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W3F1-2010-0002

February 9, 2010

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

SUBJECT: Request for NRC Alternative to ASME IWE-5521 Regarding Post  
Repair Testing of Waterford 3's Steel Containment Vessel Opening  
Waterford Steam Electric Station, Unit 3  
Docket No. 50-382  
License No. NPF-38

Dear Sir or Madam:

Pursuant to 10CFR50.55a(a)(3)(i), Entergy Operations, Inc. (Entergy) requests NRC approval to use an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, for post-repair leakage inspection of the Waterford Steam Electric Station, Unit 3 (Waterford 3) steel containment vessel (SCV). Entergy will be replacing the Waterford 3 steam generators (SGs) during the 17<sup>th</sup> refueling outage which will commence in the spring of 2011. The removal of a welded construction hatch in the SCV will be required for providing access for the original and replacement SGs in and out of containment. Entergy would be required to perform a containment integrated leak rate test (ILRT) in accordance with IWE-5221, "Leakage Test," of ASME Section XI and 10CFR50, Appendix J prior to reentry into Mode 4. However, the performance of a localized leakage test provides a more appropriate leak test than an ILRT for the limited repair area. Therefore, Entergy is requesting relief from the ASME Section XI, IWE-5221 requirements to perform a localized pressure test for the associated repair of the Waterford 3 SCV.

To support the Waterford 3 spring 2011 refueling outage, Entergy requests approval of the proposed alternative by February 9, 2011. Attachment 1 provides Entergy's request for relief including the basis for the proposed alternative.

This letter contains one new commitment as provided in Attachment 2.

A047  
WR

If you have any questions or require additional information, please contact me at 504-759-6715.

Sincerely,

A handwritten signature in black ink, appearing to read "Randy J. Moore". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

RJM/sab

- Attachments:
1. Request for NRC Alternative to ASME IWE-5521 Regarding Post Repair Testing of Waterford 3's Steel Containment Vessel Opening
  2. List of Regulatory Commitments

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**Attachment to W3F1-2010-0002**

**Request for NRC Alternative to ASME IWE-5521  
Regarding Post Repair Testing of Waterford 3's  
Steel Containment Vessel Opening**

**Relief Request W3-CISI-001**

**Entergy Operations, Inc.**  
**Waterford Steam Electric Station, Unit 3**  
**Request for Alternative W3-CISI-001**  
**Request for NRC Alternative to ASME IWE-5521 Regarding Post Repair Testing of**  
**Waterford 3's Steel Containment Vessel Opening**

**I. ASME CODE COMPONENT AFFECTED**

Component Numbers: Waterford 3 Seismic Category 1, Class MC, Steel Containment Vessel (SCV)

Code References: American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 2001 Edition through 2003 Addenda

Examination Category: E-A, Containment Surfaces

Item Number: E1.11

Description: Proposed Alternative to ASME IWE-5221, "Leakage Tests"

Unit/Inspection Waterford 3 / Third (3<sup>rd</sup>) 10-year inspection interval

Interval Applicability: May 31, 2008 thru July 2017

The Waterford Steam Electric Station, Unit 3 (Waterford 3) SCV was originally constructed as an ASME Class MC vessel in accordance with ASME Section III, Subsection NE, 1971 Edition through Summer 1971 Addenda.

**II. APPLICABLE CODE REQUIREMENT**

ASME Section XI, Paragraph IWE-5221 states:

*Except as noted in IWE-5222, repair/replacement activities performed on pressure retaining boundary of Class MC or Class CC components shall be subjected to a pneumatic leakage test in accordance with the provisions of Title 10 Part 50 of the Code of Federal Regulations, Appendix J, Paragraph IV.A.*

10CFR50, Appendix J, Paragraph IV.A states in part,

*Any major modification, replacement of a component which is part of the primary reactor containment boundary, or resealing a seal-welded door, performed after the preoperational leakage rate test shall be followed by either a Type A, Type B, or Type C test as applicable for the area affected by the modification."*

