring plan acceptance criteria have been met," Sheehan wrote in an e-mail.

"There were no significant adverse trends identified," he said.

Williams said that after the 115 percent power level, the plant will undergo several days of testing of different plant components.

## VY resumes power boost

By KRISTI CECCAROSSI

Brattleboro Reformer

Thursday, April 6, 2006

BRATTLEBORO -- Ten percent down, 10 more to go.

That's the status of a controversial plan to boost power at Vermont Yankee nuclear power plant.

Plant officials are pressing on today with the so-called "uprate," which has now raised the reactor's power 10 percent higher than its original output.

Federal regulators gave owner Entergy Nuclear the OK on Wednesday to raise power another 5 percent. So by this evening, Vermont Yankee will likely be running at 15 percent higher than its original output.

Entergy is required to boost power in 5 percent increments and then take four days at each level to run tests to assure plant systems are operating well. The U.S. Nuclear Regulatory Commission must sign off before each increase.

In the beginning of March, the NRC gave Entergy a green light on the overall uprate plan. But within days of the first power boost, vibrations were found in a steam line. That's a component that has been problematic in other "uprated" plants. Entergy suspended the uprate to analyze the vibrations. The NRC studied them, too.

Nearly a month later, both said they were satisfied with the results. And last weekend, engineers increased the power to 110 percent.

"We've reviewed all the information they gathered at the 110 percent power level and have not identified any anomalies or reasons to prevent them from going to the next higher power level," said Neil Sheehan, spokesman for the Nuclear Regulatory Commission's regional office for the Northeast.

The vibrations picked up at 105 percent had not become a larger issue at 110 percent, plant spokesman Rob Williams said. He did acknowledge, however, the vibrations were still being detected and still demanding close attention.

Williams said preparations would take place in the early hours today, with the next stage of the power increase scheduled to start sometime this afternoon.

He said the preparations for the next increase would involve "ensuring that the operators are briefed and that the ... power ascension test program is fully in place."

Sheehan said the plant was given permission to go from 110 percent to 115 percent of original power after several benchmarks were met, including:

- \* The plant has been monitoring its steam dryer, a key component that removes moisture before steam is sent to the generating turbines, and had to assure that test criteria were met.
- \* There had to be minimal changes in gauges designed to measure strain on plant components.
- \* There were no new significant adverse trends in plant operations.

Vermont Yankee is 33 years old and one of the oldest operating reactors in the country. The many critics of the uprate -- local people, state politicians and nuclear watchdog groups -- have raised questions about Vermont Yankee's ability to withstand an uprate.

Despite this opposition, the uprate plan has cleared every regulatory hurdle.

There is but one stage left in which concerns about the uprate's safety will be debated.

The New England Coalition and the state's Department of Public Service have also brought arguments to the Atomic Safety and Licensing Board, a quasi-judicial arm of the NRC.

The Atomic Safety and Licensing Board could reverse the NRC's endorsement of the uprate. Short of that, the Atomic Safety and Licensing Board could put more restrictions on terms of the uprate.

This is the first uprate that's ever been brought to that board for review.

A formal set of hearings before that board has been set for September. The board will also hold a public hearing in Brattleboro to collect testimony from local people.

## **Update: Vermont Yankee Power Increase on Hold for Data Gathering and Evaluation**

Entergy Vermont Yankee  
News Release  
April 6, 2006

Brattleboro, Vt – On Thursday afternoon, Entergy's Vermont Yankee engineers implementing the plant's Power Ascension Test Program reached the halfway point of a planned five percent increase and determined that a frequency of main steam acoustic noise had reached an administrative limit that requires additional data gathering and analysis prior to further power increases.

Since March 4, Vermont Yankee has completed three power increases for a total increased output of 12.5 percent. The plant is currently at a 581 megawatt output. The acoustic data is collected by several dozen sensitive electronic monitors located at strategic points on steam piping to ensure the acoustic noise produced in the steam does not have an adverse effect on the steam dryer used to remove liquid water from the steam.

Over the next several days, as required by the Power Ascension Test Program, steam acoustic data will be evaluated by Entergy and General Electric engineers and shared with the Nuclear Regulatory Commission. Further analyses will be used to verify that the acoustic signals measured at this power level will have no short- or long-term impact on the reliability of the steam dryer at the next higher power level.

Jay Thayer, Entergy Vermont Yankee site vice president said "By holding at this power level, we are ensuring we maintain ample margins to ensure plant reliability. The power ascension process continues to be deliberate, measured and controlled. We will maintain the plant output at the current power plateau until the additional analysis is completed." At this current plateau, the plant is producing an additional 65 megawatts for the New England electrical grid. The 65 megawatts is enough to power approximately 65,000 homes.

Entergy Nuclear's online address is [www.entergy-nuclear.com](http://www.entergy-nuclear.com)

## **New noises force halt to Vermont Yankee power boost**

By David Gram

Associated Press

April 6, 2006

MONTPELIER, Vt. --The Vermont Yankee nuclear plant on Thursday again halted the process of trying to increase its power output by 20 percent after instruments picked up new indications of strain on a key plant component.

The plant was halfway through the third stage of the increase -- each stage equal to 5 percent of its previous power level -- when acoustic gauges picked up a sound "that requires additional data gathering and analysis prior to further power increases," Vermont Yankee said in a statement.

Thursday's development marked the second time technicians at the 34-year-old reactor have had to pause in the power increase process. A similar sound picked up at 105 percent of original power in early March caused it to stop at that level and conduct four weeks of computer modeling and reviews to determine it was safe to proceed to the next level.

The acoustic gauges are designed to give indications of strains on the plant's steam dryer, a large structure at the top of the reactor that removes water from steam before it is sent to the turbines that spin to make electricity.

The new sound, picked up when the plant reached 112.5 percent of its original power level, was of a slightly higher frequency than the one recorded at the 105 percent, Williams said.

The plant's statement said that, "Further analyses will be used to verify that the acoustic signals measured at this power level will have no short- or long-term impact on the reliability of the steam dryer at the next higher power level."

Plant officials said, and a spokesman for the federal Nuclear Regulatory Commission agreed, that Vermont Yankee is using conservative standards for what level of acoustic gauge measurements trigger a pause in the power increase.

