Entergy

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September 14, 2004

Docket No. 50-271
BVY 04-097
TAC No. MC0761

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

Subject: **Vermont Yankee Nuclear Power Station**
Technical Specification Proposed Change No. 263 – Supplement No. 13
Extended Power Uprate – Response to Steam Dryer Action Items

Reference: 1) U.S. Nuclear Regulatory Commission, "Summary of July 21 and 22, 2004, Meetings with Entergy Nuclear Operations, Inc. on Steam Dryer Analysis for Vermont Yankee Nuclear Power Station (TAC No. MC0761)," Meeting Summary Accession No. ML042220022, September 2, 2004

This letter provides additional information in support of the application by Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy) for a license amendment to increase the maximum authorized power level of the Vermont Yankee Nuclear Power Station (VYNPS) from 1593 megawatts thermal (MWt) to 1912 MWt. During meetings held with the NRC staff on July 21 and 22, 2004, Entergy agreed to provide certain information regarding the structural analysis of the VYNPS steam dryer. Reference 1 provides a summary of those meetings and also identifies committed actions, which are addressed by this submittal.

Attachment 1 to this letter provides Entergy's response to nine of the ten action items resulting from the aforementioned meetings. Entergy expects to provide details regarding the remaining action item by September 29, 2004.

Because the attached responses contain proprietary information as defined by 10CFR2.390, Attachment 1 has been designated in its entirety as proprietary information. A non-proprietary version of Attachment 1, suitable for public disclosure, is provided as Attachment 2 to this letter with the proprietary information redacted. An affidavit that constitutes a request for withholding of the proprietary information in Attachment 1 from public disclosure in accordance with NRC regulations is provided by the owner of the proprietary information (General Electric Company (GE)) as Attachment 3. The proprietary information in Attachment 1 is designated by double underline within double square brackets. In each case, the superscript notation, "{3}", refers to paragraph (3) of the affidavit, which provides the basis for the proprietary determination. The proprietary information has been handled and

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classified as proprietary, is customarily held in confidence, and has been withheld from public disclosure. The proprietary information contained in the responses was provided to Entergy in a GE transmittal that is referenced by the affidavit. The proprietary information has been faithfully reproduced in the enclosed responses such that the affidavit remains applicable. GE requests that the enclosed proprietary information be withheld from public disclosure in accordance with the provisions of 10CFR2.390 and 10CFR9.17

This supplement to the license amendment request provides additional information to clarify Entergy's application for a license amendment and does not change the scope or conclusions in the original application, nor does it change Entergy's determination of no significant hazards consideration. Commitments made in this submittal are contained in Attachment 4.

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

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

Executed on September 14, 2004.

Sincerely,

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

Attachments (4)

cc: (see next page)

cc: Mr. Richard B. Ennis, Project Manager (w/attachments)
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Mr. Samuel J. Collins (w/o attatchments)
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USNRC Resident Inspector (w/o attachments)
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Vernon, Vermont 05354

Mr. David O'Brien, Commissioner (w/o proprietary information)
VT Department of Public Service
112 State Street – Drawer 20
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Attachment 2

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 263 – Supplement No. 13

Extended Power Uprate

Response to Steam Dryer Action Items

REDACTED AND NON-PROPRIETARY INFORMATION

Total number of pages in Attachment 2 (excluding this cover sheet) is 25.

NON-PROPRIETARY INFORMATION

RESPONSE TO STEAM DRYER ACTION ITEMS RELATED TO EXTENDED POWER UPRATE REQUEST VERMONT YANKEE NUCLEAR POWER STATION

PREFACE

The following information is provided in response to discussions with the NRC staff during meetings held on July 21 and 22, 2004, regarding the structural analysis of the Vermont Yankee Nuclear Power Station's steam dryer.

The requested actions are documented in NRC Meeting Summary, "Summary of July 21 and 22, 2004, Meetings with Entergy Nuclear Operations, Inc. on Steam Dryer Analysis for Vermont Yankee Nuclear Power Station (TAC No. MC0761)," Meeting Summary Accession No. ML042220022, September 2, 2004.

PROPRIETARY INFORMATION

This Attachment 2 is identical to Attachment 1 to Entergy letter BVY 04-097, except it has been edited to remove Proprietary Information. The removed information has been deemed to be proprietary to the General Electric Company. Instances where proprietary information was deleted from the text are identified by double square brackets. The basis for the proprietary information is contained within the affidavit provided as Attachment 3.

NON-PROPRIETARY INFORMATION

Action Item No. 1

Entergy noted that they are currently developing a plant specific acoustic analysis model for use in validating that the load definition for the steam dryer in the analysis of record is sufficiently conservative. This effort is scheduled for completion by the end of August, 2004. Entergy agreed to provide the results to the NRC and schedule a meeting to discuss with the NRC.

