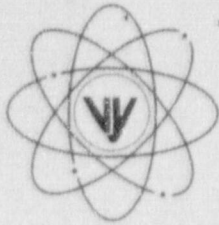


VERMONT YANKEE NUCLEAR POWER CORPORATION



P.O. Box 157, Governor Hunt Road
Vernon, Vermont 05354-0157
(802) 257-7711

May 27, 1999
BVY 99-73

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

Reference: (a) Letter, VYNPC to USNRC, "Vermont Yankee Plans for the 1998 and 1999 Refueling Outages Regarding Reactor Vessel Internals," BVY 97-123, dated September 30, 1997.

**Subject: Vermont Yankee Nuclear Power Station
License No. DPR-28 (Docket No. 50-271)
Reactor Vessel Internal Plans for the 1999 and 2001 Refueling Outages**

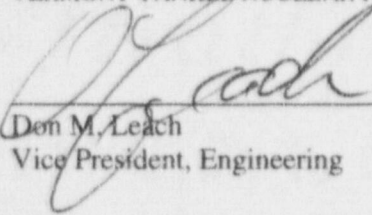
In Reference (a), Vermont Yankee informed the staff of our Spring 1998 and Fall 1999 refueling outage plans as they relate to the BWRVIP. Vermont Yankee submits this letter to update our plans for the 1999 and 2001 refueling outages. The attachment to this letter describes Vermont Yankee's plans for inspection of and modification to certain reactor vessel internals. Of note are our plans to defer replacement of the core spray piping internal to the reactor vessel from the 1999 refueling outage.

Vermont Yankee reaffirms our intent to install top guide and core plate wedges and ultrasonically inspect 140 accessible Jet Pump Mixer/Diffuser/Adapter welds during the 1999 outage. The remaining 20 welds inaccessible to UT capability will be inspected using enhanced visual inspection techniques (EVT-1). The attachment addresses all of the current BWRVIP guidelines regarding inspection scope and scheduling as they apply to the reactor vessel internal components.

We trust that the attached information is responsive to your concerns. If you have any questions on this transmittal, please contact Mr. Thomas B. Silko at (802) 258-4146.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION


Don M. Leach
Vice President, Engineering

Attachments

cc: USNRC Region 1 Administrator
USNRC Resident Inspector - VYNPS
USNRC Project Manager - VYNPS
Vermont Department of Public Service

9906090190 990527
PDR ADOCK 05000271
G PDR

ADD 1/1

80083

Docket No. 50-271

BVY 99-73

Attachment 1

Vermont Yankee Nuclear Power Station

Reactor Vessel Internal Plans for the 1999 and 2001 Refueling Outages

Reactor Vessel Internal Plans for the 1999 and 2001 Refueling Outages

Core Spray Piping

In the Fall of 1996, Vermont Yankee (VY) performed ultrasonic inspection of 39 core spray piping circumferential welds and visual inspection of five circumferential welds that were not accessible for ultrasonic inspection. These 44 welds represented 100% of the accessible core spray piping welds. The inspections met the guidelines of the Boiling Water Reactor Vessel Internal Project (BWRVIP) Core Spray Internals Inspection and Flaw Evaluation Guidelines (BWRVIP-18) for a baseline examination. Two non-pressure boundary mechanical welds, where the core spray piping penetrates the core shroud (P8b welds), were ultrasonically found to have indications of possible intergranular stress corrosion cracking. The flaw analysis evaluated several possible conditions of the core spray piping, including the limiting case where all four mechanical collar welds were completely failed. NRC evaluated the analysis and authorized operation for one cycle¹, with the stipulation that operation beyond the 1998 refueling outage would depend on the satisfactory evaluation of the reinspection results or by implementing repairs during the 1998 refueling outage. VY responded with its plans for reinspection in 1998 and replacement in 1999². NRC issued a Safety Evaluation Report³ on the basis of these plans.

The BWRVIP-18 core spray piping reinspection frequency for visual inspection is one cycle. Therefore, the five welds that were inspected visually in the Fall of 1996 were visually reinspected in the Spring of 1998. In addition, VY also visually reinspected the two core spray piping welds that, via UT, exhibited cracking during the Spring 1998 outage. As in 1996, no cracking was detected visually.

VY assigned engineering resources and initiated work on the pipe replacement project in February 1998. VY and our pipe replacement vendor have aggressively pursued a design to replace the core spray in vessel piping, including the safe-ends internal to the reactor vessel nozzles, through and including, the core shroud penetrations. However, despite the early planning, we have realized that full system replacement is a significantly larger effort than sectional replacements performed to date and that adequate prototype testing could not be completed in time to support the outage. Accordingly, VY has elected not to perform replacement of the core spray piping in 1999 in consideration of the significant risk to our outage schedule. VY intends to complete the design portion of this project in 1999.