"By holding at this power level, we are ensuring we maintain ample margins to ensure plant reliability," said Jay Thayer, site vice president for Entergy Nuclear, the plant's owner.

"The power ascension process continues to be deliberate, measured and controlled," Thayer added. "We will maintain the plant output at the current power plateau until the additional analysis is completed."

The plant's statement said that likely will take at least several days as engineers from Vermont Yankee and from General Electric, which built the plant, review data and then share their findings with the NRC.

Williams said the gauges are designed to measure the pressure of steam traveling through pipes connected to the reactor. Steam passing across the top of a T in the piping, across the hole formed by the intersecting pipe, creates a sound in a manner similar to what happens when a flutist blows across the hole in the instrument's mouthpiece.

Williams said the acoustic gauges are very sensitive, and that he could not say whether the sound would be audible to the human ear. He said the sound picked up Thursday had a pitch of about 142 hertz; that's about an octave and a half below the 440 hertz A to which most orchestras tune.

## **Power boost halted again**

By KRISTI CECCAROSSI

Brattleboro Reformer

Friday, April 7, 2006

BRATTLEBORO -- Plans to boost Vermont Yankee's power were thwarted again Thursday by a mysterious "acoustic noise." As engineers boosted the reactor's output to 115 percent of its original capacity, more stress was detected in a steam line and, for the second time since the controversial uprate was launched last month, their work was put on hold.

The plant was halfway through the third stage of the increase -- each stage equal to 5 percent of its previous power level -- when acoustic gauges picked up a sound "that requires additional analysis," according to plant spokesman Rob Williams.

That means today, Vermont Yankee is operating at 112.5 percent of its original power.

In early March, as engineers worked the plant up to 105 percent, a similar noise prompted them to stop at that level and conduct four weeks of computer modeling and reviews to determine if it was safe to proceed to the next level.

The acoustic gauges are designed to give indications of strains on the plant's steam dryer, a large structure at the top of the reactor that removes water from steam before it is sent to the turbines that spin to make electricity.

In other nuclear power plants that have been "uprated," the steam dryer has been problematic, even causing in one case for a plant to be repeatedly shut down.

The new sound, picked up when the plant reached 112.5 percent of its original power level, was of a slightly higher frequency than the one recorded at the 105 percent, Williams said.

"Further analyses will be used to verify that the acoustic signals measured at this power level will have no short- or long-term impact on the reliability of the steam dryer at the next higher power level," plant officials wrote in a prepared statement.

Plant officials said, and a spokesman for the federal Nuclear Regulatory Commission agreed, that Vermont Yankee is using conservative standards for what level of acoustic gauge measurements trigger a pause in the power increase.

"By holding at this power level, we are ensuring we maintain ample margins to ensure plant reliability," said Jay Thayer, site vice president for Entergy Nuclear, the plant's owner.

"The power ascension process continues to be deliberate, measured and controlled," Thayer added. "We will maintain the plant output at the current power plateau until the additional analysis is completed."

The plant's statement said that likely will take at least several days as engineers from Vermont Yankee and from General Electric, which built the plant, review data and then share their findings with the NRC.

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## **Vermont Yankee power boost on hold — again**

Vermont Guardian

April 7, 2006

**BRATTLEBORO** — For the second time in less than a month, Vermont Yankee officials have had to put on hold a power boost because of indications that a key component is being strained.

On Thursday afternoon, Entergy's Vermont Yankee engineers implementing the plant's Power Ascension Test Program reached the halfway point of a planned 5 percent boost and determined that a frequency of main steam acoustic noise had reached a level that forces them to stall the increase until additional data can be gathered and analyzed.

"By holding at this power level, we are ensuring we maintain ample margins to ensure plant reliability. The power ascension process continues to be deliberate, measured and controlled. We will maintain the plant output at the current power plateau until the additional analysis is completed," said Jay Thayer, Entergy Vermont Yankee site vice president, in a statement.

Since March 4, Vermont Yankee has completed three power increases for a total increased output of 12.5 percent out of a planned 20 percent boost from its 540 megawatt level.

The acoustic data is collected by several dozen sensitive electronic monitors located at strategic points on steam piping to ensure the acoustic noise produced in the steam does not have an adverse effect on the steam dryer used to remove liquid water from the steam, company officials said.

Over the next several days the data will be evaluated by Entergy and General Electric engineers and shared with the Nuclear Regulatory Commission.

Further analyses will be used to verify that the acoustic signals measured at this power level will have no short- or long-term impact on the reliability of the steam dryer at the next higher power level.

"We expect Entergy to be exhaustive in assessing the data. The company must fully understand why it is getting indications of strain on the steam dryer that are higher than projected, though still well within safe levels. We will then review that analysis, with assistance from experts at Argonne National Laboratory, to determine if we are satisfied with the results. Our approach is that the company needs to take as much time as necessary to get to the bottom of the signals before resuming the power ascension," said Neil Sheehan, a spokesman for the NRC's regional office.

"If we see a need for Entergy to go beyond what it is currently doing, we won't hesitate to tell the company to take additional steps," he added.

Skeptics of the power boost approval remain concerned that the way in which company engineers and federal regulators will not ensure that the long-term impact of running the plant at higher output levels.

In February, state and federal officials gave Entergy the go-ahead to boost power to 120 percent of its current output. But, it had to happen in 5 percent increments.

Shortly after hitting the 105-percent level on March 4, excess vibrations on one of the plant's main steam lines were detected and the company stopped the process. VY operators sent the data from gauges on the line to General Electric, the company that built the 535-megawatt reactor.

Weeks later, on March 28, Entergy sent federal regulators an engineering evaluation on the acoustic signal. In it, Entergy concluded that power ascension to 110 percent was safe and justified. Days later, staff at the Nuclear Regulatory Commission (NRC), with help from consultants at the Argonne National Laboratory, agreed and Entergy began boosting power to 110 percent.

It is under this new testing regime that the new steam line problem was detected.

Entergy had agreed to hold the power output at 110 percent for 96 hours to determine if it was safe to continue. That time limit ended Thursday morning, but federal regulators gave the green light to VY late Wednesday.