Entergy Response to Action Item No. 1

Entergy has contracted with Continuum Dynamics, Inc. (CDI) to develop an acoustic analysis model in support of the VYNPS steam dryer structural analysis. CDI has completed power-dependent analyses of acoustic loads on the steam dryer at power levels corresponding to 80%, 85%, 90%, 95% and 100% of current licensed thermal power (CLTP). These analyses have been reviewed by Entergy and provided to GE as input toward establishing the steam dryer's response spectra. GE is in the process of determining the plant-specific load definition for use in the structural analysis of the VYNPS steam dryer.

Entergy expects that the acoustic model will demonstrate that the VYNPS steam dryer load definition applied in the analysis of record (as described in the response to RAI EMEB-B-1 in Entergy's letter of July 2, 2004, BVY 04-058) is sufficiently conservative. Results of the acoustic analysis model will be provided to the NRC staff during a meeting scheduled to be held later this month.

NON-PROPRIETARY INFORMATION

Action Item No. 2

Entergy agreed to provide additional details on the power ascension test plan including plans for monitoring the steam dryer, as well as other plant systems and components, for flow induced vibration (FIV). This would include the acceptance criteria that will be used.

Entergy Response to Action Item No. 2

Entergy expects to provide additional details in response to this request by September 29, 2004.

NON-PROPRIETARY INFORMATION

Action Item No. 3

Entergy agreed to supply computational fluid dynamic output plots showing velocity profiles and streamlines.

Entergy Response to Action Item No. 3

The following Figures 3-1 through 3-6 illustrate the computational fluid dynamic (CFD) model and velocity streamline results for the VYNPS dryer analysis. As described in the response to request for additional information (RAI) EMEB-B-8 in Entergy's letter of July 2, 2004 (BVY 04-058), the CFD calculation was performed to determine the static differential pressure loading on the dryer plates; the mesh size and parameters (e.g., k-epsilon turbulence model) used in the model were chosen for this purpose. The results shown are for EPU power level conditions.

Figure 3-1 illustrates the geometry for the exterior boundary of the CFD model. To aid in meshing and problem convergence, the annular gaps between the vessel wall and the sides of the dryer were not modeled. There is only a narrow gap with little flow in this region. The annular gap between the dryer skirt and vessel wall was modeled in the region of the outer dryer bank and steam line nozzles.

Figure 3-2 illustrates the surface mesh on the vessel wall and vessel head from the perspective of the steam lines (90° azimuth). The notches on sides are where the annular gaps between the vessel wall and the sides of the dryer were eliminated. Figure 3-3 illustrates the surface mesh on the outer bank vertical plate and lower horizontal cover plate. [[

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Figure 3-4 shows a cross-section of the velocity streamlines through the entire model. The center bank of the dryer is made up of two halves. The halves are oriented such that the steam exits are on opposite sides. This asymmetry causes the swirling flow pattern shown in the vessel head region.

Figures 3-5 and 3-6 show the velocity streamlines in the chamber formed by the outer hood and vessel wall. The flow tends to come down the center of the chamber where the flow area is greatest, then moves horizontally toward the steam line nozzles. This horizontal flow component creates a vortex at the entrance to the nozzle.

NON-PROPRIETARY INFORMATION

Figure 3-7 shows the pressure distribution over the outer hood vertical plate. The local low pressure regions are caused by the vortices at the entrances to the steam line nozzles. The inner white circles represent the steam line nozzles at the vessel wall. The outer white circles represent the ends of the steam lines in the CFD model. The pressure distributions over the other surfaces of the dryer are fairly uniform.

NON-PROPRIETARY INFORMATION

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Figure 3-1: Exterior Boundary of CFD Model

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Figure 3-2: Surface Mesh in Steam Dome Region

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Figure 3-3: Surface Mesh for Outer Hood Vertical Plate and Lower Horizontal Cover Plate

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Figure 3-4: Velocity Streamlines – Dryer and Steam Dome Region

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Figure 3-5: Velocity Streamlines – Outer Hood and Steam Line Entrance

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Figure 3-6: Velocity Streamlines – Outer Hood and Steam Line Entrance

NON-PROPRIETARY INFORMATION

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Figure 3-7: Pressure Distribution – Outer Hood Vertical Plate

NON-PROPRIETARY INFORMATION

Action Item No. 4

Entergy agreed to provide a discussion of the effects of potential bi-stable flow on the steam dryer dynamics.

Entergy Response to Action Item No. 4

Potential bistable flow effects on the dryer dynamic loads were discussed in Section 2.5.2.4 of GE report GENE-0000-0018-3359-P Rev. 1, "Technical Assessment, Quad Cities Unit 2, Steam Dryer Failure – Determination of Root Cause and Extent of Condition," dated August 2003. [[

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NON-PROPRIETARY INFORMATION

Action Item No. 5

Entergy agreed to supply the basis for the stress intensity limit of 5 ksi-in$^{1/2}$ limit for the drain channel cracks.

Entergy Response to Action Item No. 5

This item is addressed in the response to Action Item No. 6, which follows.

