



CNRO-2007-00003
Entergy

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CNRO-2007-00003
January 31, 2007

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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
Arkansas Nuclear One, Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-29

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 Arkansas Nuclear One, Unit 1 (ANO-1) for mitigating Alloy 600/82/182 butt welds on pressurizer spray, surge, and relief lines. These plans are discussed in Enclosure 1.

Regarding Arkansas Nuclear One, Unit 2 (ANO-2), Entergy replaced the ANO-2 pressurizer during the fall 2006 refueling outage (2R18) with one manufactured of materials resistant to primary water stress corrosion cracking (PWSCC). Further inspections to address concerns with Alloy 600/82/182 butt welds are not necessary. Future inspections of pressurizer butt welds at ANO-2 will be performed in accordance with industry guidance provided in EPRI MRP-139.

Entergy will inform the NRC if we revise any information contained in this letter prior to installing the weld overlays. 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.

This letter contains commitments identified in Enclosure 2.

Sincerely,

FGB/GHD/ghd

Enclosures: 1. Actions Planned to Mitigate Alloy 600/82/182 Pressurizer Butt Welds at ANO-1
2. Licensee-Identified Commitments

A110

cc: Mr. W. A. Eaton (ECH)
Mr. J. S. Forbes (ANO)

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ALLOY 600/82/182 PRESSURIZER BUTT WELDS AT ANO-1

ENCLOSURE 1

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**ACTIONS PLANNED TO MITIGATE
ALLOY 600/82/182 PRESSURIZER BUTT WELDS AT ANO-1**

ACTIONS PLANNED TO MITIGATE
ALLOY 600/82/182 PRESSURIZER BUTT WELDS AT ANO-1

Mitigation activities of the pressurizer Alloy 600/82/182 dissimilar metal (DM) butt welds at Arkansas Nuclear One, Unit 1 (ANO-1) have not yet been completed, but are scheduled to be completed during the upcoming spring 2007 refueling outage (1R20). At that time, Entergy will visually inspect and mitigate the pressurizer Alloy 600/82/182 butt welds by installing full structural weld overlays on these welds. Details concerning ANO-1's mitigation activities are provided in Table 1. In addition, by letter dated January 12, 2007, Entergy Operations, Inc. (Entergy) proposed to the NRC staff an alternative to ASME Code requirements for weld overlay repairs. This request, ANO1-R&R-010, contains details regarding the weld overlay activities. Future inspections of these pressurizer butt welds at ANO-1 will be performed in accordance ANO1-R&R-010. The results of these mitigation activities will be reported to the NRC within 60 days following startup from 1R20.

If ANO-1 should shut down due to primary system unidentified leakage prior to 1R20, 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.

In addition to the mitigation activities described above, ANO-1 is closely monitoring reactor coolant system (RCS) leakage in accordance with ANO-1 Technical Specification (TS) 3.4.13, *RCS Operational Leakage*, and ANO-1 Operations Procedure OP-1103-013, *RCS Leak Detection*. TS 3.4.13 requires RCS leakage to be limited to no pressure boundary leakage and 1 gpm unidentified leakage. ANO-1 has written instructions documented in procedure OP-1103.013 that specify actions to be taken based on RCS leakage rates well below the TS limit of 1 gpm unidentified RCS leakage. Procedure OP-1103.013 uses three (3) reactor coolant leak detection systems of different operating principles to monitor RCS leakage. Each system is discussed below.

- Reactor Coolant Inventory Balance System

The Makeup Tank level is monitored via operator rounds conducted periodically during each shift. This provides a single point trend of RCS inventory and is used as an early indicator of changing RCS leakage rates.

TS Surveillance Requirement (SR) 3.4.13.1 requires RCS operational leakage to be verified within limits by performing an RCS inventory balance every 72 hours. Procedure OP-1103.013 establishes more conservative control by requiring this balance to be performed daily. The RCS leak rate determination is highly accurate utilizing changes in RCS pressure, temperature, and level, along with Makeup Tank level, known input sources (e.g., zinc injection), and Quench Tank volume changes over time.