NRC technical staff determined that all steam dryer monitoring plan acceptance criteria had been met and there had been "minimal overall change" in the strain gage data during the boost from 105-percent to 110-percent power, Neil Sheehan, an NRC spokesman, told the Guardian on Wednesday.

Entergy officials have said they are committed to safety, and will not increase power further until it can be done safely. Entergy has invested an estimated \$60 million in uprate modifications at the Vernon reactor, and stands to earn an estimated \$20 million in annual profits from the sale of increased power, according to state officials.

## **Group seeks halt to uprate**

By KRISTI CECCAROSSI

Brattleboro Reformer

Saturday, April 8, 2006

BRATTLEBORO -- Lawyers for a nuclear watchdog group are calling for an immediate halt to Vermont Yankee's power boost, and they're asking the state's highest court to step in.

A firm representing the New England Coalition filed an injunction on Friday, claiming the controversial boost in the plant's output is posing an imminent danger to the public.

In March, plant engineers began incrementally increasing power and twice -- including once this week -- they've had to put those plans on hold because the uprate may have been putting too much stress on plant systems.

Attorneys cite those incidents, as well as other factors, as proof that the uprate needs to be suspended until further study of the plant's safety is done.

The New England Coalition's legal documents were submitted late Friday afternoon to the Vermont Public Service Board, a quasi-judicial panel that deals with the state's utilities. The board authorized the uprate and to suspend it, New England Coalition attorneys must first petition the board.

The board apparently issued a late order saying it would not stop the uprate. That means the New England Coalition's appeal will go directly to the Vermont Supreme Court on Monday.

Right now, Vermont Yankee is operating at 112.5 percent of its original power capacity. On Thursday, engineers were in the process of boosting the reactor's output to 115 percent -- marking the third incremental power increase -- when stress was detected in a steam line. That's a component that has been problematic in other nuclear power plants that have been "uprated."

"This underscores the importance of conducting an immediate and thorough evaluation of the plant," Burlington attorney Ronald Shems wrote in the New England Coalition's filing on Friday. "Each incremental power increase further imperils (the plant's) reliability."

The New England Coalition has been fighting the uprate since it was first proposed more than two years ago. It has challenged Entergy Nuclear, Vermont Yankee's Mississippi-based owners, in state and federal proceedings on the issue.

Coalition members insist that the 34-year-old Vernon reactor, one of the oldest in operation in the country, cannot withstand the increased pressure of a full 20 percent power uprate.

Hundreds of residents, state and local officials have also criticized the uprate. To assuage some of their concerns, Entergy and federal nuclear regulators created an uprate plan whereby plant engineers would raise power in 5 percent increments and hold at each level for four days of analysis.

Ray Shadis, technical adviser for the New England Coalition, says the results of the first month of the uprate show that so-called "Power Ascension Test Program" isn't enough.

"The whole reason for that program was to show that Entergy couldn't demonstrate with analysis that the steam dryer would survive at 120 percent," he said. "Even if they inch it up carefully, it's all still an experiment."

Rob Williams, plant spokesman, said Entergy and U.S. Nuclear Regulatory Commission officials are studying the pressure caused by this week's power increase. He said by early next week, officials will have a clearer sense of when and how they will proceed with the update.

## **Yankee power boost back on**

Plant holding at 115% of former capacity

Sunday, April 23, 2006

DAVID GRAM

Associated Press

MONTPELIER, Vt. — Vermont Yankee's on-again, off-again power increase is on again.

Technicians at the 34-year-old nuclear plant in Vernon began the process of increasing the plant's power output by 20 percent, from a rated capacity of 540 megawatts to 650 megawatts in early March, after receiving final regulatory approvals in late February.

But they'd twice halted the increase, which is being done in stages equal to 5 percent of the original power level, to check out sounds that instruments are picking up that may indicate undue strain on plant components.

The second unplanned hiatus in the power increase process ended Friday evening, when officials at the Nuclear Regulatory Commission told Vermont Yankee that it could increase its power output by another notch, from 112.5 percent to 115 percent of its original output.

Neil Sheehan, spokesman for the NRC's Northeast regional office in King of Prussia, Penn., said in an e-mail that "NRC staff, with support from its consultants at Argonne National Laboratory, completed its review of the information. The NRC staff had no objections, based on that review, to Vermont Yankee continuing with the power ascension to the next plateau, 115-percent power."

Vermont Yankee spokesman Robert Williams said the 115 percent level was reached at 11 a.m. Saturday. "Since March 4, Vermont Yankee has completed power increases totaling 81 megawatts for the New England electrical grid," Williams said in a statement released by e-mail. "The 81 megawatts is enough to power approximately 81,000 homes."

Sheehan and Williams said when the plant hits 115 percent, it will pause for 96 hours, or four days, to collect data on how it's performing at the new power level.

The four-day pauses were to occur at 105, 110 and 115 percent of original power before the plant was given the green light to go to 120 percent. But twice, once at the 105 percent level and again halfway between the 110 and 115 percent levels, instruments have picked up sounds indicating possible strain on the plant's steam dryer.

The steam dryer is a large unit at the top of the reactor that removes moisture from the steam made by the boiling water reactor before it is sent to spin the plant's turbines. Officials with Vermont Yankee's owner, Entergy Nuclear, and the NRC have expressed concern about the steam dryer because steam dryers have cracked at some other nuclear plants around the country that have increased power.

Sonic signals picked up when the plant hit 105 percent of original power in early March caused it to stop the power increase process for four weeks, while Vermont Yankee officials joined their counterparts from General Electric, which built the plant, and the

NRC in reviewing the data and determining the plant could proceed to the next power level.

Vermont Yankee appeared to clear the 110 percent hurdle without any significant problems, but officials said on April 6 that the power increase had been halted again at 112.5 percent because of a new sonic signal — this one at a slightly higher frequency than the one picked up at 105 percent. That caused the most recent pause in the power increase process, this one lasting about two weeks.

## **Nuke wins approvals to store more waste, finish power boost**

By David Gram, Associated Press Writer

April 26, 2006

MONTPELIER, Vt. --The Vermont Yankee nuclear plant got two green lights on Wednesday: State regulators said it could store highly radioactive waste in concrete canisters on the plant grounds, and federal regulators said it could complete its 20 percent increase in power output.