NON-PROPRIETARY INFORMATION

Action Item No. 6

Entergy agreed to supply a discussion of the FIV and extended power uprate operating condition effect on crack growth.

Entergy Response to Action Item No. 6

The following response updates and replaces the response to RAI EMCB-A-1 that was provided by Entergy letter of July 2, 2004 (BVY 04-058) and incorporates a discussion of the effect of flow-induced vibration (FIV) and EPU conditions on crack growth. In addition, the basis for the 5 ksi-in$^{1/2}$ stress intensity limit for drain channel cracks is addressed.

RAI EMCB-A-1 was included in NRC letter dated May 28, 2004, and requested:

> *For any detected flaw in the steam dryer left unrepaired, provide a structural integrity evaluation and identify the critical flaw size for EPU conditions and the margins between the critical flaw size and the flaw size projected for the period of time that these flaws will remain in-service. The analysis should consider the potential impact on flaw growth due to the proposed EPU conditions, intergranular stress corrosion cracking (IGSCC) and fatigue. The margins should be compared to those specified in IWB-3600 of Section XI of the American Society of Mechanical Engineers (ASME) Code. An assumed IGSCC crack growth rate should be compared to those specified in NUREG-0313.*

As with many previous evaluations of visual indications in drain channel locations and vane bank end plate flaws, GE developed the justification for continued operation (JCO) using qualitative, sound engineering evaluation arguments. These discussions are presented in the response to RAI EMCB-B-2 provided by Entergy letter of July 2, 2004 (BVY 04-058). To address this request, each flaw has been further evaluated with the details of the evaluation presented below.

Drain Channel DC-V04C

For the case of the VYNPS dryer drain channel cracking, the evaluation of the inspection results (discussed further in the RAI response to EMCB-B-2) concluded that this crack is IGSCC and shows no evidence of fatigue extension at the current licensed thermal power operating condition. Several observations support the conclusion that the flaw is IGSCC: (1) It is located in the heat-affected-zone adjacent to the weld; (2) the flaw follows the grain boundaries; (3) the flaw exhibits a jagged appearance; and (4) the flaw is not straight and does not have any other characteristics of a fatigue crack. Figure 6-1 below schematically shows the length and location of the 12-inch IGSCC crack.

The initial engineering assessment dispositioned the flaw based on qualitative factors: (1) the drain channel flaw is in the non-structural portion of the dryer (i.e., not located in the skirt cylinder structure itself); (2) the drain channel flaw has not propagated the full length of the drain channel; it is only 13% of the length of the weld; (3) there is no field experience indicating that

drain channel cracking can extend the entire length of the weld; and (4) a postulated full length crack extending the full length of the drain channel would still not generate a loose piece because the two sides of the skirt plate and the pipe attachment provide enough structure to maintain integrity of the cracked location. The field experience supports the "leave as-is" operation decision, particularly in the context that the indication will be re-inspected at the next refueling outage.

The structural analysis of the 12-inch long IGSCC flaw determined the margins between the critical flaw size and the flaw size projected for the period of time between refueling outages. This process required two steps. First, IGSCC crack growth was assumed during future operation at a rate of $5x10^{-5}$ in/hr on each end, consistent with established BWRVIP growth rates (which is also consistent with the IGSCC rates given in NUREG-0313). This growth will be independent of any fluctuating loading since it is dependent only on the sustained loads, which in this case are the residual stresses from the dryer fabrication. The fuel cycle length at VYNPS, time between refueling outages, is nominally 18-months (13,140 hrs). The predicted IGSCC growth for the next fuel cycle is then ($5x10^{-5}$ x 13,140) or 0.66 inch at each end of the indication. This translates into a projected increase in crack length from 12.0 inches to (12.0+0.66+0.66) or 13.32 inches. This is the crack length (2a) that was used in the fracture mechanics evaluation.

The next step was to evaluate the crack length at which fatigue crack growth could occur. Note that this flaw shows no indication of growing rapidly due to fatigue, and there is no evidence of this occurring for similar flaws at other BWR steam dryers. The fluctuating loading for the fatigue crack growth is the FIV loading. It is well established that fatigue will only occur when the applied stress intensity factor range exceeds the threshold stress intensity factor (ΔK_{th}). For stainless steel at 550°F, this value is conservatively assumed to be 5 ksi-in$^{1/2}$. The basis for this assumed value is discussed next.

The ΔK_{th} for a material is a strong function of the R-ratio (ratio of minimum to maximum stress or load). The mean stress significantly affects the R-ratio (the higher the mean stress, the higher the R-ratio). For a through-wall flaw geometry, the relevant mean stress is the average membrane stress through the thickness. The only potential source of significant mean stress at this location is the weld residual stress. However, the weld residual stress distribution through the thickness is expected to be self–balanced (i.e., no net membrane stress). Therefore, the R-ratio at this location is expected to be low (less than 0.5). Figure 6-2 below shows the results of crack growth rate experiments conducted by GE on type 304 stainless steel to determine the ΔK_{th} value (Reference 1). A threshold in crack growth is reached when the experimental crack growth rate curve turns perpendicular to the X- or ΔK axis (see Figure 6-2). A review of Figure 6-2 shows that for R-ratios 0.5 or less, the ΔK_{th} values are well in excess of 5 ksi-in$^{1/2}$. This value is also consistent with that reported in Reference 2.