VY is informing NRC that the Safety Evaluation Report may warrant revision relative to the two flawed core spray piping structural welds that were previously documented and evaluated. Both welds are collar-to-shroud welds, identified as P8b welds per the BWRVIP. These welds are not pressure retaining welds. In 1996 engineering analyses were performed which demonstrated that the annulus piping would perform its safety function if all four collar-to-shroud welds were completely failed. Given that if a P8b weld completely failed, the core spray annulus piping could be displaced ¼ inch axially and 0.028 inches vertically and horizontally. In such a case, the stresses in the core spray system annulus piping were determined to be within ASME Section III allowable stress limits. These welds are redundant to the sparger tee-box-to-shroud pipe welds, identified as P9 welds per the BWRVIP. The P9 welds are the actual pressure-retaining welds. All other pressure-retaining welds in the internal core spray piping system were

¹ Letter, USNRC to VYNPC, "Review of Core Spray System Piping Collar-to-Shroud Weld Flaw Evaluation and Core Spray System Inspection Plan at Vermont Yankee Nuclear Power Station (TAC Nos. M96671 and M96689)," NVEY 96-176, dated November 20, 1996.

² Letter, VYNPC to USNRC, "Vermont Yankee Plans for the 1998 and 1999 Refueling Outages Regarding Reactor Vessel Internals," BVY 97-123, dated September 30, 1997.

³ Letter, USNRC to VYNPC, "Plans for the 1998 and 1999 Refueling Outages Regarding Reactor Vessel Internals - Vermont Yankee Nuclear Power Station," NVEY 98-44, dated March 25, 1998.

ultrasonically examined and were identified to be free of flaws. Based upon these results the P9 welds can be considered to be fully functional with a high level of confidence.

In addition, the flaws found by ultrasonic inspection in the P8b welds could not be verified using enhanced visual inspection techniques. No portion of the flaws extend to the surface of the shroud or thermal sleeve and therefore we believe, based upon further assessment of the weld configuration, that the flaws are likely fabrication-related.

VY will reinspect the Core Spray Piping Internal Welds in accordance with the BWRVIP guidelines. BWRVIP-18 specifies that certain target welds be reinspected, of which VY has 32. The BWRVIP core spray piping reinspection frequency for ultrasonic inspection is two cycles. Consequently, of the 44 welds that were inspected ultrasonically and visually in 1996, 32 will require reinspection in 1999. VY intends to perform Enhanced Visual Inspection (EVT-1) of these welds.

The core spray piping bracket welds, up until the 1998 refueling outage, were inspected with a modified VT-1 inspection technique. Since that time, the BWRVIP committee has agreed with the NRC to revise BWRVIP-18 and perform EVT-1's of these attachment welds. Therefore, for future inspections VY will perform EVT-1's of the core spray piping bracket welds. The BWRVIP-18 recommended inspection frequency is every four cycles for these welds. The next inspection is scheduled for 2001, although not necessary until the currently scheduled outage of 2004.

Core Spray Spargers

With the Spring 1998 outage, VY committed to follow the guidance of the BWRVIP-18 for inspection of core spray spargers. In 1998, following the published guidance for a geometry-tolerant plant, VY performed a modified VT-1 (with cleaning) of the core spray sparger circumferential welds and a VT-3 of the nozzles and brackets in 1998. No flaws were found. Since that time, the BWRVIP has agreed with the NRC to revise BWRVIP-18 and discontinue the designation of geometry-tolerant plant status. Therefore, in the future, VY will perform EVT-1's of the sparger circumferential and bracket welds and a VT-1 inspection of the nozzle welds. The reinspection frequency for sparger circumferential welds is two cycles. The reinspection frequency for nozzle welds is 50% every two cycles, and the reinspection frequency for sparger bracket welds is four cycles, as defined by BWRVIP-18. Therefore, the sparger circumferential welds and 50% of the nozzle welds will be reinspected in 2001.

Core Shroud

VY performed an ultrasonic inspection of its circumferential welds in the Spring of 1995. As a result of that inspection, a four tie-rod modification was installed on the shroud in 1996 which provided full circumferential weld structural replacement. In conjunction with the 1996 repair, ultrasonic and eddy current inspections of the repair design-reliant welds were performed. The design-reliant welds consist of portions of eight vertical welds, six ring-segment welds and portions of welds H8 and H9 at the jet pump baffle plate. No cracking was found in any of these welds.

