



April 3, 2006  
JAFP-06-0059

T.A. Sullivan  
Site Vice President - JAF

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

SUBJECT: Entergy Nuclear Operations, Inc.  
James A. FitzPatrick Nuclear Power Plant  
Docket No. 50-333  
License No. DPR-59

**Response to Request for Additional Information (RAI)  
Regarding Request for Approval of Relief Request No. 39,  
Implementation of BWRVIP Guidelines in lieu of ASME  
Section XI Code Requirements on Reactor Vessel Internals  
and Components Inspection (TAC No. MC 8587)**

- REFERENCES:
1. Entergy Nuclear Operations, Inc. letter to USNRC (JAFP-05-0151), Request for Approval of Relief Request No. 39, dated October 7, 2005.
  2. USNRC letter to Entergy Nuclear Operations, Inc., Request for Additional Information (RAI) Regarding Relief Request RR-39, Implementation of BWRVIP Guidelines, (TAC No. MC8587) dated February 9, 2006.
  3. Telecom dated March 8, 2006 between NRC Staff and JAF Regarding Clarification of Questions in Response to Reference 2.

Dear Sir:

By letter dated October 7, 2005 (Reference 1), Entergy Nuclear Operations, Inc. (ENO) submitted a relief request for the James A. FitzPatrick Nuclear Power Plant (JAF) which would implement various Boiling Water Reactor Vessel Internals Program (BWRVIP) guidelines in lieu of the American Society for Mechanical Engineers (ASME), Section XI, Boiler and Pressure Vessel Code inspection requirements on reactor vessel internals and components.

On February 9, 2006, ENO received a request for additional information (RAI) (Reference 2) regarding clarification of this submittal.

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On March 8, 2006, a telecom (Reference 3) was held with your Staff to obtain further clarification regarding ENO's response to the RAI.

Attachment 1 to this letter provides ENO's response to the RAI. Attachment 2 provides JAF's currently planned reactor vessel internals inspection schedule requested during the March 8, 2006 telecom.

This response does not change the scope or conclusions in the original Relief Request (Reference 1).

There are no commitments contained in this report.

Should you have any questions or comments concerning this submittal, please contact Mr. Jim Costedio, Regulatory Compliance Manager, at (315) 349-6358.

Sincerely,

  
T. A. Sullivan  
Site Vice President

TAS:GB:gb

Attachments:

1. Response to Request for Additional Information
2. Reactor Vessel Internals Inspection Five (5) Cycle Look-Ahead

cc:

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**Attachment 1 to JAFP-06-0059**  
Entergy Nuclear Operations, Inc. – FitzPatrick  
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Response to Request for Additional Information (RAI)

*RAI 1*

*“According to Sections 3.3 and 3.4 of the BWRVIP-76, “BWR Vessel and Internals Project, BWR Core Shroud Inspection and Flaw Evaluation Guidelines” report, core shroud welds shall be inspected every 6 years when the enhanced visual test (EVT-1) method is used for one-sided weld inspections, and shall be inspected every 10 years when the subject welds are examined with the ultrasonic test (UT) method. The inspection frequency for the core shroud welds as indicated in Section 6.4 of the submittal is not consistent with the aforementioned requirement. Therefore, the NRC staff requests that the licensee revise the inspection frequency requirement for the subject welds in Section 6.4 of the submittal.”*

**JAF RESPONSE TO RAI 1:**

**Entergy concurs with the clarification that the inspection intervals for core shroud welds per BWRVIP-76 is 6 years (maximum) if the enhanced visual test (EVT-1) method is used for one-sided weld inspections, and 10 years (maximum) if the inspection is full volumetric or two-sided EVT-1 (BWRVIP-76, Figure 3-3).**

**For Section 6.4 of the original Relief Request RR-39 submittal, under the heading of “BWR Core Shroud Inspection and Flaw Evaluation Guideline (BWRVIP-76)”, the 2<sup>nd</sup> bullet is hereby replaced with the following:**