The Vermont Public Service Board approved "dry cask storage," of spent nuclear fuel at Vermont Yankee, lifting the threat that running out of room in its existing spent fuel storage pool would cause the plant to close by 2008.

"The board found that the construction of the facility can occur without undue harm to the natural environment, without increased safety risk and without affecting the reliability of Vermont Yankee," the PSB said in a statement accompanying its approval.

Also Wednesday, the federal Nuclear Regulatory Commission told Vermont Yankee's owner, Louisiana-based Entergy Nuclear, that it could complete the last stage of its 20 percent of its original power output, going from 115 percent to 120 percent of its original power level. The plant's rated capacity is being increased from 540 megawatts to 650 megawatts of electricity.

The plant needed both state and federal approval for the power increase; the Public Service Board granted its final approval in early March. It needed only state approval for the dry cask storage plan.

"It you're using a cask already approved by us, the licensee doesn't require NRC approval" to begin storing waste in the large concrete and steel structures, said Diane Screnci, spokeswoman for the NRC's regional office for the Northeast.

Vermont Yankee spokesman Robert Williams said, "We're still looking at the specifics of the Public Service Board order. But it represents progress to securing the state's future energy supply. They (the board) agreed that our going to the dry mode of storage won't unduly harm the environment or increase safety risk."

Williams said plant officials were looking especially at conditions the board had put on its approval. Among them:

-- Entergy "must submit financial assurances to show that it will manage spent fuel through the decommissioning of Vermont Yankee," which might not be completed until 2082.

-- The approval only covers waste generated until the plant's current license expires in 2012. The plant has applied for a 20-year license extension.

-- Entergy may not store waste from any site other than Vermont Yankee at its property in Vernon.

During a tour offered to media and regulators in September, Vermont Yankee officials showed off the area where they planned to build a 76-by-132-foot reinforced concrete pad on which the casks, 20 feet high and 11 feet across and weighing 190 tons each, would be placed.

Plant officials said that the pad would be at 252 feet above sea level, about 210 feet from the Connecticut River. It's been estimated that there would be one flood in 500 years in which the river passing the plant would rise to 231 feet above sea level, 21 feet lower than the pad.

At a public hearing that followed the tour, some nuclear industry critics said they worried that installing dry cask storage at nuclear plants around the country would take the pressure off long-stalled efforts to find a permanent disposal site for the waste, some of which is estimated to remain radioactive for tens of thousands of years.

Many of the same critics say they're bothered by Vermont Yankee increasing its power output, which will produce radioactive waste at a faster clip.

Despite those concerns, and questions about how well the 34-year-old reactor would respond to being run at 120 percent of its original capacity, the NRC gave final approval for the power boost in late February, agreeing with the plant's plan to achieve the increase in stages equal to 5 percent of its original power output.

On Wednesday, the NRC gave the plant the go-head to go to 120 percent of its original capacity. That OK came after a process that included two weeks-long pauses, at 105 percent and 112.5 percent, as plant technicians and regulators studied indications picked up by instruments of stresses on the plant's steam dryer.

That's a key component that removes moisture from the steam the plant makes before it is sent to the turbines that make electricity. Some other plants around the country have experienced cracking in their steam dryers after increasing their power output.

## **VY gets approval to complete its power boost**

By ANDY ROSEN, Reformer Staff

Thursday, April 27

VERNON -- Vermont Yankee has been cleared to complete its uprate.

After several pauses -- some planned, others not -- the plant is now cleared to make its final power ascension to 120 percent of its original output.

On Wednesday morning, the Nuclear Regulatory Commission announced that it had no objections to Vermont Yankee completing the last leg of its power increase.

Plant spokesman Rob Williams said Vermont Yankee is beginning preparations to finish the boost, but didn't expect it to happen on Wednesday night.

"Depending on how the preparations go, we could be at the next power level by the end of the week," he said. "We're taking every step to make sure that safety remains the highest priority."

But staff at the nuclear watchdog group New England Coalition were skeptical about the uprate's safety.

"It is clear that Entergy and the NRC are rushing forward in a dangerous experiment which shows a lack of concern for due process and the interests of the public who have been vocal in opposing the uprate," the group said in a prepared statement.

The plant boosted its power to 115 percent on Saturday. It was required to hold at that level for testing over a four-day period, which ended Wednesday at 7:11 p.m.

Engineers from both the plant and the NRC collected and evaluated data during that time.

NRC spokesman Neil Sheehan said the commission looked, among other things, at whether the plant's performance met criteria for monitoring its steam dryer.

Those criteria caused the uprate to be suspended twice, when acoustic gauges at the plant picked up noises in its steam lines, which lead to the steam dryer.

The frequencies of those noises exceeded the plant's institutional limits.

In both cases, the uprate was suspended for several weeks while engineers from Vermont Yankee and the NRC conducted computer modeling and analysis.

But since the plant increased its power to 115 percent, Williams said there hadn't been any similar problems with the steam line.

The acoustic gauges are designed to give indications of strains on the plant's steam dryer, a large structure at the top of the reactor that removes liquid water from steam before it is sent to the turbines that spin to make electricity.

That component has been problematic at other nuclear plants that have increased their output.

Sheehan said the NRC will continue to monitor for potential strains on the steam dryer even after the plant gets to 120 percent output.

"The gauges will stay in place," he said. "They weren't just installed to check through the power ascension."

## Vermont Yankee power boost stopped again

By David Gram, Associated Press Writer  
Boston Globe | April 28, 2006

MONTPELIER, Vt. --The Vermont Yankee nuclear plant had to stop short of its goal of increasing its power by 20 percent when two new problems cropped up at the plant Friday.

Plant spokesman Robert Williams said the 34-year-old Vernon reactor was running into a problem that twice before in recent weeks has prompted it to halt the "power ascension" process. The problems are acoustic signals from gauges that are picking up what may be new strains on the plant's steam dryer.

"We came up another 2.5 percent this morning to the 117.5 percent (of original power) level," Williams said. "We are on a hold (due to) the comprehensive computer analysis of steam line acoustic data and to communicate with the NRC" -- the federal Nuclear Regulatory Commission.