Strain gage data from an overseas BWR measured on the drain channel was used to determine the magnitude of the peak alternating stresses that would be present. The measured maximum peak-to-peak stress was 0.5 Kg/mm^2 or 709 psi. The main steam line velocity at this plant was

NON-PROPRIETARY INFORMATION

141 ft/sec. At VYNPS, the main steam line velocity at EPU conditions was determined as 168 ft/sec. Therefore, to convert the measured stress of 709 psi to a VYNPS-specific value, a multiplier equal to $(168/141)^2$ or 1.42 was used. The use of velocity-ratio-squared as the multiplier is consistent with the recommendation in Appendix N of the ASME Code, Section III that deals with the treatment of dynamic loads. Also, the exponent of 2 is consistent with the average of the exponents obtained in the development of the generic fluctuating load definition. Thus, the membrane stress used in the fracture mechanics evaluation was (709 x 1.42) or 1,007 psi or 1.0 ksi.
The applied ΔK value for the predicted end-of-life crack length (2a) of 13.32 inches was then calculated. The crack configuration was idealized as a through-wall crack in an infinite plate. The stress intensity factor K was calculated as follows:

$$\Delta K_{applied} = \sigma\sqrt{(\pi a)}$$

With the peak-to-peak stress of 1.0 ksi and the value of 'a' equal to (13.32/2) or 6.66 inches, the applied stress intensity factor value was calculated as 4.61 ksi-in$^{1/2}$. Since this value is less than the threshold value of 5 ksi-in$^{1/2}$, the subject indication is not expected to grow by fatigue during the next cycle of operation. Another way to look at the available margin is to determine the crack length at which fatigue crack growth is predicted. Using the preceding equation, this crack length was determined as 15.6 inches. In other words, the applied stress intensity factor at the crack length of 15.6 inches is exactly equal to the threshold value of 5 ksi-in$^{1/2}$. This would be predicted to occur after 32 months of additional operation. The conclusion of the analysis is consistent with the current observations that the crack is purely IGSCC. It also supports the current disposition of the flaw. The analysis is also consistent with the field occurrences of fatigue cracking in drain channels. In those cases, the cracking initiated at the lower end of the skirt, a location where cyclic stresses could produce displacements leading to crack initiation.

Drainpipe Indication

All characteristics of this indication lead to the conclusion that it is also IGSCC. Its observed circumferential length is 3.0 inches. In that there are no significant alternating loads, the only concern is lengthening by IGSCC. Using the rate of 5×10^{-5} in/hr on each end, consistent with established BWRVIP growth rates over 18-months of operation, the predicted crack would reach 4.2 inches, 33% of the circumference. Secondly, even if more cracking were to occur, the pipe would remain captured in the skirt since it was inserted into the skirt prior to welding as detailed in the steam dryer fabrication drawings and would need to displace significantly in order to become disengaged. This additional engagement provides another source of structural margin. Therefore, continued operation with this flaw is also fully acceptable.

Vane Bank End Plate Flaws

For the case of vane bank end plate flaws, the assessment is based on the following factors: (1) it is a highly redundant structure and there is no structural consequence of the cracking, and

NON-PROPRIETARY INFORMATION

(2) postulated significant flaw extension leading to the flaw reaching the full section of the channel geometry would not cause a structural concern or create the opportunity for loose parts. The field experience supports the "leave as-is" operation decision in the context that the indication will be re-inspected at the next refueling outage.

The dryer unit end plates with indications are securely attached and captured within the structure of the steam dryer bank assembly. The vertical edges of these end plates are attached to the dryer assembly with 3/16-inch fillet welds (each weld approximately 48-inches long). There were no relevant indications reported in these vertical welds. The geometric configuration of unit end plates is such that the upper and lower edges are mechanically captured by the steam dryer assembly as shown in Figure 6-3. The reported horizontal indications were seen in the 1.25-inch inlet side end plate flange. The vanes prevent inspection of the central end plate surface, but inspection of the outlet side end plate flanges found no indications. For the purpose of this discussion it is postulated that the end plate horizontal indications propagate across the entire 8.75-inch unit end plate width including both the inlet and outlet side flange, as shown in Figure 6-3. Such full-width, through-thickness cracks would have no structural impact due to redundancy, nor is there any concern for loose parts. The separated end plate sections, as shown in Figure 6-3, are still attached and will continue to function. Therefore, continued operation with these non-structural flaws is also acceptable.