- **“The BWRVIP requires an EVT-1 or UT of each core shroud design reliant weld every 10 years (maximum). When the EVT-1 method is used for one-sided weld inspection, the inspection interval shall be 6 years (maximum).”**

*RAI 2*

*“In Attachment 2 of the submittal, the licensee provides a comparison of ASME Category B-1 and B-2 examination requirements with the BWRVIP guidelines. The NRC staff requests that the licensee include the following welds in this attachment.*

- (A) ASME Item B13.30, Table IWB-2500-1, Shroud support welds H9 and H12.*
- (B) ASME Item B13.40, Table IWB-2500-1, Shroud horizontal welds H1 and H2.*
- (C) ASME Item B13.40, Table IWB-2500-1, Shroud H8 Attachment welds.”*

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**JAF RESPONSE TO RAI 2(A):**

The shroud support H9 weld was already included in Attachment 2 (Reference 1), under the ASME Item B13.30 section “Shroud Support (Weld H9)”.

The JAF shroud support configuration does not have an H12 weld. The support configuration consists of gusset plates welded to the RPV wall and to the shroud support plate (BWRVIP-38, Figure 2-5).

**JAF RESPONSE TO RAI 2(B) AND RAI 2(C):**

Shroud horizontal welds H1 and H2 and the shroud H8 attachment welds were structurally replaced by the tie-rod repair. Inspection is not required for the welds that are structurally replaced by repair (Reference BWRVIP-76, Section 3.2). Tie rods are inspected per vendor and BWRVIP-76 (Section 3.5 and 3.6) guidelines at 10 year inspection intervals, by EVT-1/VT-3 methods.

*RAI 3*

*“According to Figure 3-3 of the BWRVIP-76 report, vertical and top guide ring segment welds shall be inspected every 6 years when the EVT-1 is used for one-sided weld inspections and shall be inspected every 10 years when the subject welds are examined with the UT method. In Attachment 2 of the submittal, the inspection frequency requirement for the vertical and top guide ring segment welds (Item B13.40 in Table IWB-2500-1 of the ASME Code, Section XI) is not consistent with the aforementioned requirement specified in the BWRVIP-76 report. Therefore, the NRC staff requests that the licensee revise the inspection frequency requirement for the subject welds in Attachment 2 of the submittal.”*

**JAF RESPONSE TO RAI 3:**

The BWRVIP inspection requirements for top guide ring segment welds in repaired shrouds shall be specified by the repair designer (BWRVIP-76, Section 3.4) and is submitted in Attachment 2 of Reference 1.

Shroud repair vendor examination requirements for top guide ring segment welds in repaired shrouds include EVT-1 or UT inspection methods at intervals not to exceed ten (10) years, since inspections performed to date have shown no indications in any of the top guide ring segment radial welds.

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**JAF RESPONSE TO RAI 3 (cont.)**

**NOTE:**

*During the 3/8/2006 telecom, while reviewing RAI 3 with the NRC (Cover Letter, Reference 3), an NRC Staff member requested that JAF provide reactor water chemistry data including hydrogen/oxygen molar ratio concentrations.*

**JAF RESPONSE:**

**JAF measures the molar ratio from a reactor water sample line. The typical molar ratio of Hydrogen to Oxygen ranges from 800 to 1200. Since 1999, when the first Noble Metal Chemical Application (NMCA) occurred, the H<sub>2</sub>/O<sub>2</sub> molar concentration ratio has exceeded the minimum requirement levels in proposed BWRVIP Guideline BWRVIP-62, “Technical Basis for Inspection Relief for BWR Internal Components With Hydrogen Injection,” which recommends a ratio value of greater than 3 to 1.**

**RAI 4**

*“In Attachment 2 of the submittal, the licensee indicates that the BWRVIP-38, “BWR Vessel Internal Project, BWR Shroud Support Inspection and Flaw Evaluation Guideline” report will be used for inspecting core shroud attachment welds. The staff’s final safety evaluation (SE) of the BWRVIP-38 report indicates that when inspection tooling and methodologies are developed that allow the welds in the lower plenum to be accessible, the guidelines will state that the licensee will inspect these welds with the appropriate non-destructive examination methods in order to establish a baseline for these welds. One of the core shroud attachment welds that has limited accessibility in the lower plenum is the H12 weld. Therefore, the NRC staff requests that the licensee revise Attachment 2 to include a commitment that the shroud support weld-H12 be inspected when the inspection tooling and methodologies permit such an inspection.”*

