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10 CFR 50.55a

W3F1-2013-0018

August 27, 2013

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

Subject: Waterford 3 Request for Relief from American Society of Mechanical Engineers (ASME) Code, Section XI for the Third 10-year Interval – Inservice Inspection Request for Relief W3-ISI-022  
Waterford Steam Electric Station, Unit 3  
Docket No. 50-382  
License No. NPF-38

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a(a)(3)(ii), Entergy Operations, Inc. (Entergy) requests relief from the requirements of the ASME, Boiler and Pressure Vessel Code (Code), Section XI pertaining to the period pressure testing requirements for Waterford Steam Electric Station Unit 3 (WF3) reactor vessel head flange seal leak detection piping. Entergy has determined that compliance with the specified pressure test requirements of this section would result in hardship and unusual difficulty without a compensating increase in the level of quality and safety due to the configuration and design of the system.

The proposed alternative is based on ASME Code Case N-805, "Alternative to Class 1 Extended Boundary End of Interval or Class 2 System Leakage Testing of Reactor Vessel Head Flange O-ring Leak Detection System." However, Code Case N-805 has not been approved by the NRC and is not identified in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1." Similar relief requests have been approved. These include: Vermont Yankee Nuclear Power Station, Comanche Peak Nuclear Power Plant, LaSalle County Station, and Susquehanna Steam Electric Station.

The need for this relief request was identified during an NRC inspection of the WF3 In-Service Inspection (ISI) program during the fall refueling outage (RF18) in November 2012.

The reactor vessel head flange seal leak detection piping was examined using the proposed alternative method during RF18. WF3 was in Mode 6, the reactor vessel head was removed, and the reactor cavity was filled to its normal refueling water level. The associated ASME Class 2 piping system was subject to the static pressure head when the reactor cavity was filled. After a 4-hour hold time, a visual (VT-2) examination of the accessible areas of the piping system was performed and no evidence of leakage was identified.

The next WF3 refueling outage (RF19) during which the alternative examination method could be performed will occur in Spring 2014 (third ISI 10-year interval, second period). Entergy plans to credit the RF18 examination of the reactor flange seal leak detection system to the third ISI 10-year interval, second period, which began July 1, 2011, and will end May 31, 2014, should it comply with the relief request as approved by the NRC.

This submittal contains no regulatory commitments.

If you have any questions or require additional information, please contact me at (504) 739-6203.

Sincerely,

A handwritten signature in black ink, appearing to read "B. J. Kellogg". The signature is fluid and cursive, with a long horizontal stroke at the end.

BJP/RJP

Attachment: Relief Request W3-ISI-022

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**Attachment to**  
**W3F1-2013-0018**  
**Relief Request W3-ISI-022**

Waterford 3 Steam Electric Station  
10 CFR 50.55a Request No. W3-ISI-022  
Proposed Alternative in Accordance With 10 CFR 50.55a(a)(3)(ii)  
--Hardship and Unusual Difficulty without Compensating Increase in Level of Quality or Safety--  
(Pressure Testing Requirements for Reactor Vessel Head Flange Seal Leak Detection Piping)

1. ASME Code Component(s) Affected

Code Class: ASME Code Class 2  
Component Numbers: Reactor Pressure Vessel (RPV) Flange Seal Leak-Off Piping  
Line Numbers 2RC3/4-56, 2RC3/4-157, 2RC3/4-158 and 2RC1-201  
Code References: ASME Section XI 2001 Edition w/ 2003 Addenda,  
Table IWC-2500-1 and IWC-5220 (IWC-5221)  
Code Case N-805  
Plant Boundary Drawing P-172, Sheet 1  
Examination Category: C-H  
Item Number(s): C7.10  
Unit/Inspection Interval Waterford Steam Electric Station, Unit 3 (WF3) / Third (3rd) 10-Year Interval

2. Applicable ASME Code Requirements

ASME Section XI, Table IWC-2500-1, Examination Category C-H, "Pressure Retaining Components – Inspection Program B":

Item C7.10 requires a System Leakage Test (Visual-VT2) each inspection period of all Class 2 pressure retaining components.

Per IWC-5221, the system leakage test shall be conducted at the system pressure obtained while the system, or portion of the system, is in service performing its normal operating function or at a system pressure developed during a test conducted to verify system operability (e.g., to demonstrate system safety function or satisfy technical specification surveillance requirements).

3. Reason for Request

Pursuant to 10 CFR 50.55a(a)(3)(ii), Entergy Operations, Inc. (Entergy) requests an alternative from performing the code required examination. Compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

4. Proposed Alternative and Basis for Use

Proposed Alternative

In lieu of the requirements of IWC-5221, a VT-2 visual examination of the accessible areas will be performed each inspection period on the piping subjected to the static pressure from the head of water when the reactor cavity is filled for at least four hours. This test will be part of the reactor coolant Class 2 leakage test. The test will be performed within the

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frequency specified by table IWC-2500-1 for a System Leakage Test (once each inspection period).

