



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

May 18, 2010

Vice President, Operations  
Entergy Operations, Inc.  
Waterford Steam Electric Station, Unit 3  
17265 River Road  
Killona, LA 70057-3093

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – REQUEST FOR RELIEF FROM REQUIREMENTS OF ASME CODE, SECTION XI, IWE-5221 RE: POST-REPAIR LEAKAGE INSPECTION OF STEEL CONTAINMENT VESSEL (TAC NO. ME3345)

Dear Sir or Madam:

By letter dated February 9, 2010, Entergy Operations, Inc. (Entergy, the licensee), submitted request for relief No. W3-CISI-001, pursuant to paragraph 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations* (10 CFR). In its submittal, the licensee requested relief from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, for post-repair leakage inspection of the Waterford Steam Electric Station, Unit 3 (Waterford 3) steel containment vessel. Entergy will be replacing the Waterford 3 steam generators (SGs) during the 17th refueling outage, commencing in the Spring of 2011. The licensee's proposed alternative test method for containment leak testing is in lieu of a Type A integrated leak rate test as required by ASME Code, Section XI, IWE-5221, "Leakage Test." The proposed alternative is applicable to Waterford 3's third 10-year inservice inspection (ISI) interval which began on May 31, 2008.

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the licensee's request and concludes that the proposed alternative provides an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the proposed one-time alternative for the third 10-year ISI interval during the Waterford 3 Cycle 17 refueling outage, when the SGs are planned to be replaced.

All other ASME Code, Section XI requirements for which an alternative was not specifically requested and approved in this relief request remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

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 [Nuclear Energy Institute] NEI 94-01, Revision 2 ... 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.

### 3.6 NRC Staff Evaluation

To facilitate the Waterford 3 SG replacement, the free-standing SCV of Waterford 3 will be breached. ~~Two openings~~ *A preexisting construction hatch opening* will be cut in the SCV in order to remove and replace the SGs. The SCV ~~sections removed~~ will be reattached by welding after the SG replacement. The ASME Code, Section XI, Paragraph IWE-5221, requires that leakage rate testing be conducted to ensure the integrity of the repairs prior to returning the SCV to operable status. In lieu of the Type A, Type B, or Type C leakage rate testing, the licensee has proposed to perform a series of examinations and a leak test, subjecting the SCV to accident pressure, to verify the leak tightness and integrity of the liner welds and the SCV.

*construction hatch*

The detailed examination and test sequence are included in the licensee's proposed relief request and summarized herein. The licensee has proposed to perform the activities described below as a part of the SCV restoration effort. The ~~sections of the SCV that were~~ removed will be re-welded in place in accordance with the 2001 Edition through 2003 Addenda, ~~Entergy's Code of record requirements~~. Magnetic particle ~~testing of the back gouge of the root pass~~ area, along with 100 percent radiography of the final repair weld, will be performed. In addition, a general visual and a VT-3 examination of the SCV pressure boundary welds will be conducted. To perform a weld leak test, the containment will be pressurized to a test pressure  $P_a$  (of at least ~~15~~ psig) and held for a minimum of 10 minutes. A bubble test of the repair weld and a VT-2 ~~44~~ visual inspection will then be performed with the pressure held at or above ~~15~~ psig. A zero leakage criteria will be used for weld acceptance, which is determined by the absence of any bubbles. All personnel performing the testing will meet the requirements of "Qualification and Certification of Nondestructive Testing Personnel," as recommended in ~~SNT-TC-1A 2001~~ ANSI/ASNT CP-189.

SCV construction hatch that was  
For liquid penetrant testing of the weld preparation

The magnetic particle ~~testing~~ and the 100 percent radiography of the repair weld, followed by the bubble test, will provide adequate assurance that the repair welds do not leak or have any structural defects. The zero leakage acceptance criteria for the bubble test will ensure that the SCV leakage rate is not altered by the SG replacement activity and the pressurization of the SCV to the accident pressure will confirm the integrity of the SCV after the repair. Therefore, the NRC staff concludes that the proposed alternative will provide adequate assurance of structural integrity.

For liquid penetrant testing of the weld preparation area

#### 4.0 REGULATORY COMMITMENT

In its letter dated February 9, 2010, the licensee made the following commitment:

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).

The proposed commitment satisfies the need for one-time action compliance, prior to MODE 4, coming out of the Waterford 3 refueling outage 17. The NRC staff considers the proposed commitment to be a regulatory commitment and concludes it is acceptable.

#### 5.0 CONCLUSION

On the basis of the above, the NRC staff has determined that the proposed alternative tests provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the use of the proposed one-time alternative for the third 10-year ISI interval during the Waterford 3 Cycle 17 refueling outage, when the SGs are planned to be replaced.