



CNRO-2007-00002

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CNRO-2007-00002

January 31, 2007

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

SUBJECT: Inspection and Mitigation of Alloy 600/82/182 Pressurizer Butt Welds

Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

REFERENCE: Letter from Mr. Marvin S. Fertel, NEI Chief Nuclear Officer, to
Mr. Luis A. Reyes, NRC Executive Director of Operations, dated
January 26, 2007

Dear Sir or Madam:

In October 2006, while performing inspections of its pressurizer Alloy 600/82/182 butt welds in accordance with MRP-139, a PWR licensee discovered several circumferential indications in its pressurizer surge, safety, and relief nozzles. Because of the importance of this issue, Entergy Operations, Inc. (Entergy) is notifying the NRC staff of actions planned for Waterford Steam Electric Station, Unit 3 (Waterford 3) for mitigating Alloy 600/82/182 butt welds on pressurizer spray, surge, and relief lines. These actions will be implemented during Waterford 3's spring 2008 refueling outage (RF-15), which is approximately five (5) months beyond the completion date of December 31, 2007 specified in EPRI MRP-139. The actions and the justification for the schedule extension are provided in Enclosure 1.

Entergy is aligned with positions pertaining to this issue as discussed in the referenced letter from NEI to the NRC and is actively participating with the industry to address them.

Entergy will inform the NRC if we revise any information contained in this letter prior to taking actions identified in Enclosure 1. Our staff is available to meet with the NRC to discuss any of the information in this letter. Should you have any questions pertaining to this letter, please contact Guy Davant at (601) 368-5756.

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ENCLOSURE 1

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**MITIGATING ACTIONS AND ASSOCIATED SCHEDULE
FOR ALLOY 600/82/182 PRESSURIZER BUTT WELDS AT WATERFORD 3**

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I. ACTIONS AND ASSOCIATED SCHEDULE

Mitigation activities of the pressurizer Alloy 600/82/182 dissimilar metal (DM) butt welds at Waterford Steam Electric Station, Unit 3 (Waterford 3) have not yet been completed, but are scheduled to be completed during the upcoming spring 2008 refueling outage (RF-15). Entergy Operations, Inc. (Entergy) will perform and complete the following mitigative activities at Waterford 3 pertaining to these welds on the pressurizer:

1. If Waterford 3 enters an outage of sufficient duration prior to RF-15, Entergy will visually inspect pressurizer DM butt welds for signs of leakage.
2. During RF-15:
 - a. Entergy will visually inspect pressurizer DM butt welds for signs of leakage; and
 - b. To permanently mitigate potential degradation of these welds, Entergy will install full structural weld overlays on these welds.
3. If Waterford 3 should shut down due to primary system unidentified leakage prior to RF-15, and if the leakage cannot be confirmed to originate from a source other than the pressurizer DM welds, Entergy will perform, prior to restart, a bare metal visual examination of the Alloy 600/82/182 butt weld locations on the pressurizer to determine whether the leakage originated at those locations.

The results of these mitigation actions will be reported to the NRC within 60 days following startup from RF-15.

Details concerning Waterford 3's mitigation activities are provided in Table 1. Future inspections of these pressurizer butt welds at Waterford 3 will be performed in accordance industry guidance contained in EPRI MRP-139 or any associated relief request approved by the NRC staff pursuant to 10 CFR 50.55a.

II. JUSTIFICATION FOR SCHEDULE EXTENSION

The schedule to implement the actions identified in Section I above during RF-15, which is approximately five (5) months beyond the EPRI MRP-139 completion date of December 31, 2007, is acceptable based on the points given below.

A. Previous Inspections

During the spring 2005 and fall 2006 refueling outages at Waterford 3 (RF-13 and RF-14), Entergy performed a bare metal visual examination of those DM weld locations on the pressurizer and hot legs that are susceptible to primary water stress corrosion cracking (PWSCC). No indications of leakage were found during either examination.

B. Technical Evaluations

The Electric Power Research Institute (EPRI) Materials Reliability Program (MRP) performed safety assessments for DM butt welds and developed a comparison of plant-specific designs. Based on these assessments Entergy has concluded that the structural integrity of these welds at Waterford 3 will not degrade to a point that would result in a safety concern (i.e., pipe break or significant increase in core damage frequency) prior to the planned implementation of the weld overlays.

C. Primary System Leakage Monitoring

Waterford 3 Technical Specification (TS) 3.4.5.2 requires reactor coolant system (RCS) leakage to be limited to no pressure boundary leakage and 1 gpm unidentified leakage. The containment sump used to collect unidentified leakage and other inputs is instrumented to alarm for increases of 0.5 gpm and 1.0 gpm. Therefore, primary system leakage will be detected before reaching the TS limit.

Waterford 3 has written instructions documented in procedure OI-040-000, *Reactor Coolant System Leakage Monitoring*, that specify actions to be taken based on RCS leakage rates below the TS limit of 1 gpm unidentified RCS leakage. These actions are discussed below.

1. Action Level Entry Conditions

To determine the RCS leakage action level entry condition, the baseline RCS leakage must first be known. The baseline RCS leak rate is determined at 100% power by averaging six or more unidentified leakage data points following a refueling outage or other occasion that merits a reset of baseline values. After a baseline RCS leakage rate has been established, the RCS leakage rate is continuously measured using the Plant Monitoring Computer. This measurement is formally documented each 72 hours in accordance with Section 7.3 of procedure OP-903-024. These measured leak rates relative to the baseline leakage are then used to determine the applicable action level in accordance with the table below. The actions to be taken are described in item 2, below.