**JAF RESPONSE TO RAI 4:**

**The JAF shroud support configuration has no H12 weld [see above response to RAI 2(A)].**

**Attachment 1 to JAFP-06-0059**  
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*RAI 5*

*“In Attachment 4 of the submittal, the licensee does not address the inspection requirements for the following welds, and the NRC staff requests that the licensee include them in this attachment.*

- *Jet pumps riser welds RS-4 and RS-5.”*

**JAF RESPONSE TO RAI 5:**

**The JAF jet pump configuration does not have riser welds RS-4 and RS-5. These welds only apply to BWR/3's and Vermont Yankee Nuclear Power Station (BWRVIP-41, Rev.1, Table 3.3-1).**

*RAI 6*

*“In a letter dated October 1, 2003, the licensee submitted a similar relief request for the Vermont Yankee Nuclear Power Plant Station (VYNPS). The NRC staff approved the VYNPS relief request by an SE dated September 19, 2005. In Table 1 of the VYNPS relief request, the licensee provided details of its inspection requirements for the reactor vessel internals (RVI) components and the corresponding inspection bases that were delineated in the respective BWRVIP reports. The NRC staff requests that the licensee provide similar inspection requirements and the inspection frequency for the JAFNPP's RVI components. This information will enable the NRC staff to perform an effective review of the BWRVIP inspection criteria that will be used by the licensee for the JAFNPP's RVI components.”*

**JAF RESPONSE TO RAI 6:**

**Attachment 3 to ENO's Request for Relief dated 10/7/2005 (Cover Letter, Reference 1) provided a comprehensive inspection history of the JAF reactor internals, updated through Refuel Outage 16 (RO16), October 2004. Attachment 2 to this letter provides a listing of JAF's reactor internal components, with corresponding inspection bases, and the currently planned inspection schedule through the year 2014 (RO22).**

**Attachment 2 to JAFP-06-0059**  
**Entergy Nuclear Operations, Inc. – FitzPatrick**  
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**Reactor Vessel Internals Inspection Five (5) Cycle Look-Ahead**