References

(3) P.K. Liaw, M.G. Peck and H.S. Mehta, "Fatigue Crack propagation Behavior of Stainless Steels," Final Report, Contract No. 529-88B860X, April 1990 (GE Proprietary).

(4) S.T. Rolfe and J.M. Barsom, "Fracture and Fatigue Control in Structures: Applications of Fracture Mechanics," Prentice Hall, 1977.

(3) U.S. Nuclear Regulatory Commission, "Summary of July 21 and 22, 2004, Meetings with Entergy Nuclear Operations, Inc. on Steam Dryer Analysis for Vermont Yankee Nuclear Power Station (TAC No. MC0761)," Meeting Summary Accession No. ML042220022, dated September 2, 2004.

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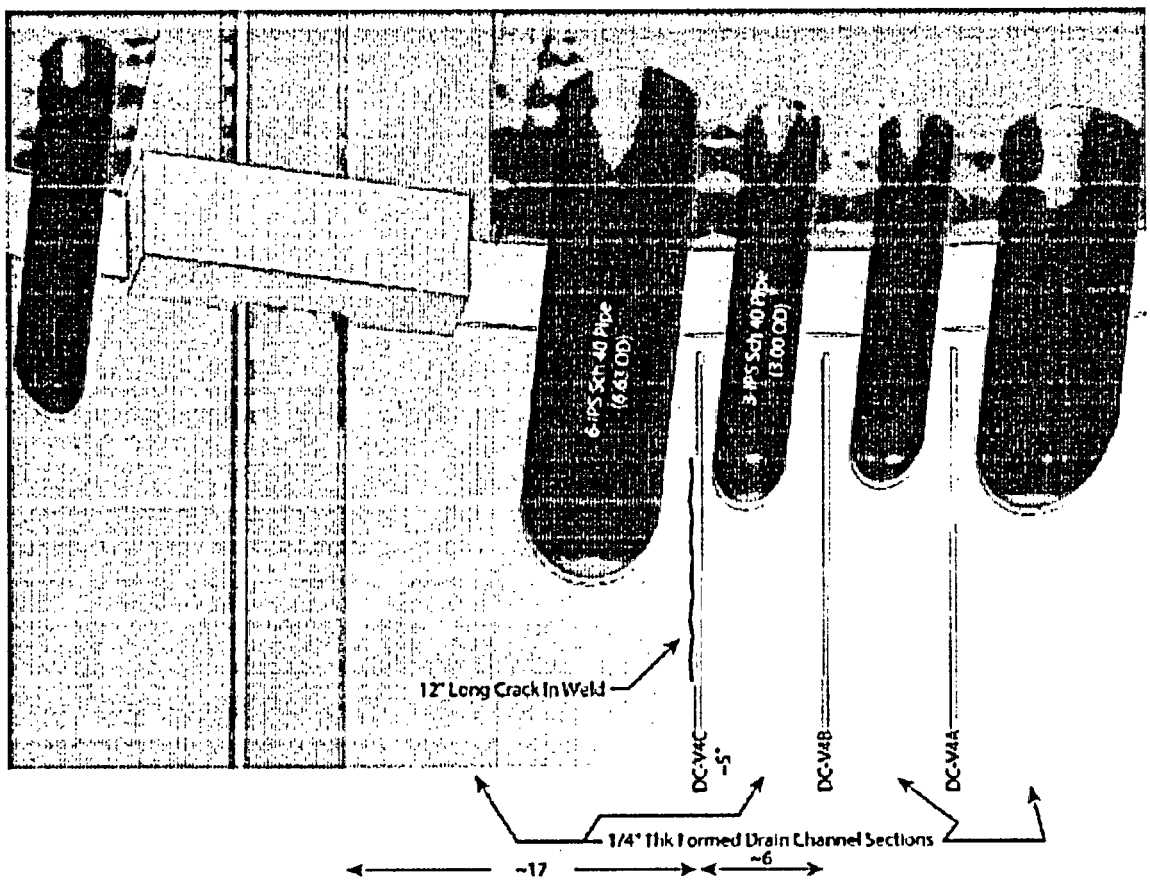

Figure 6-1. Schematic representation of drain channel cracking.