The 1996 vertical and ring segment weld inspections meet the proposed BWRVIP Guidelines for Reinspection of BWR Core Shrouds (BWRVIP-07) for a baseline inspection of repaired shrouds, even as they are now being revised (as a result of Nine Mile Point 1 vertical weld cracking). Because VY has performed a full baseline inspection of repair design-reliant welds, the BWRVIP reinspection frequency does not recommend performance of an inspection in either the 1999 or 2001 outages, with the possible exception of portions of welds H1 and H2.

The first cycle inspection of all four tie-rods was conducted during the Spring 1998 refueling outage. The inspection consisted of a visual examination to criteria approved by the repair designer. There were no inspection findings. Because the tie-rods were re-torqued in 1998 to a higher value to support future increased core flow initiatives; all four tie-rods will be reinspected in 1999.

Shroud Support

No cracking was identified during the Fall 1996 ultrasonic and eddy current inspections of welds H8 and H9. The Fall 1996 inspections satisfy the guidance of BWRVIP-38 for a baseline examination. The BWRVIP-38 reinspection frequency does not recommend reinspection in either the 1999 or 2001 outages. Access hole cover welds will continue to be inspected each refueling outage until the BWRVIP provides guidance in this area.

Top Guide

VY plans to install top guide wedges during the Fall 1999 refueling outage. This is being done in order to eliminate inspections of the top guide aligner assemblies, the top guide hold-down assemblies, and the top guide rim weld as recommended by BWRVIP-26. For plants with top guide wedges, BWRVIP-26 recommends verification that the wedges are in place.

We will continue examination, as recommended by General Electric Service Information Letter (SIL) 554, of a sample of top guide grid beams. VY has repeatedly examined these locations and has not found any indication of flaws.

Core Plate

VY also plans to install core plate wedges during the Fall 1999 refueling outage. This is being done in order to eliminate inspections of the core plate rim hold-down bolts recommended by BWRVIP-25. For plants with core plate wedges, the only inspection recommended by BWRVIP-25 is to verify that the wedges are in place.

Jet Pump Assemblies

VY completed baseline inspection per BWRVIP-41 of the 30 jet pump riser circumferential welds in 1998. Four flaws were discovered in thermal sleeve-to-elbow welds. The NRC recently issued a revised Safety Evaluation Report⁴ which allows operation until the 2001 refueling outage. In 2001, these four welds will be reinspected. In 1998, VY also completed baseline inspection, per BWRVIP-41, of 50% of the riser-to-restrainer welds, 50% of the riser brace welds, 50% of the inlet clamp bolted connections, and 50% of the restrainer assemblies. No flaws were identified in these components.

In accordance with recommendations in NUREG/CR-3052 and the guidance of BWRVIP-41, VY also performed inspection of 100% of the jet pump hold-down beams during the 1998 refueling outage. One

⁴ Letter, USNRC to VYNPC, "Jet Pump Circumferential Weld Inspections at Vermont Yankee Nuclear Power Station (TAC No. MA5109)," NVE 99-46, dated April 29, 1999.

beam was replaced as a result of a UT indication. In accordance with BWRVIP-41, 50% of the jet pump hold-down beams will be inspected during the 1999 and 2001 refueling outages.

In 1999, VY will complete the baseline inspection of the jet pump circumferential welds. The 30 riser circumferential welds were inspected in 1998. A total of 140 circumferential welds in the mixer, diffuser and adapter sections of the jet pump will be ultrasonically examined from the ID of the jet pumps. Access is gained for inspection tooling through the mixer inlet throats. Twenty (20) circumferential welds are inaccessible for UT inspection and will be examined using the EVT-1 visual technique.

With the exception of the hold-down beams, the four flawed riser welds, and the possible inspection of jet pump thermal sleeve welds (if inspection capability becomes available), no inspection of any other jet pump components is recommended in 2001 per BWRVIP-41.

Standby Liquid Control System

Per BWRVIP-27, the nozzle-to-safe end weld external to the vessel is the only inspection location within the scope of the BWRVIP that is critical to its function. The guidelines state, "A volumetric examination of the nozzle-to-safe end weld should be performed, if accessible, at the next outage when inspection tooling is available and appropriate pre-outage planning can be done." The BWRVIP Inspection Committee and EPRI are currently working on volumetric NDE techniques for these small diameter dissimilar metal welds, but it is not clear when a technique will be ready. VY intends to perform this examination when a demonstrated technique becomes available. In the interim, VY will continue to perform enhanced leakage examination of this joint in accordance with BWRVIP-27. It should be noted that at VY the Standby Liquid Control System safe end is fabricated with low carbon (0.019%) stainless steel, and thus is not considered to be susceptible to IGSCC.

