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1CAN031702

March 14, 2017

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

SUBJECT: Reactor Building Inspection Summary Report – 1R26
 Arkansas Nuclear One - Unit 1
 Docket No. 50-313
 License No. DPR-51

Dear Sir or Madam:

Entergy Operations, Inc. (Entergy) inspected the Arkansas Nuclear One, Unit 1 (ANO-1) Reactor Building moisture barrier during the Fall 2016 refueling outage (1R26). This inspection identified signs of corrosion at the liner to moisture barrier interface indicating that there could be additional corrosion below the moisture barrier. This report was developed and submitted in accordance with Technical Specification (TS) 5.6.6 and the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, 2001 Edition with the 2003 Addenda. 1R26 was completed on December 14, 2016.

During the inspection of the Reactor Building moisture barrier, multiple ultrasonic and pit gauge readings were taken. An evaluation of the thinned areas of the liner plate was performed, and the conclusion was that the liner plate continued to maintain its design function. This submittal provides the engineering evaluation that was performed for this condition.

This submittal completes the reporting requirements of the ANO-1 TSs for this inspection.

This letter contains no new regulatory commitments. If you have any questions concerning this submittal, please contact me.

Sincerely,

**ORIGINAL SIGNED BY DAVID B. BICE (ACTING REGULATORY ASSURANCE MANAGER
FOR STEPHENIE L. PYLE**

SLP/rwc

Attachment: Summary of Engineering Evaluation for the 1R26 Moisture Barrier and Liner
Plate Degraded Conditions

cc: Mr. Kriss Kennedy
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ATTACHMENT TO

1CAN031702

**SUMMARY OF ENGINEERING EVALUATION FOR THE
1R26 MOISTURE BARRIER AND LINER PLATE DEGRADED CONDITIONS**

SUMMARY OF ENGINEERING EVALUATION FOR THE 1R26 MOISTURE BARRIER AND LINER PLATE DEGRADED CONDITIONS

Scope and Objective

This report provides a summary of Entergy's engineering evaluation of the degraded conditions of the moisture barrier and liner plate that were identified during Arkansas Nuclear One, Unit 1 (ANO-1) Fall 2016 (1R26) refuel outage. This report has been prepared to satisfy the requirements of the ANO-1 Containment Inservice Inspection Program, the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 2001 Edition with the 2003 Addenda, Sub-section IWE-3122.3, and ANO-1 Technical Specification (TS) 5.6.6. Specifically, TS 5.6.6 states:

“Any degradation exceeding the acceptance criteria of the containment structure detected during the tests required by the Containment Inspection Program shall undergo an engineering evaluation within 60 days of the completion of the inspection surveillance. The results of the engineering evaluation shall be reported to the NRC within an additional 30 days of the time the evaluation is completed. The report shall include the cause of the condition that does not meet the acceptance criteria, the applicability of the conditions to the other unit, the acceptability of the concrete containment without repair of the item, whether or not repair or replacement is required, and if required, the extent, method, and completion date of necessary repairs, and the extent, nature, and frequency of additional examinations.”

The scope of this report is limited to examinations of the moisture barrier and the liner plate that were within the scope of IWE Inservice Inspection Program Plan for 1R26, including its applicability to the other ANO unit.

Summary of Results

In accordance with the ANO-1 Containment Inservice Inspection Program Section 2.5.1.1 and Item E1.30 of Table IWE-2500, the moisture barrier examinations are performed once each period and include 100% of the sealants intended to prevent intrusion of moisture into inaccessible areas of the pressure retaining metal or liner at concrete-to-metal interfaces which are not seal welded. This inspection of the entire moisture barrier was completed in 1R26. As a result of the inspection, it was discovered that there were signs of corrosion at the liner to moisture barrier interface indicating that there could be additional corrosion below the moisture barrier. A section of the moisture barrier was removed at the corroded locations for further inspection of the liner plate. Additional corrosion was found below the barrier, and the scope of the moisture barrier removal was expanded to determine the limits of the corrosion.