ENTRY CONDITIONS			
Action Level	Unidentified Leakage above Baseline	7-Day Average Unidentified Leakage above Baseline	Containment Sump Equivalent Leak Rate
Normal Operation	< 0.100 gpm	< 0.050 gpm	< 0.200 gpm
1	≥ 0.100 to 0.150 gpm	≥ 0.050 to 0.100 gpm	≥ 0.200 to 0.250 gpm

ENTRY CONDITIONS			
Action Level	Unidentified Leakage above Baseline	7-Day Average Unidentified Leakage above Baseline	Containment Sump Equivalent Leak Rate
2	> 0.150 to 0.200 gpm	> 0.100 to 0.150 gpm	> 0.250 to 0.300 gpm
3	> 0.200 gpm	> 0.150 gpm	> 0.300 gpm

2. Action Levels

a. Action Level 1

- Increase monitoring of containment airborne activity and containment sump pump-out parameters.
- Increase scrutiny of other containment parameters (e.g., temperature, pressure).
- Review the results of or re-perform radioactivity sampling on adjacent systems.
- Perform walk-down of accessible areas in containment with particular attention to signs of boron precipitation.
- Analyze recent operational data and plant configuration for evidence of leak location and nature; consider restoration of equipment to the condition that existed prior to the "trigger."
- Coordinate with the Planning & Scheduling department to expedite repairs to any out of service leakage indicators.
- Identify and trend additional leakage indicators.
- Analyze the containment PIG radiation monitor filters for traces of boron.

b. Action Level 2

- Repeat the steps of Action Level 1.
- Add a containment inspection for RCS leakage to the Forced Outage Plan.

- Shutdown for a containment inspection for RCS leakage within 90 days should be considered. Engineering judgment should be used to determine if a shutdown is warranted and when it should occur.
- c. Action Level 3
- Repeat the steps of Action Level 1.
 - Shutdown for a containment inspection for RCS leakage within 30 days should be considered. Engineering judgment should be used to determine if a shutdown is warranted and when it should occur.

Waterford 3 will continue to use the enhanced techniques for monitoring primary system leakage governed by TS 3.4.5.2 and Procedure OI-040-000.

III. CONCLUSION

Based on the discussions provided above regarding previous inspections, technical evaluations, and primary system leakage monitoring, Entergy believes there is no safety concern associated with extending the mitigation activities for the Alloy 600/82/182 DM butt welds on the Waterford 3 pressurizer to RF-15.

TABLE 1

Mitigation Summary for Waterford 3 Alloy 600/82/182 Pressurizer Butt Welds

Nozzle		MRP-139 Volumetric Inspection Requirement to be Met		Mitigation to be Completed	Comments
Function / Designation	Susceptible Material Description	Outage Designation	Start Date	Outage Designation	
Spray - #RC-301A/B	Nozzle-to-safe end weld	RF-15	Spring 2008	RF-15	SA-508 carbon steel nozzle with 182 butter to stainless steel safe end with 182 butt weld
Surge	Nozzle-to-safe end weld	RF-15	Spring 2008	RF-15	SA-508 carbon steel nozzle with 182 butter to stainless steel safe end with 182 butt weld
Relief Valve - #RC-317A	Nozzle-to-safe end weld	RF-15	Spring 2008	RF-15	SA-508 carbon steel nozzle with 182 butter to cast stainless steel safe end with 182 butt weld
Relief Valve - #RC-317B	Nozzle-to-safe end weld	RF-15	Spring 2008	RF-15	SA-508 carbon steel nozzle with 182 butter to cast stainless steel safe end with 182 butt weld
Relief Valve - capped nozzle	Nozzle-to-safe end weld	RF-15	Spring 2008	RF-15	SA-508 carbon steel nozzle with 182 butter to cast stainless steel safe end with 182 butt weld

ENCLOSURE 2

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LICENSEE-IDENTIFIED COMMITMENTS

LICENSEE-IDENTIFIED COMMITMENTS

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
1. Entergy will inform the NRC if we revise any information contained in this letter prior to installing the weld overlays.	✓		End of RF-15
2. If Waterford 3 enters an outage of sufficient duration prior to its spring 2008 refueling outage (RF-15), Entergy will visually inspect pressurizer DM butt welds for signs of leakage.	✓		End of RF-15
3. During RF-15: a. Entergy will visually inspect pressurizer DM butt welds for signs of leakage; and b. To permanently mitigate potential degradation of these welds, Entergy will install full structural weld overlays on these welds.	✓		End of RF-15
4. If Waterford 3 should shut down due to primary system unidentified leakage prior to RF-15, and if the leakage cannot be confirmed to originate from a source other than the pressurizer DM welds, a bare metal visual examination of the Alloy 600/82/182 butt weld locations on the pressurizer will be performed to determine whether the leakage originated at those locations prior to restart.	✓		End of RF-15
5. The results of the mitigation activities (see item #3 above) will be reported to the NRC within 60 days following startup from RF-15.	✓		60 days following startup from RF-15
6. Future inspections of these pressurizer butt welds at Waterford 3 will be performed in accordance industry guidance contained in EPRI MRP-139 or any associated relief request approved by the NRC staff pursuant to 10 CFR 50.55a.		✓	

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
7. Waterford 3 will continue to use the enhanced techniques for monitoring primary system leakage governed by TS 3.4.5.2 and Procedure OI-040-000.	✓		End of RF-15