NON-PROPRIETARY INFORMATION

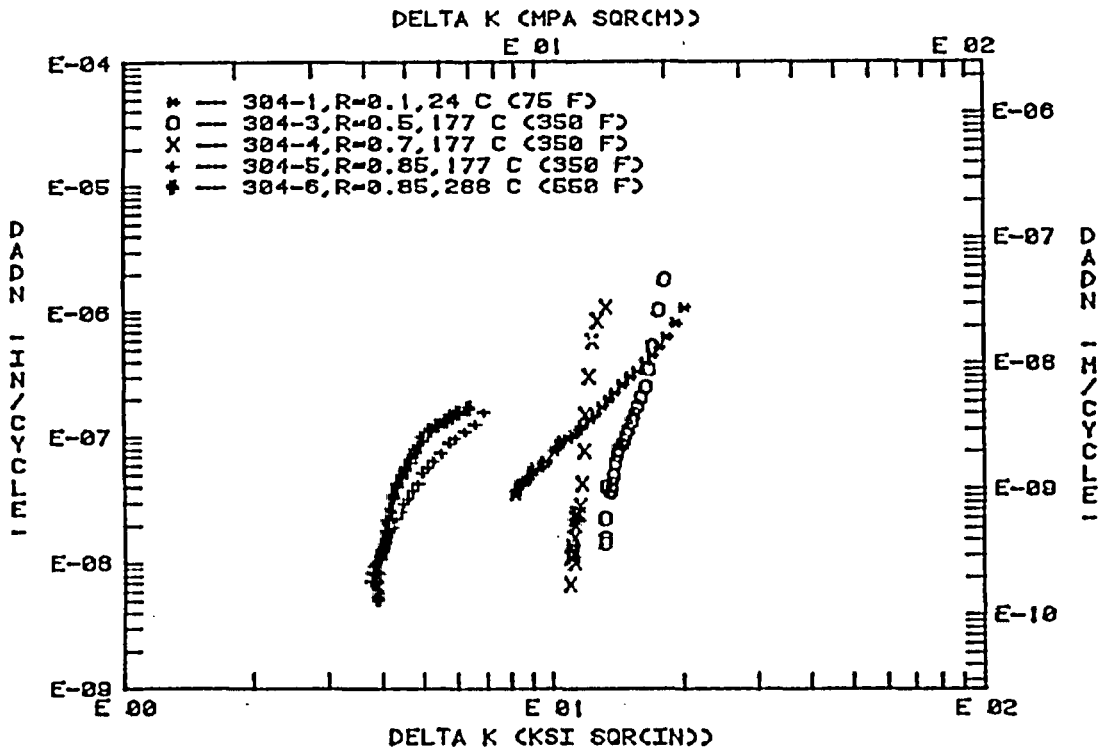

Figure 6-2. Experimental data to determine ΔK_{th} for Type 304 stainless steel

NON-PROPRIETARY INFORMATION

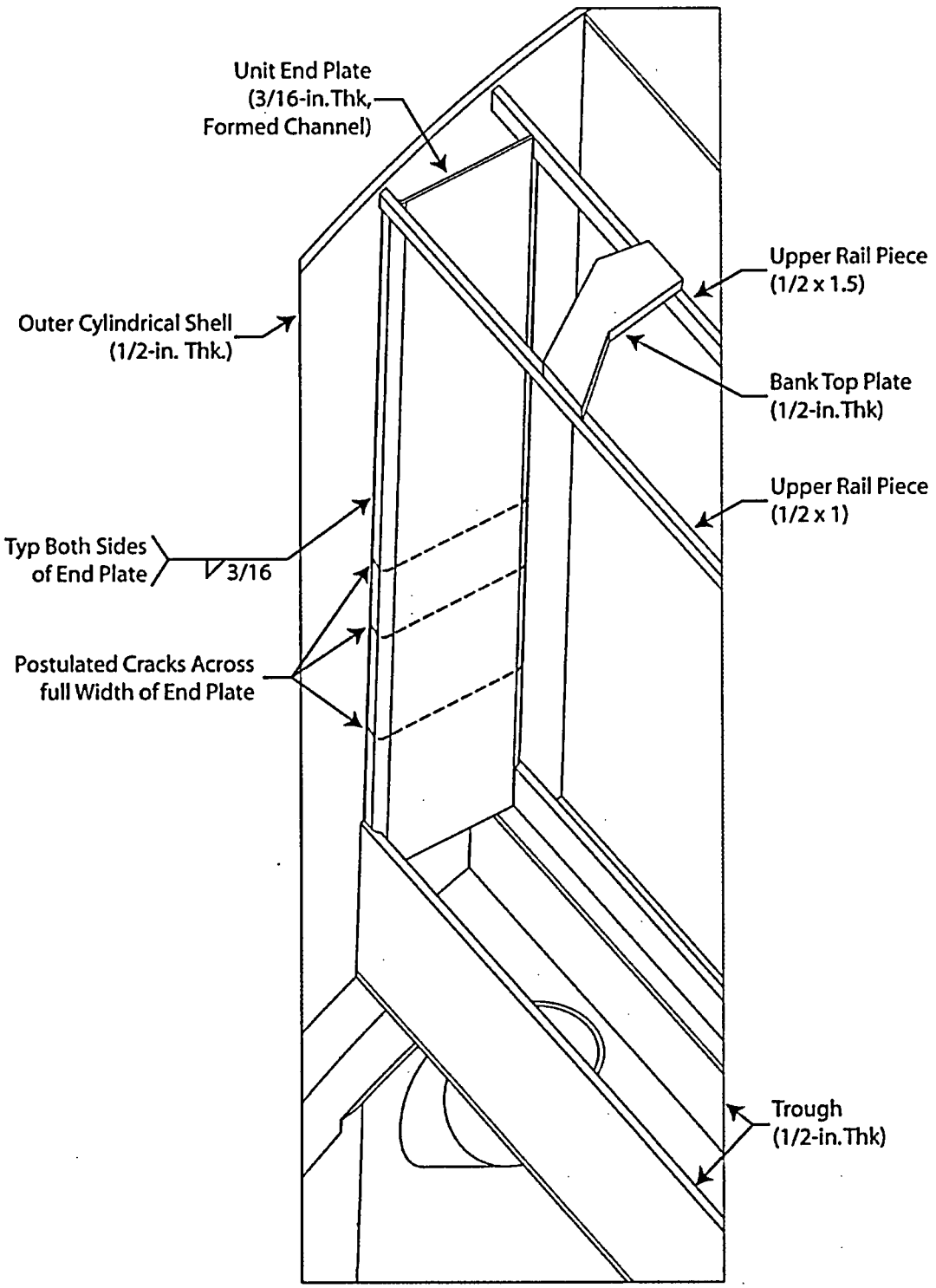

Figure 6-3: Cut-away of Bank Showing Unit End Plate

NON-PROPRIETARY INFORMATION

Action Item No. 7

Entergy agreed to provide a commitment to perform detailed inspections of the steam dryer during the next two refueling outages, in accordance with SIL-644, Supplement 1.

Entergy Response to Action Item No. 7

As stated in the response to RAI EMCB-A-2 in Entergy's letter of July 2, 2004 (BVY 04-058), Entergy will perform a detailed inspection of the steam dryer during the next scheduled refueling outage (i.e., fall 2005). This outage should occur approximately eight months after the first step-up in power to approximately 115% of CLTP. Entergy will also perform a detailed inspection of the VYNPS steam dryer during the two subsequent refueling outages (scheduled for spring 2007 and fall 2008). These refueling outages will occur after operating at full EPU power (i.e., 120% CLTP). The inspections will be performed in accordance with the VYNPS vessel internals monitoring program and the recommendations of GE SIL 644, Supplement 1.

NON-PROPRIETARY INFORMATION

Action Item No. 8

Entergy agreed to provide the results of the inspections scheduled for the next two outages to the NRC and discuss any changes to the long term monitoring plan once these inspections are completed.

Entergy Response to Action Item No. 8

Entergy will provide to the NRC staff the results of steam dryer inspections scheduled to be performed during the next two refueling outages. The inspection results provided will include a description of flaw indications identified during the inspection. Information on indications identified in previous inspections that were not repaired will be compared with the previous information (e.g., validation of crack growth projections). Results provided will also include, as necessary, the disposition of any newly identified flaw indications for operation over the next cycle, relative to the acceptance criteria for unacceptable failure (see the response to Item #9 below). Justification will be provided for any new flaw indications left unrepaired (i.e., left as-is).