The NRC said later that a second problem possibly involving the steam dryer also showed up Friday. The steam dryer has been a source of problems at other nuclear plants around the country that have increased their power output. It is a large component at the top of the reactor that removes moisture from steam made by the reactor before it is sent to the turbines that spin to generate electricity.

NRC spokeswoman Neil Sheehan said the plant determined on Friday that too much moisture was being allowed to go to the turbines. "An administrative limit related to the amount of moisture in the steam flowing to the turbine was exceeded," Sheehan said in an e-mail.

Diane Screnci, who works with Sheehan as a spokeswoman in the NRC's regional office for the Northeast, said in a later interview, "You want the steam to be as dry as possible so that there's not moisture in the turbine, because that can affect the performance of the turbine."

Screnci said the cause of the excessive moisture would not be known until after engineering studies are done that likely won't be completed until at least the middle of next week.

Both she and Sheehan said the measures that caused the pause in the power ascension were set conservatively, meaning that they were designed to halt the process before any major problems develop.

Raymond Shadis, technical adviser with the New England Coalition, a group critical of the nuclear industry, said gauge readings that exceeded preset limits at 105 percent, 112.5 percent and now 117.5 percent of Vermont Yankee's original power level should not be cause for confidence.

"Apparently, (Vermont Yankee owner Entergy Nuclear) doesn't like to call this an 'experiment.' Well, it sure has the look and feel of an experiment," Shadis said. "And, if they manage to inch their way to 120%, does that mean it is safe to do it day in and day out, on a routine basis from that point forward? I think not."

Vermont Yankee won final federal and state approvals for the power boost -- known in the industry as an uprate -- in late February and early March, respectively. The plant's aim is to boost its capacity from 540 to 650 megawatts, or 20 percent.

Originally, it was to pause for engineering studies at 105, 110 and 115 percent of original power. It now has had two unscheduled pauses at 112.5 and 117.5 percent. Screnci said the pauses should not be cause for worry.

"A slow, deliberate power ascension is what we wanted the put those license conditions (the scheduled pauses) in," she said, "so that they would stop and evaluate data as it came in."

## **Vermont Yankee boosts power**

*Southern Vermont Bureau*

**Rutland Herald** April 29, 2006

VERNON — Vermont Yankee nuclear power plant boosted its power by 2-1/2 percent Friday, bringing the total power output for the plant to 117.5 percent, plant officials announced.

The Vernon-based nuclear plant will remain at that level for at least the next 10 days as engineers study steam line acoustic data and consult with the Nuclear Regulatory Commission, according to Rob Williams, a spokesman for Entergy Vermont Nuclear, the plant's owner.

This was a planned stop on the plant's path to boost its power by 20 percent, he said.

## **VY stops final hike NRC plans to monitor moisture level in dryer**

By CATE LECUYER, Reformer Staff  
Brattleboro Reformer Saturday, April 29

VERNON -- Vermont Yankee halted its final boost to complete its 20 percent uprate Friday after excess moisture was detected in the steam dryer.

VY spokesman Rob Williams said the nuclear power plant increased its power Friday by another 2.5 percent. It is now operating at 117.5 percent of its original output, and has only one more 2.5 percent boost to go before it reaches the full 120 percent capacity, which the Nuclear Regulatory Commission OK'd on Wednesday.

But NRC spokesman Neil Sheehan said the power output will remain at the 117.5 percent plateau for about 10 days while Vermont Yankee checks on above-normal levels of moisture in the steam dryer, a large structure at the top of the reactor that removes liquid water from steam before it is sent to the turbines that spin to make electricity.

"Just because they exceed (administrative limits) in the power ascension doesn't mean it's a safety hazard," Sheehan said Friday. There are many thresholds set in monitoring the steam dryer, and they are all set conservatively.

However, New England Coalition, a nuclear watchdog group, said the moisture could erode the piping in the turbine.

"From everything that we know about it, the moisture excess will not go away as they go up in power," said Raymond Shadis, the coalition's technical advisor. "At this point it's a minor amount of excess moisture carryover, but it may indicate the limits of the steam dryer."

This is the first time Vermont Yankee has produced too much moisture, Sheehan said, but it is not the first time it has had to take a close look at the steam dryer.

In the past there have been high noise levels in the plant's steam lines, and the uprate was suspended twice for several weeks -- once at 105 percent, and once at 112 percent -- so Vermont Yankee could analyze the data, said Williams.

So far, the noises have ceased since last Saturday, when the plant increased its power to 115 percent. Williams said Vermont Yankee will still analyze the frequency levels, and Sheehan said it will have to look at the moisture levels as well.

"The steam dryer monitoring plan requires that if an administrative limit is exceeded, Entergy must promptly suspend power ascension until an engineering evaluation concludes that further ascension is safe," Sheehan said in a prepared statement.

"Therefore, Vermont Yankee will remain at the current power level until Entergy completes this evaluation and the NRC reviews it. That process isn't expected to be wrapped up until sometime next week."

But in the last stages of the power boost, anti-nuclear groups remain skeptical about the safety of the plant.

"If they manage to nurse this thing, inch by inch, up to 100 percent, what does that prove?" asked Shadis. "Should that be assurance you can do it every day? Just throw the switch and move forward? I don't think so."

The New England Coalition, the Citizens Awareness Network and members of the former Vermont Yankee Decommissioning Alliance will hold a public meeting in Montpelier on Sunday to discuss strategies to halt the uprate.

"For the first time in a long time it is a statewide issue," Shadis said. "The people in northern Vermont tend to forget the state hosts a nuclear power station."

## **Nuclear plant gets OK for final stage of power increase**

By David Gram, Associated Press Writer

May 4, 2006

MONTPELIER, Vt. --Federal regulators on Thursday cleared the Vermont Yankee nuclear plant for the final stage of its 20-percent power increase.

"Entergy (Nuclear, Vermont Yankee's owner) has completed its evaluation justifying further power ascension to 120 percent power and provided that information to the NRC staff for review," NRC spokeswoman Diane Screnci said in a statement released by the agency.

"The NRC staff, with support from its consultants at Argonne National Laboratory, completed its review of the information and determined that there are no objections with continuing the power ascension process to 120 percent," she added.