**III. REASON FOR REQUEST**

The Waterford 3 SCV is a free standing steel pressure vessel, consisting of an all-welded vertical cylinder with a hemispherical upper dome and an ASME ellipsoidal bottom head. The SCV was designed, fabricated, erected, and tested in accordance with the requirements of Section III, Subsection NE of the ASME Code for Class MC Components, 1971 Edition, Summer 1971 Addenda. During original construction of the SCV, a construction hatch was installed for transporting major components into and out of containment. This hatch consists of a 32 ft diameter steel barrel which is capped on the

inside of containment with a hemispherical hatch cover butt-welded to the barrel. The construction hatch is located in the northeast quadrant of containment at a centerline elevation of 63.5 ft. The construction hatch is depicted in Waterford 3 FSAR Figures 1.2-17 and 1.2-20.

Entergy will be replacing the Waterford 3 steam generators (SGs) and reactor vessel closure head (RVCH) during the spring 2011 refueling outage. These replacement activities require the opening of the SCV construction hatch to provide access for the removal of the original steam generators (OSGs) and RVCH as well as the installation of the replacement SGs (RSGs) and replacement RVCH. Following replacement of these major components, the SCV construction hatch will be restored to its original leak tight design requirements.

Once the SCV has been restored, a leakage test in accordance with IWE-5521 would be required. ASME IWE-5221 specifies that Class MC components undergo pneumatic leakage testing by either a Type A, Type B, or Type C test in accordance with Paragraph IV.A of 10CFR50, Appendix J. Entergy believes that for the nature of the repair which restores the butt weld to ASME requirements can be more effectively performed by an alternative leakage test.

#### **IV. PROPOSED ALTERNATIVE AND BASIS FOR USE**

##### Proposed Alternative

Entergy proposes to perform a localized leakage test on the SCV repair area in lieu of the Type A, integrated leak rate test (ILRT) specified by ASME Section XI, Paragraph IWE-5221 after restoration of the SCV pressure boundary. Specifically, the SCV hatch cover repair weld will be tested under a localized leakage "bubble test" by pressurizing the containment vessel to greater than or equal to the design pressure ( $P_a$ ) which is 44.0 pounds per square inch gauge [psig]). The bubble test of the repair weld will be performed after a hold time of at least 10 minutes. The test acceptance criteria will be zero detectable leakage which will be determined by the absence of bubble formation using a leak detection medium in accordance with test procedures. A VT-2 inspection will be performed with the test pressure held at or above 44.0 psig which will structurally test the SCV repair weld. Any leakage identified will be corrected and the test will be re-performed. The NDE personnel performing the VT-2 visual inspection will be certified in accordance with the requirements of ANSI/ASNT CP-189, "Qualification and Certification of Nondestructive Testing." This leakage test shall be performed prior to entry into Mode 4 after restoration of the SCV boundary.

The localized leakage bubble test on the pressure boundary weld area of the SCV will provide a more effective examination than the Type A test as required by ASME IWE-5521. Therefore, an alternative to the requirement of Paragraph IWE-5221 is requested pursuant to 10CFR50.55a(a)(3)(i) in that the proposed alternative provides an acceptable level of quality and safety.

### Basis for Use

The repair and replacement activities associated with temporary removal and reinstallation of the Waterford 3 SCV construction hatch will be performed in accordance with the requirements of the 2001 Edition through 2003 Addenda of ASME Section XI. ASME Section XI, Paragraph IWA-4411 states that welding and installation activities shall be performed in accordance with the Owner's requirements and the original Construction Code. Fabrication and installation activities (i.e., cutting and welding) will be performed in accordance with the original Construction Code of Subsection NE of ASME Section III, or as reconciled to a later edition. The restoration of the construction hatch and associated weld will return the structural integrity of the SCV to its original design requirements.