#### Basis for Use

The ASME Code Section XI, 2001 Edition through 2003 Addenda requires that Class 2 pressure boundary piping shall be pressure tested once each inspection period. The reactor vessel head flange seal leak detection piping is separated from the reactor coolant pressure boundary by one passive metallic seal, which is the first of two O-rings. The pressure tap for the leak detection piping is located on the vessel flange mating surface. A second O-ring is located on the outside of the pressure tap in the vessel flange. Failure of the inner O-ring is the only condition under which this line is pressurized. Therefore, the line is not expected to be pressurized during the system pressure test following a refueling outage.

If the inner O-ring should leak during the operating cycle it will be identified by an increase in pressure of the leak-off line and annunciate a pressure switch. This leak detection piping pressure switch has a control board annunciator in the Control Room and is monitored. This pressure increase would actuate an alarm in the Control Room, which is closely monitored by procedurally controlled operator actions allowing identification of any further compensatory actions required.

Additionally, the reactor vessel head flange seal leak detection piping would only function as a Class 2 pressure boundary if the inner O-ring fails; thereby, pressurizing the line. If any significant leakage does occur in the leak detection piping during this time of pressurization, it would exhibit boric acid accumulation that would be discernible during the VT-2 visual examination to be performed as proposed in this request.

The piping is  $\frac{3}{4}$ " and 1" nominal pipe size (NPS) schedule 160 seamless stainless steel, made of SA 376, Type 304 material. It was designed ASME Section III Class 2 for 2485 psi at 650° F. The configuration of this piping precludes system pressure testing while the vessel head is removed because the pressure tap would have to be plugged. This would require a design modification to install a plug into the pressure tap on the vessel flange. A threaded or pressure test type plug would need to be installed in the flange face to act as a pressure boundary for each test, and then removed after the test. The installation of the mechanical modification and subsequent use would incur significant dose, which would be inconsistent with keeping dose as low as reasonably achievable (ALARA). Either method of plugging would also present a foreign material exclusion issue for the handling of a very small diameter plug that would be required to be installed to complete a leakage test at pressure.

The configuration also precludes pressurizing the line externally with the head installed. The closure head contains two concentric grooves that hold the inner and outer O-rings. The O-rings are held in place by a series of retainer clips that are housed in recessed cavities in the flange face. If a pressure test were to be performed with the head installed, the inner O-ring would be pressurized in a direction opposite to its design function. This test pressure would

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result in a net inward force on the inner O-ring that would tend to push it into the recessed cavity that houses the retainer clips. The thin O-ring material could be damaged by the inward force. Purposely failing or not installing the inner O-ring in order to perform a pressure test would require a new O-ring set to be installed. The time and radiation exposure associated with removing and reinstalling the closure head, replacing the inner O-ring and re-cleaning of the vessel flange mating surface prior to head installation would be an undue hardship. In addition, this special test would require a reactor coolant system heat-up / cool down cycle. Therefore, compliance with the IWC- 5221 system pressure test requirements results in an unnecessary hardship without a sufficient compensating increase in the level of quality and safety.

5. Duration of Proposed Alternative

This alternative is requested for the remainder of the third ISI inspection interval, which is scheduled to end July 1, 2017.

6. Precedents

This request is similar in nature to the following requests for alternatives, in that, nuclear stations were granted using ASME Code Case N-805 or similar methodology.

- Vermont Yankee Nuclear Power Station Relief Request ISI-PT-02 Reactor pressure vessel head flange leak-off lines, (Fourth Interval) ADAMS Accession No. ML13055A009]
- Comanche Peak, Unit 1, Relief Request No. C-2 for the Unit 1 Reactor Pressure Vessel Leak-off Flange Third ISI Interval ADAMS Accession No. ML13046A385
- LaSalle County Station, Units 1 and 2 - Request for Relief Nos. 13R-03, 13R-04, 13R-08, 13R-09 and 13R-10: Third 10-Year Interval In-service Inspection Program Plan (TAC NOS. MD5459, MD5460, MD5390, MD5463, MD5464, MD5465, MD5466, MD5467, and MD5468); January 30, 2008; Docket Nos. 50-373 and 50-374 [ADAMS Accession No. ML073610587]
- Susquehanna Steam Electric Station, Units 1 and 2 - Third 10-Year Inservice Inspection Interval Program Plan (TAC NOS. MC1185, MC1186, MC1191, MC1192, MC1193, MC1194, MC1195, MC1196, MC1197, MC1198, MC1199, MC1200); September 24, 2004; Docket Nos. 50-387 and 50-388 [ADAMS Accession No. ML042680078