Reactor Internal Component	Inspection Bases	RO17 (2006)	RO18 (2008)	RO19 (2010)	RO20 (2012)	RO22 (2014)	
Control Rod Drive Guide Tube Body Welds	BWRVIP-47-A, Table 3-3		EVT-1	EVT-1(IN)		EVT-1	
Control Rod Drive Guide Tube Lug and Pin	BWRVIP-47-A, Table 3-3		VT-3	VT-3(IN)		VT-3	
Core Plate Rim Hold-Down Bolts	BWRVIP-25, Table 3-2	VT-3/VT-1(*)	VT-1	VT-3/VT-1(*)	VT-3/VT-1(*) (IN)	VT-3/VT-1(*) (IN)	
Core Shroud Vertical & Ring Segment Welds	BWRVIP-76, Figure 3-3 & 3-4	EVT-1/UT	EVT-1(IN)	EVT-1(IN)	EVT-1	EVT-1	
Core Shroud Tie-Rod Repair	BWRVIP-76, Section 3.5	VT-3/EVT-1(4)	VT-3/EVT-1(6)				
Core Shroud Support Welds (H9)	BWRVIP-38, Figure 3-5	EVT-1	EVT-1			EVT-1	
Core Shroud Gusset Welds	BWRVIP-38, Figure 3-2 and BWRVIP-76, Section 3.6	EVT-1	EVT-1			EVT-1	
Core Spray Thermal Sleeve Welds (Hidden)	BWRVIP-18-A, Section 3.2.4		UT (*)	UT (IN)	UT (IN)	UT (IN)	
Core Spray Piping Welds	BWRVIP-18-A, Table 3-5	EVT-1	EVT-1	EVT-1	EVT-1	EVT-1	
Core Spray Sparger Large Circ Welds	BWRVIP-18-A, Table 3-5	EVT-1		EVT-1		EVT-1	
Core Spray Sparger Nozzle Welds	BWRVIP-18-A, Table 3-5	VT-1 (50%)		VT-1 (50%)		VT-1 (50%)	
Core Spray Piping Brackets	BWRVIP-18-A, Table 3-5	EVT-1				EVT-1	
Core Spray Sparger Brackets	BWRVIP-18-A, Table 3-5	VT-1		VT-1		VT-1	
Feedwater Sparger Tee Welds	NUREG 0619			VT-1			
Feedwater Sparger Bracket Attachment	BWRVIP-48-A, Table 3-2			EVT-1			
Feedwater Sparger Assembly	NUREG 0619			VT-3			
Jet Pump Beams	BWRVIP-41, Rev.1, Table 3.3-1 and BWRVIP-138, Section 6.4	UT			UT		
Jet Pump Thermal Sleeve Welds (Hidden)	BWRVIP-41, Rev.1, Table 3.3-1		UT (*)	UT (IN)	UT (IN)	UT (IN)	
Jet Pump Assembly (High Priority Welds)	BWRVIP-41, Rev.1, Table 3.3-1	UT/EVT-1			EVT-1 (50%)		
Jet Pump Assembly (Medium & Low Priority Welds)	BWRVIP-41, Rev.1, Table 3.3-1	EVT-1			EVT-1 (25%)		
Jet Pump Riser Brace Welds	BWRVIP-41, Rev.1, Table 3.3-1	EVT-1			EVT-1 (25%)		
Jet Pump Restrainer Wedges	BWRVIP-41, Rev.1, Table 3.3-1	VT-1			VT-1(50%)		
Lower Plenum	BWRVIP-47-A, Section 3.2	WHEN ACCESSIBLE					
Miscellaneous Vessel Internal Attachments	BWRVIP-48-A, Table 3-2	VT-3				VT-3/EVT-1	
Orificed Fuel Support Castings (Sampling)	BWRVIP-47-A, Table 3.2-1	VT-3	VT-3	VT-3	VT-3	VT-3	
SLC Nozzle-to-Safe End Weld	BWRVIP-27-A, Section 3.3.1	PT or EVT-2*	EVT-2* (IN)	PT or EVT-2*	EVT-2* (IN)	PT or EVT-2*	
Top Guide Hold-down Assemblies	BWRVIP-26-A, Table 3-2	VT-1 (2)		VT-1 (2)		VT-1 (2)	
Top Guide Grid Beams (Sampling)	BWRVIP-26-A, Section 3.2.2	VT-3/VT-1					

**Attachment 2 to JAFP-06-0059**  
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Reactor Vessel Internals Inspection Five (5) Cycle Look-Ahead

**Table Key**

- Standard Print = Inspections mandated by BWRVIP I & E Guidelines
- Italics* = Inspections recommended for Risk-To-Generation purposes
- UT = Ultrasonic Testing planned
- UT (\*) = Ultrasonic Testing when the technique becomes available
- VT-3/VT-1(\*) = Contingency examination subject to lower plenum access
- VT = Visual Testing planned
- EVT-1 = EVT-1; Enhanced Visual Test to look for cracking; 1/2 mil wire resolution with cleaning assessment
- EVT-2\* = Enhanced Leakage Inspection (direct view of component during pressure test)
- VT-1 = VT-1; Visual Test to look for cracks, wear, corrosion, etc.; resolution required: 1/32" black line
- VT-3 = VT-3; Visual Test to determine general mechanical/structural condition; no resolution requirements
- PT = Surface examination
- (IN) = If necessary, to complete number of inspections not performed in previous outage(s)
- (all, number, or %) = Perform inspection on all or on remainder components, limited number (or percentage) of components, or just flawed components