Repair information will be provided for indications that are repaired.

As stated in the response to RAI EMCB-A-2 in Entergy's letter of July 2, 2004 (BVY 04-058), once the structural integrity of the repairs and modifications has been demonstrated and the unrepaired indications have been shown to have stabilized at the final EPU power level, the long term plan may be revised as appropriate to reflect adequate dryer structural integrity monitoring. Prior to implementing any significant changes to the long term plan, Entergy will discuss these changes with the NRC staff.

NON-PROPRIETARY INFORMATION

Action Item No. 9

Entergy agreed to supply the acceptance criteria that will be used in evaluating the structural integrity of the dryer.

Entergy Response to Action Item No. 9

The VYNPS dryer strengthening modification that was implemented during the last refueling outage (i.e., spring 2004) was designed using the ASME Section III Code as guidance. The analysis details, load combinations and stress acceptance criteria were provided to the NRC staff in the response to RAI EMEB-B-1 by Entergy letter of July 2, 2004 (BVY 04-058). As provided in the response to RAI EMCB-A-1 in Entergy's letter of July 2, 2004 (BVY 04-058), Entergy has applied the criteria from ASME Section XI, along with industrial standards and practices, to evaluate indications found during the April 2004 dryer inspection. Entergy intends to add the steam dryer inspection to the VYNPS Vessel Internals Inspection Program as an augmented exam.

As stated in the response to RAI EMCB-A-2 in Entergy's letter of July 2, 2004 (BVY 04-058), Entergy plans to inspect the VYNPS steam dryer during the next three scheduled refueling outages (i.e., fall 2005, spring 2007 and fall 2008). The latter two inspections will occur after achieving full 120% OLTP uprate. The existing and any new indications will be evaluated using ASME Section XI criteria as guidance, along with industrial standards and practices. A fracture mechanics analysis will be incorporated into the evaluation as appropriate. Any indication predicted to result in an unacceptable failure will be repaired in accordance with approved procedures.