The increase from a rated capacity of 540 megawatts to 650 megawatts began in early March, but three times during the process power ascension had to pause while technicians studied troublesome sounds from gauges measuring stresses on a key plant component called the steam dryer.

The steam dryer, a large unit at the top of the reactor that removes moisture from steam before the steam is sent to spin turbines and generate electricity, has been a source of trouble at some other U.S. nuclear plants that have boosted power.

At Vermont Yankee, each time the trouble signals came -- at 105 percent, 112.5 percent, and 117.5 percent of original power -- plant technicians halted the increase, collected data, and relayed the data to the NRC. The NRC and its consultant then studied the information and concluded it was safe to continue the increase.

NRC and plant officials emphasized throughout that the gauge signals that prompted the pauses were set at levels below standards set by the American Society of Mechanical Engineers, which sets limits for stresses on a wide range of industrial equipment.

At the 117.5 percent level, plant technicians picked up two signs of trouble: more acoustic signals similar to those that triggered the earlier pauses, and a new finding that the steam making it to the turbines was more moist than they wanted.

Screnci said the acoustic signals at the 117.5 percent level were not a cause for worry.

"Entergy's evaluation determined that the stress levels on the steam dryer still remain significantly below the ASME Code limit," she said.

She said much the same about the higher moisture levels reaching the turbines.

She said the "evaluation determined that the increase in moisture carryover is not considered to be a significant change from previous readings and is not indicative of steam dryer degradation."

Vermont Yankee spokesman Robert Williams said the plant expected to begin the last stage of the power ascension Friday morning. "Then we'll do data gathering at the previous levels and also do testing ... of the plant systems, including the feedwater system, testing the steam flow into the turbine and the water flow into the reactor."

Raymond Shadis, technical adviser to the nuclear watchdog group New England Coalition, said the problems the plant had as it increased power should be cause for worry.

"It would be delusional to assume that inching to 120 percent over a period of several weeks means that the plant can now be operated at 120 percent day in and day out without equipment failure and the increased risk of accidents with increased potential consequences," he said.

## **Yankee OK'd for final hike**

By ANDY ROSEN, Reformer Staff

Friday, May 5, 2006

VERNON -- Vermont Yankee is again in the clear to complete the final stage of its uprate, and the plant may increase its power as soon as this morning.

On Thursday, the federal Nuclear Regulatory Agency gave the plant a green light to finish its power ascension, and move to 120 percent of its original output.

The plant has been holding at 117.5 percent since last Friday, when engineers detected possible signs of trouble with the plant's steam dryer.

The steam dryer removes liquid water from steam before it reaches the plant's turbines, which spin to generate power. That component has been problematic at other plants that have increased their output.

Last Friday, gauges at Vermont Yankee picked up noise in its steam lines, which could indicate strain on the dryer. Also, engineers identified an increased amount of water reaching the plant's turbines.

The uprate had already been halted twice because of similar readings within the steam lines.

NRC and plant engineers spent six days reviewing data and conducting computer modeling, and officials at both organizations said they've determined it's safe to continue the boost.

The plant first reviewed its own data, then sent it to the NRC for approval.

"We looked at (Vermont Yankee's) conclusions, and what they used to reach them," said NRC spokeswoman Diane Screnci, "and we determined that we had no objections to them continuing."

Plant officials welcomed the news, and said the boost will soon be complete.

"We got concurrence from the NRC, and we're making preparations to do the final ascension," Rob Williams, spokesman for Vermont Yankee, said last night. "Depending on how the preparations go overnight, we could begin the final increase in power as soon as this morning."

NRC and plant officials emphasized that the gauge signals that prompted the pauses were set at levels below standards set by the American Society of Mechanical Engineers, which sets limits for stresses on a wide range of industrial equipment.

Ray Shadis, technical advisor for the nuclear watchdog New England Coalition, said he doubts the methods of evaluating the uprate can assure its safety.

"Anyone who believes that gingerly increasing the reactor (to 120 percent) provides any assurance that it can run that way day in and day out is deluding themselves," he said.

Shadis said the increase in power was not necessary to begin with, and the excess capacity could have been generated through other power sources.

"All of this angst and drama has been over squeezing an additional amount of power out of a reactor that no one needs," he said.

Vermont Yankee and NRC officials had initially said it would take 10 days to evaluate data before the uprate could continue.

Williams said the analysis and computer modeling took a shorter amount of time than expected, because the plant was able to work with data it already had from previous stages of the uprate.

## **Regulators approve Vt. Yankee production boost to 120 percent**

May 5, 2006

By Susan Smallheer

Rutland Herald

BRATTLEBORO — Federal regulators said Thursday they were satisfied that the most recent problems to crop up at Vermont Yankee as it was boosting power production posed no safety problems at the nuclear reactor.

The Nuclear Regulatory Commission gave Entergy Nuclear, owner of the plant, clearance to bump up the final 2.5 percent of power and reach 120 percent of its original license of 540 megawatts.

"Entergy's evaluation determined that the stress levels on the steam dryer still remain significantly below the ASME Code limit," said Diane Screnci, a public affairs officer at NRC's regional office outside Philadelphia.

ASME stands for the American Society of Mechanical Engineers.

Entergy spokesman Robert Williams said the final 2.5 percent boost in power production could come today. Entergy started boosting power production two months ago, after it received final approval from both the NRC and the state Public Service Board.

"Depending on how preparations go, it could be as early as tomorrow morning," he said Thursday.

He added that once the reactor reaches 120 percent, more tests of key components will be conducted during the weekend and next week.

Williams said the two problem areas that prompted the most recent halt in the uprate — continuing acoustic vibrations and increased moisture levels in the steam dryer — were within federal limits set in the plant's amended operating license

"The frequencies will be closely monitored," he said.

The increase in moisture, which some industry watchers say could be a result of unknown cracks in the steam dryer, was closely paralleling the increase in steam flow and power production, Williams said.

Neil Sheehan, another NRC spokesman, said the moisture levels are "not considered to be a significant change and is not indicative of steam dryer degradation."

The plant will be closely monitored for any future potential problems, he said.