- Reactor Building Sump Monitoring

The reactor building sump level is monitored by operations personnel periodically during each shift. Using these measurements, a sump fill rate is calculated. This fill rate is trended and used as an indicator of potential RCS leakage. The reactor building sump

level monitor is used in conjunction with other diverse RCS leak rate measurements to identify the source of leakage into the sump. This device is required pursuant to TS 3.4.15, *Leakage Detection Instrumentation*.

- Reactor Building Atmospheric Radioactive Monitoring

The reactor building atmospheric radioactive monitoring system consists of a reactor building particulate detector and a reactor building gaseous detector. These monitor readings are recorded on operator logs. Once per day, the reactor building air monitor readings are reviewed to determine a representative daily value and to denote any trend in reactor building atmospheric radiological conditions. This system is also required by TS 3.4.15.

Procedure OP-1103.013 specifies that if any of the following conditions exist, operations personnel are to initiate a leakage investigation to identify the location(s) of the leakage and take appropriate actions to stop the leak:

- The reactor building sump fill rate exceeds the 5-day average sump fill rate by 0.05 gpm; or
- The RCS unidentified leak rate exceeds the 5-day average RCS unidentified leak rate by 0.1 gpm; or
- The 5-day average RCS unidentified leak rate exceeds 0.15 gpm.

Unit shutdown would be initiated as directed by Technical Specifications.

ANO-1 will continue to use the enhanced techniques for monitoring primary system leakage governed by TS 3.4.14, TS 3.4.15, and Procedure OP-1103.013. The methods of leak detection described above are sufficient to ensure RCS leakage is readily detected and corrective actions initiated prior to conditions degrading to a level resulting in a failure of the RCS pressure boundary.

TABLE 1

Mitigation Summary for ANO-1 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	Nozzle-to-safe end weld, A600 safe end, and safe end-to-pipe weld	1R20	Spring 2007	1R20	Two welds: (1) Carbon steel nozzle welded to A600 safe end; (2) A600 safe end welded to stainless steel pipe. Welds are A600/82/182.
Surge	Nozzle-to-safe end weld only	1R20	Spring 2007	1R20	Carbon steel nozzle to stainless steel safe end using A600/82/182
Electromatic Relief Valve #PSV-1000	Nozzle-to-flange weld only	1R20	Spring 2007	1R20	Carbon steel nozzle to stainless steel flange using A600/82/182
Code Safety Valve #PSV-1001	Nozzle-to-flange weld only	1R20	Spring 2007	1R20	Carbon steel nozzle to stainless steel flange using A600/82/182
Code Safety Valve #PSV-1002	Nozzle-to-flange weld only	1R20	Spring 2007	1R20	Carbon steel nozzle to stainless steel flange using A600/82/182

10. NE

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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 1R20
2. Future inspections of pressurizer butt welds at ANO-2 will be performed in accordance with industry guidance provided in EPRI MRP-139.		✓	
3. During the upcoming spring 2007 refueling outage at ANO-1 (1R20), Entergy will visually inspect and mitigate the pressurizer Alloy 600/82/182 butt welds by installing full structural weld overlays on these welds.	✓		End of 1R20
4. The results of the ANO-1 mitigation activities will be reported to the NRC within 60 days following startup from 1R20.	✓		60 days following startup from 1R20
5. Future inspections of these pressurizer butt welds at ANO-1 will be performed in accordance Request for Alternative ANO1-R&R-010 (submitted to the NRC on January 12, 2007).		✓	
6. If ANO-1 should shut down due to primary system unidentified leakage prior to 1R20, and if the leakage cannot be confirmed to originate from a source other than the pressurizer DM welds, a bare metal visual examination of 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 1R20
7. ANO-1 will continue to use the enhanced techniques for monitoring primary system leakage governed by TS 3.4.14, TS 3.4.15, and Procedure OP-1103.013.	✓		End of 1R20