Technical justification will be documented for all unrepaired flaw indications left in service for the next cycle. An unacceptable failure is one that results in generation of loose parts or cracks or tears in the dryer that result in excessive moisture carryover. Such failures would be detected during operation through moisture carryover monitoring. This regular monitoring measures moisture carryover on a periodic basis and will identify any significant changes in moisture carryover for further evaluation. Entergy intends to implement the BWROG guidelines on moisture carryover monitoring when issued.

NON-PROPRIETARY INFORMATION

Action Item No. 10

A number of technical questions associated with the GENE analysis (e.g., damping values) were discussed and it was agreed that additional discussions would occur during the NRC's audit in San Jose.

Entergy Response to Action Item No. 10

A number of technical questions associated with the GENE steam dryer analysis were discussed during the NRC staff's audit that was conducted in GENE's San Jose offices on August 24-26, 2004. Included in the discussions was the damping value used in the VYNPS steam dryer analysis. A damping of 1% is used in the VYNPS dryer analysis with the response spectrum method. This value is based on (1) K-6 Steam Dryer Hammer Test, GENE-F4100056-02, February, 1997 and (2) 1F1 Dryer Vibration Program, GE DRF A00-03804, 1991.

Attachment 3

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 263 – Supplement No. 13

Extended Power Uprate

Response to Steam Dryer Action Items

Affidavit – General Electric Company

Total number of pages in Attachment 3 (excluding this cover sheet) is 3.

General Electric Company

AFFIDAVIT

I, George B. Stramback, state as follows:

(1) I am Manager, Regulatory Services, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in Attachment 2 to GE letter GE-VYNPS-AEP-360, Michael Dick (GE) to Craig Nichols (ENOI), *VYNPS Extended Power Uprate - Response to July 21, 2004 NRC Meeting Steam Dryer Action Items, Proprietary and Non-Proprietary Versions,* dated September 10, 2004. The Attachment 2 proprietary information, *GE Responses to NRC RAIs/Action Items of "Summary of July 21 and 22, 2004, Meetings with Entergy ...", items 3 and 4,* is delineated by a double underline inside double square brackets. In each case, the superscript notation[3] refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.790(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, resulting in potential products to General Electric;

d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a., and (4)b, above.

(5) To address 10 CFR 2.790 (b) (4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it contains detailed information in support of NEDC-33090P, *Safety Analysis Report for Vermont Yankee Nuclear Power Station Constant Pressure Power Uprate,* Class III (GE Proprietary Information), Revision 0, dated September 2003, which was submitted to the NRC. This power uprate report contains detailed results and conclusions from evaluations of the safety-significant changes necessary to demonstrate the regulatory acceptability for the power uprate of a GE BWR, utilizing analytical models, methods and processes, including computer codes, which GE has developed, obtained NRC approval of and applied to perform evaluations of the transient and accident events in the GE Boiling Water Reactor ("BWR"). The development and approval of these system, component, and thermal hydraulic models and computer codes was achieved at a significant cost to GE, on the order of several million dollars.

The development of the evaluation process along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GE asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 10th day of September 2004.

George B. Stramback
General Electric Company

Attachment 4

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 263 – Supplement No. 13

Extended Power Uprate

Response to Steam Dryer Action Items

Commitments

Total number of pages in Attachment 4 (excluding this cover sheet) is 2.

Licensee Identified Commitment Form

This form identifies actions discussed in this letter for which Entergy Nuclear Operations, Inc. (Entergy) commits to perform. Any other actions discussed in this submittal are described for the NRC's information and are not commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	One-Time Action	Continuing Compliance	
Provide details regarding Action Item No. 2.	X		September 29, 2004
Provide results of the acoustic analysis model to the NRC staff during a meeting.	X		September 30, 2004
Perform a detailed inspection of the steam dryer during the next scheduled refueling outage. The inspection will be performed in accordance with the VYNPS vessel internals monitoring program and the recommendations of GE SIL 644, Supplement 1.	X		Fall 2005
Perform a detailed inspection of the steam dryer during two subsequent refueling outages. The inspections will be performed in accordance with the VYNPS vessel internals monitoring program and the recommendations of GE SIL 644, Supplement 1.	X		Spring 2007 and Fall 2008
Provide the NRC staff the results of steam dryer inspections during the next two refueling outages.	X		After Fall 2005 And Spring 2007
Prior to implementing, discuss changes to the long term monitoring plan for the steam dryer with the NRC staff.	X		(indeterminate)
Add the steam dryer to the VYNPS Vessel Internals Inspection Program as an augmented exam.	X		Fall 2005

Existing and new steam dryer indications will be evaluated using ASME Section XI criteria as guidance, along with industrial standards and practices. Fracture mechanics analysis will be incorporated into the evaluation as appropriate. Any indication predicted to result in an unacceptable failure will be repaired in accordance with approved procedures. Technical justification will be documented for all unrepaired flaw indications left in service for the next cycle.	X		(indeterminate)
Implement the BWROG guidelines on moisture carryover monitoring when issued.	X		(indeterminate)