Multiple ultrasonic and pit gauge readings were taken. An evaluation of the thinned areas of the liner plate was performed, and the conclusion was that the liner plate continued to maintain its design function. It was determined that the Reactor Building was operable, but degraded / non-conforming because the thickness of the thinned areas of the liner plate is not in conformance with the design. The full evaluation is maintained on-site and is available for review.

Detailed Discussion

CAUSE OF CONDITION:

The cause of the corrosion and thinned areas of the liner plate is a result of the moisture barrier not performing adequately to prevent moisture intrusion below the barrier. By design, the upper edge of the base slab has a notch that creates a small trough at the interface between the liner plate and the slab. This design feature creates an area that is filled with backer rod and sealed over with a moisture barrier. When moisture gets below the barrier, it settles in this trough and over time begins to corrode the liner plate.

The cause of the degraded moisture barrier is due to mechanical damage caused by foot traffic, equipment, scaffolds, and other items. The entire moisture barrier is inspected at the required scheduled interval of once each period which is approximately every 3.5 years. Additional details of the inspection may be found in Section 2.5.1.1 of the ANO-1 Containment Inservice Inspection (CISI) Program. It has been determined that the mechanical damage to the moisture barrier is taking place after or between the regularly scheduled inspections.

APPLICABILITY OF CONDITION TO THE OTHER UNIT:

This condition is directly applicable to ANO, Unit 2 (ANO-2). The configuration of the liner plate and the base slab is very similar for both units, and the moisture barrier material used in each unit is the same. Mechanical damage to the ANO-2 moisture barrier was recently identified. Moisture was present below the barrier, but only light surface corrosion was present.

ACCEPTABILITY OF CONTAINMENT:

ANO-1:

An evaluation was completed for the thinned liner plate. Multiple ultrasonic and pit gauge readings were taken, and the measurements indicated that the maximum thinned area was pitting at a depth of 0.156 inches on the 0.25 inch thick liner plate. A corrosion rate was calculated, and a projection of continued corrosion of the liner through the next operating cycle was calculated. The result of the evaluation was that the liner remains acceptable through the next operating cycle. The corroded liner plate was cleaned and recoated with Service Level 1 coatings. The moisture barrier was then restored in the areas it had been removed.

ANO-2:

During the forced outage associated with a leaking Low Pressure Safety Injection check valve inside containment (2SI-13D) (Spring 2016), an inspection of the moisture barrier below the leaking valve was completed to insure that it was intact. The inspection found evidence of a degraded moisture barrier, and it was noted that there was moisture below the barrier. A section of the moisture barrier was removed to inspect the liner plate below the barrier, and

some surface corrosion was identified on the liner plate. Non-destructive evaluation data was taken on the liner plate in the area of the surface corrosion, and the results indicated that the liner plate wall was at least nominal thickness. An evaluation was completed to address the potential effects of having moisture below the barrier. The evaluation outlined the current acceptability of the condition, and provided recommendations for additional inspection in the future. The removal of additional moisture barrier samples in the Spring 2017 refueling outage (2R25) is being tracked within the ANO corrective action program. Outage activities have been approved by outage management for the replacement of all 360° of moisture barrier around the inside perimeter of the Containment Building. This replacement includes an inspection of the area for any degradation of the liner plate.

REQUIREMENTS FOR REPAIR REPLACEMENT:

The evaluation performed for the ANO-1 Reactor Building found that the structure was acceptable for the next operating cycle. At the next refuel outage, Spring 2018 (1R27), the moisture barrier is scheduled to be removed to allow reexamination and evaluation of the liner plate for continued operability. Actions within the ANO corrective action program are tracking the resolution of the condition.

The evaluation performed for the ANO-2 Reactor Building concluded the structure is acceptable for continued use.

ADDITIONAL EXAMINATION REQUIREMENTS:

Additional examinations of the moisture barrier and liner are required. Augmented examinations, including supplemental examinations as required by ASME, Section XI, Subsection IWE, are scheduled to be performed during the ANO-1 refueling outage 1R27 and the ANO-2 refueling outage 2R25. These examinations are being tracked within the CISI program and the ANO corrective action program.