Prior to performing the repair weld, the surfaces to be welded will be cleaned and examined by magnetic particle or liquid penetrant methods. A complete penetration weld will be applied over the 360° circumference of the hatch cover to barrel interface. The weld filler metal shall have a specified minimum tensile strength of 70 ksi consistent with the original SCV hatch cover weld requirement. This weld will be performed by qualified personnel in accordance with ASME Section III requirements. Post weld examinations will be performed on the SCV repair which will include a full radiography of the weld, as well as a general visual examination on the SCV hatch repair area. Therefore, the SCV construction hatch will be restored to its SCV design requirements and examined to assure weld integrity.

The proposed localized leakage bubble test will provide further confirmation of SCV leak tight integrity for the weld repair. This bubble test will assure zero leakage at the repair area, while a Type A test measures total containment leakage. The acceptance criterion for leakage of the repair weld will assure that there is zero leakage around the weld. This acceptance criterion is a more stringent criterion than that of a Type A test. Pressurization to greater than or equal to design pressure will assure the structural integrity of the SCV. Therefore, if there is any leakage of the SCV at the repair weld, it would be identified by the bubble test, and corrected.

The ILRT requires additional scheduled time, manpower, dose, and test instrumentation to be installed throughout containment. The ILRT takes longer to perform and virtually stops other work from taking place inside of containment for an extended period. In addition, the ILRT provides less assurance of the quality of the repair weld of the containment vessel since it could allow some leakage through the repair weld. Therefore, a localized leak test provides a more accurate and direct method of assuring the leak tight integrity of the repair weld. The localized leak bubble test is considered a superior test for determining leakage at the repaired area as compared to a Type A test.

The proposed localized leakage test for the SCV hatch repair is also consistent with Section 9.2.4, "Containment Repairs and Modifications", of NEI 94-01, Revision 2 (Reference 1) which states:

*Repairs and modifications that affect the containment leakage integrity require local leakage rate testing or short duration structural tests as appropriate to provide assurance of containment integrity following the modification or repair. This testing shall be performed prior to returning the containment to operation.*

The combination of a full radiography (meeting the construction code radiography acceptance criteria) and the localized leak test of the repair weld (while at design pressure) will confirm the integrity of the steel containment vessel. In accordance with the requirements of 10CFR50.55a (a)(3)(i), Entergy believes that the localized leak test provides an acceptable level of quality and safety in lieu of the ASME Code required test.

#### **V. DURATION OF PROPOSED ALTERNATIVE**

The performance of a localized leak test is a one-time alternative for the ASME Code repair/replacement activity associated with the Waterford 3 SCV affected by the replacements of the Waterford 3 steam generators and RVCH.

#### **VI. PRECEDENT**

A similar relief was requested by Tennessee Valley Authority on November 17, 2005 for the Watts Bar Nuclear Plant (Reference 2). The NRC approved this request on August 30, 2006 (Reference 3).

#### **VII. REFERENCES**

1. NEI 94-01, "Nuclear Energy Institute Industry Guideline for Implementing Performance-Based Option of 10 CFR PART 50, Appendix J", Revision 2, August 2007.
2. Letter from Tennessee Valley Authority to NRC dated November 17, 2005, "Watts Bar Nuclear Plant, Unit 1 - One Time Request for Relief from American Society of Mechanical Engineers (ASME), Section XI Code Requirements - Tests Following Repair, Modification, or Replacement (IWE-5221)" (ADAMS Accession No. ML053260493).
3. Letter from NRC to TVA dated August 30, 2006, "Watts Bar Nuclear Plant, Unit 1 - One Time Request for Relief from American Society of Mechanical Engineers, Section XI Code Requirements - Tests Following Repair, Modification, or Replacement (IWE-5221) (TAC No. MC8920)" (ADAMS Accession No. ML061590111).

**Attachment 2 to W3F1-2010-0002**

**List of Regulatory Commitments**

**List of Regulatory Commitments**

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE  (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
Entergy will conduct a localized leakage bubble test in accordance with Alternative W3-CISI-001 on the restoration of the Waterford 3 steel containment vessel construction hatch (in lieu of a Type A integrated leak rate test as required ASME IWE-5221).	X		Prior to Mode 4 coming out of Refuel 17