Lower Plenum

BWRVIP-47 governs inspection of the components in the lower plenum. This document identifies inspection of five items, which are integral of the control rod drive assembly. These are the guide tube body-to-sleeve welds; the guide tube base-to-body welds; the guide tube sleeve-to-alignment lug welds; and the fuel support alignment pin-to-core plate weld and the pin itself. VY will perform these examinations as a part of the blade change-out procedure beginning in 2001. This will satisfy the minimum sample guidelines in BWRVIP-47 for these components.

Feedwater Nozzle Inner Radii

In 1995, VY performed a unique examination of the four feedwater nozzle inner radii in accordance with a Relief from NUREG-0619. This was performed from the inside of the reactor vessel using tooling that manipulated ultrasonic transducers in the annulus between the feedwater thermal sleeve and the nozzle. The NRC issued an SER^{5,6} that approved an inspection frequency of four cycles. Therefore, in 2001 this examination will be repeated.

⁵ Letter, USNRC to VYNPC, "Feedwater Nozzle Inspection Relief Request - Vermont Yankee Nuclear Power Station," NVEY 95-142, dated October 12, 1995.

⁶ Letter, USNRC to VYNPC, "Erratum to the Safety Evaluation of Vermont Yankee Nuclear Power Corporation's Request for Relief from NUREG-0619 Feedwater Nozzle Inspection Requirements - Vermont Yankee Nuclear Power Station," NVEY 96-182, dated December 5, 1996.

Internal Attachment Welds

Other than the jet pump and core spray attachment welds discussed above, no vessel internal attachment welds are scheduled for inspection in 1999 or 2001.

Other Reactor Internals Components

There are no safety-related reactor internals components other than the ones discussed above.

As described in the forgoing discussion and demonstrated by previous initiatives, VY believes in an aggressive and conservative approach in performing reactor vessel internal inspections and implementing repairs or replacements. VY is also proactive in following the BWRVIP emerging recommendations and has demonstrated our intent in meeting these recommendations at the earliest possible times.

Docket No. 50-271
BVY 99-73

Attachment 2

Vermont Yankee Nuclear Power Station

Reactor Vessel Internal Plans for the 1999 and 2001 Refueling Outages

SUMMARY OF VERMONT YANKEE COMMITMENTS

The following table identifies commitments made in this document by Vermont Yankee. Any other actions discussed in the submittal represent intended or planned actions by Vermont Yankee. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Licensing Manager of any questions regarding this document or any associated commitments.

COMMITMENT	COMMITTED DATE OR "OUTAGE"
1) VY will reinspect the Core Spray Piping Internal target welds in accordance with the BWRVIP guidelines.	1999 refueling outage
2) VY will perform EVT-1's of the core spray piping bracket welds. (A1, P2)	2004 refueling outage
3) VY will perform EVT-1's of the [core spray] sparger circumferential and bracket welds and a VT-1 inspection on 50% of the nozzle welds. (A1, P2)	2001 refueling outage
4) VY will perform EVT-1's of the [core spray] bracket welds. (A1, P2)	2004 refueling outage
5) All four [core shroud] tie-rods will be reinspected. (A1, P3)	1999 refueling outage
6) Access hole cover welds will continue to be inspected each refueling outage until the BWRVIP provides guidance in this area. (A1, P3)	Each refueling outage
7) We will continue examination, as recommended by GE SIL 554, of a sample of top guide grid beams. (A1, P3)	1999 refueling outage
8) These four [jet pump thermal sleeve-to-elbow welds with flaws] will be reinspected. (A1, P3)	2001 refueling outage
9) In accordance with BWRVIP-41, 50% of the jet pump hold-down beams will be inspected. (A1, P3)	1999 refueling outage
10) In accordance with BWRVIP-41, 50% of the jet pump hold-down beams will be inspected. (A1, P3)	2001 refueling outage
11) VY will complete the baseline inspection of the jet pump circumferential welds. A total of 140 circumferential welds in the mixer, diffuser and adapter sections of the jet pump will be ultrasonically examined from the ID of the jet pumps. Twenty (20) circumferential welds are inaccessible for UT inspection and will be examined using the EVT-1 visual technique. (A1, P4)	1999 refueling outage
12) Perform enhanced leakage examination of this joint [nozzle-to-safe end weld] in accordance with BWRVIP-27, until a demonstrated volumetric NDE technique becomes available. (A1, P4)	Each refueling outage
13) VY will perform these examinations [guide tube body-to-sleeve welds; the guide tube base-to-body welds; the guide tube sleeve-to-alignment lug welds; and the fuel support alignment pin-to-core plate weld and the pin itself] as a part of the blade change-out procedure beginning in 2001. (A1, P4)	2001 refueling outage
14) Perform a unique examination of the four feedwater nozzle inner radii in accordance with a Relief from NUREG-0619. (A1, P4)	2001 refueling outage

Note: A = Attachment #, P = Page #