Once Vermont Yankee reaches 120 percent, it will generate up to 110 additional megawatts of power. A small percentage, 10 megawatts, will eventually be sold to the Vermont Electric Cooperative.

For the time being, until there is a capability audit, the additional 110 megawatts is being sold to the previous owners of Vermont Yankee, such as Central Vermont Public Service, Green Mountain Power and six other New England utilities, Williams said.

## **Entergy Vermont Yankee Completes Power Increase Operational Tests to Check Plant System Response**

VY News Release

May 5, 2006

VERNON, VT – The Vermont Yankee Nuclear Power Station in Vernon on Friday completed a two-month process to gradually increase its electrical output by up to 20%. The plant, owned by Entergy Nuclear, is safely generating 110 additional megawatts as baseload power -- available around the clock every day -- by the ISO-New England control center in Holyoke, Massachusetts. It will serve consumers throughout the region and will further reduce the need for burning fossil fuels to generate electricity.

Entergy Vermont Yankee engineers, technicians and operators will be conducting tests during the coming week at the new power level to confirm plant system response including a required test of the feedwater system that supplies water to the reactor for steam production. The testing, which may involve a plant shutdown, will be overseen by the Nuclear Regulatory Commission.

Entergy Vermont Yankee Site Vice President Ted Sullivan said, "Vermont Yankee's focused commitment to safety throughout this power ascension is a testament to the safety culture of the plant. I also want to credit the leadership of former Site Vice President Jay Thayer for our success in this initiative. This shows what can be achieved when management and staff have safety as the top priority."

The increased power output was approved by the Nuclear Regulatory Commission (NRC) in early March after 29 months of NRC technical staff review. Their finding in favor of the power increase was backed by a recommendation in January of this year from the independent Advisory Committee on Reactor Safeguards which was established by Congress to advise the NRC on matters of nuclear safety. The NRC decision found that the power increase would be consistent with its regulations.

The Vermont Public Service Board (PSB) had previously issued a Certificate of Public Good for the power increase after a 13-month review that considered expert testimony on economic, environmental and plant reliability aspects and culminated in the issuance of a certificate of public good in March 2004. As a condition of the approval, the PSB asked the NRC to perform an additional inspection called an Independent Engineering Assessment to give the PSB an added measure of assurance that the uprate would not impact plant reliability. The NRC performed the assessment in September 2004.

During the last two refueling and maintenance outages, Entergy Vermont Yankee engineers and technicians performed work to prepare the plant for the uprate, including installing a new high-pressure turbine, new feedwater heaters and refurbishing the electrical generator. The company also conducted extensive operator training in anticipation of regulatory approval of the uprate. That work was done entirely at Entergy's expense and was completed in November 2005. The plant is scheduled for its next refueling in the Spring of 2007.

## Vermont Yankee completes power boost

May 6, 2006

By David Gram  
Associated Press

MONTPELIER — The Vermont Yankee nuclear plant on Friday completed its 20 percent increase in power output and initial tests showed it was running well and not exceeding its fenceline radiation limits, plant and federal officials said.

Vermont Yankee owner Entergy Nuclear said, though, that the plant may shut down next week during a test of the system that "provides water to the reactor for steam production."

Nuclear Regulatory Commission spokesman Neil Sheehan said the plant had reached 120 percent of its original power level, boosting its rated capacity from 540 to 650 megawatts, at about 10:30 a.m. Friday.

"Our resident inspectors at the plant and staff in our Office of Nuclear Reactor Regulation will continue to closely monitor the remaining testing as well as the continued performance of the plant at the new power level," Sheehan said in an e-mail.

The plant started the power increase process in early March, and were expected to complete it in less than three weeks. But three times plant technicians had to pause and check out signals they were getting from acoustic gauges of possibly troubling strains on the plant's steam dryer.

The plan was for a four-day pause for data collection and analysis at 105, 110, and 115 percent of the plant's original power level. The pause at 105 percent turned out to last about four weeks as the troubling acoustic signals were analyzed. Similar problems cropped up and brought the process to a halt at 112.5 and 117.5 percent of the original power level.

Sheehan said after reaching 120 percent, Entergy continued to monitor data on the steam dryer. "Once that evaluation is wrapped up, the data will be forwarded to the NRC for review," he said.

There was concern during Public Service Board hearings on the plant's request to increase power might increase radiation emitted from the plant above state limits. Sheehan said testing Friday showed that the plant was violating neither federal limits nor the more stringent state ones.

## **120 percent for Yankee**

Saturday, May 06, 2006

PETER J. CLEARY

Sentinel Staff

VERNON, Vt. — The Vermont Yankee nuclear power plant completed its planned 20 percent power increase on Friday, according to a plant spokesman, though sensors are still picking up acoustic vibrations like the ones that previously led to pauses in the power boost.

Vermont Yankee operators will spend the next week conducting tests of the plant at the full power level, according to spokesman Robert Williams.

Those include U.S. Nuclear Regulatory Commission-required tests of two pumps that send water into the reactor for steam production. The tests, which involve reducing water flow to the reactor, may cause a temporary plant shutdown, Williams said. He couldn't say how long a shutdown would last if one happens.

The pump testing is related to plant performance rather than safety, according to NRC spokesman Neil A. Sheehan.

Though tests will continue, Williams said Vermont Yankee officials are satisfied the plant is running safely at the new power level.

"Vermont Yankee's focused commitment to safety throughout this power ascension is a testament to the safety culture of the plant," Entergy Vermont Yankee Site Vice President Ted Sullivan said in a statement. Entergy Nuclear operates the Vermont plant.

Plant operators unexpectedly paused the power boost three times as they gradually increased power during the past two months. The pauses came after acoustic vibrations in the plant's steam pipes had exceeded levels outlined in the NRC-approved power boost plan.

The vibrations, if of a great enough magnitude, can cause fractures in the plant's steam dryer, which sits atop the reactors. The steam dryer removes excess moisture from steam before it's sent to spin the power turbines.

Steam dryers cracked at two midwestern plants following power boosts.

At its new long-term operating capacity, there are still vibrations in the pipes that exceed a threshold in the power boost plan.

But they're not cause for concern, said Sheehan, the NRC official, as the monitoring thresholds are set conservatively.

Members of the New England Coalition, a nuclear watchdog group that has opposed the upgrade, were unavailable for comment.

Vermont Yankee and NRC officials reviewed the potential effects of the acoustic vibrations during each pause, and Williams said the current vibrations are at a similar frequency to those noticed earlier in the power boost.

And there shouldn't be any long-term issues with the acoustic vibrations, Sheehan said. The NRC looked at long-term plant operation when it approved the power boost. Vermont Yankee recently asked the NRC for a 20-year extension of its operating license, which expires in 2012.

Vermont Yankee is now producing 650 megawatts of power, Williams said, enough for 650,000 houses.

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OF COUNSEL**

April 7, 2006

Susan Hudson  
Clerk  
Vermont Public Service Board  
112 State Street, Drawer 20  
Montpelier, Vermont 05620-2701

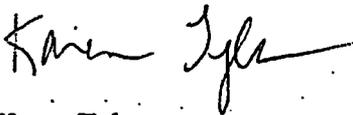
Re: Petition of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc., Pursuant to 30 V.S.A. 248, for a Certificate of Public Good to modify certain generation facilities. Docket No. 6812.

Dear Ms. Hudson:

Please find enclosed for filing in the above stated matter New England Coalition's Request For Expedited Decision On Motion For Injunction Pending Appeal.

Thank you for your attention to this matter.

Sincerely,



Karen Tyler

Enc.

Cc: Docket 6812 service list

Exhibit 6

STATE OF VERMONT  
PUBLIC SERVICE BOARD

Petition of Entergy Nuclear )  
Vermont Yankee, LLC et al. )

No. 6812

**NEC'S REQUEST FOR EXPEDITED DECISION ON MOTION FOR  
INJUNCTION PENDING APPEAL**

New England Coalition (NEC) requests the Board's expedited consideration of NEC's Motion for Injunction Pending Appeal. Yesterday's detection of vibrations in the Vermont Yankee plant's steam system demonstrates that uprate operation places the plant at an immediate risk of major component or system failure that would result in a significant to complete loss of reliability. Attachment 1, Supplemental Affidavit of Arnold Gundersen. This underscores the importance of conducting an immediate and thorough evaluation of the plant, through a Vertical Slice Inspection of four systems as ordered by the Public Service Board on March 15, 2004, prior to increased power ascension of this aged plant. *Id.* Each incremental power increase further imperils reliability. *Id.* Irreparable harm to NEC members and the public would result from a reliability failure.

April 7, 2006

New England Coalition

by:

  
\_\_\_\_\_  
Ronald A. Shems  
Karen Tyler (on the brief)  
SHEMS DUNKIEL KASSEL & SAUNDERS PLLC  
For the firm

Attorneys for NEC

**SUPPLEMENTAL AFFIDAVIT OF ARNOLD GUNDERSEN**

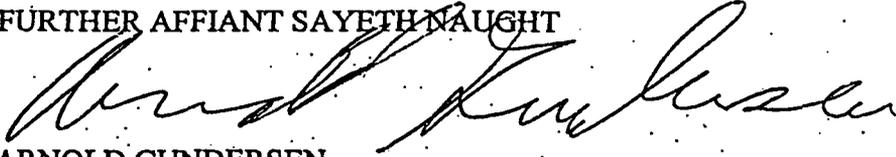
Arnold Gundersen, being over the age of eighteen (18) years, having personal knowledge of the facts contained in this Affidavit, and being properly sworn, states the following:

1. I am providing this supplemental affidavit regarding the Public Service Board's decision to grant Entergy a Permit to Uprate Power at Vermont Yankee and based upon new information. My credentials were submitted in my first affidavit filed March 8, 2006 as an attachment to New England Coalition's Motion for Stay Pending Appeal.
2. I understand that the NRC has frozen the Vermont Yankee uprate at 112.5 percent of design capacity, after a measurement taken on Thursday, April 6, 2006 recorded vibrations in the steam system, indicating stress on the plant's steam dryer, which exceeded acceptable levels.
3. Each 5 percent ascension in power at the Vermont Yankee plant represents an increase of 100,000 thermal horsepower.
4. Without a "Vertical Slice Inspection", as the Public Service Board held to be necessary on March 15, 2004, it is not possible to determine whether the operation of the Vermont Yankee plant under the tremendous stress of a 20 percent uprate will jeopardize the plant's reliability. The effects of the uprate to date indicate that there may be significant problems.
5. Specifically, the stress on the plant's steam dryer detected on April 6, 2006 suggests that a failure or even disintegration of the steam dryer under uprate conditions is a real

possibility. Steam dryers have failed under uprate conditions at several other nuclear plants during the past four years. A failure of the steam dryer may damage other plant systems.

6. Without a "Vertical Slice Inspection", it is not possible to determine how other Vermont Yankee plant systems would respond to a failure or disintegration of the steam dryer. Nor is it possible to adequately determine the reliability of other portions of the plant.
7. Moreover, the stress detected in the steam system is a likely bellwether of other potential weaknesses in the 33-year-old Vermont Yankee plant, suggesting that other components of this aging plant may also fail under uprate conditions.
8. The April 6, 2006 finding of excessive strain on Vermont Yankee's steam system underscores the importance of conducting an *immediate* and thorough evaluation of the plant, through a Vertical Slice Inspection of four systems as ordered by the Public Service Board on March 15, 2004, prior to operating this old plant at 120 percent of design capacity.
9. In my opinion, under uprate conditions, the Vermont Yankee plant is at immediate risk of a reliability failure.

FURTHER AFFIANT SAYETH NAUGHT

  
ARNOLD GUNDERSEN

I HEREBY CERTIFY that on this 7th day of April 2006, personally appeared Arnold Gundersen, resident of Burlington Vermont, who is personally known to me or who produced the following identification, and he swore, subscribed, and acknowledged before me that he executed the foregoing as his free act and deed as an expert witness of said case, for the uses and purposes therein mentioned, and that he did take an oath.

In witness whereof, I have hereunto set my hand and seal in the County and State aforesaid.

OFFICIAL NOTARY Christine McLennan NOTARY PUBLIC STATE OF VERMONT

MY COMMISSION EXPIRES: 2-10-07

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