



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION IV  
1600 E. LAMAR BLVD.  
ARLINGTON, TX 76011-4511

August 19, 2016

EA-15-194

Clay Warren, Acting Site Vice President  
Arkansas Nuclear One  
Entergy Operations, Inc.  
1448 SR 333  
Russellville, AR 72802-0967

**SUBJECT: ARKANSAS NUCLEAR ONE - REVISED NON-CITED VIOLATION; NRC  
INSPECTION REPORT 05000313/2015002 AND 05000368/2015002**

Dear Mr. Warren:

On August 5, 2015, the U.S. Nuclear Regulatory Commission (NRC) issued NRC Inspection Report 05000313/2015002 and 05000368/2015002 that included a non-cited violation of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion XI, "Test Control," documenting the failure to adequately test the emergency diesel generator fuel oil transfer piping (Agencywide Documents Access and Management System (ADAMS) ML15218A371).

In a written response dated September 3, 2015 (ML15246A591), you denied the non-cited violation (NCV 05000313/2015002-04, 05000368/2015002-04) associated with the failure to adequately test the emergency diesel generator fuel oil transfer piping and indicated that you were in compliance with regulatory requirements. On October 9, 2015, the NRC acknowledged receipt of your letter (ML15282A338) and informed you that we would review the basis for your denial.

The NRC conducted a detailed review of your response and the applicable regulatory requirements, in accordance with Part I, Section 2.2.8 of the NRC Enforcement Manual. Individuals who were not involved with the original inspection effort performed this review.

After consideration of the bases for your denial of the non-cited violation, the NRC has concluded that a violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," related to the failure to establish an adequate testing program for the emergency diesel generator fuel oil transfer piping for Arkansas Nuclear One, Units 1 and 2, is appropriate. However, the NRC also concluded that the original non-cited violation references to 10 CFR 50.55a(g)(1) and 10 CFR 50.55a(g)(4) should be removed. Therefore, a revision to the subject NRC inspection report will be issued to remove the 10 CFR 50.55a(g)(1) and 10 CFR 50.55a(g)(4) references in the non-cited violation. The details of the NRC's evaluation are contained in the enclosure.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room and from ADAMS, accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

C. Warren

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If you have any questions about this matter, please contact Heather Gepford, Chief, Plant Support Branch 2, Division of Reactor Safety, at 817-200-1156.

Sincerely,

*/RA/*

Kriss M. Kennedy  
Regional Administrator

Dockets: 50-313; 50-368  
Licenses: DPR-51; NPF-6

Enclosure:  
NRC Evaluation of Licensee  
Response to Non-Cited Violation

cc w/encl.: Electronic Distribution

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ADAMS ACCESSION NUMBER: **ML16232A618**

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## **NRC EVALUATION OF LICENSEE RESPONSE TO NON-CITED VIOLATION**

### **Restatement of the Violation**

Title 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures, which incorporate the requirements and acceptance limits contained in applicable design documents.

For facilities with a construction permit issued prior to January 1, 1971, 10 CFR 50.55a(g)(1) states, in part, that components (including supports) must meet the requirements of paragraphs (g)(4) and (g)(5) of this section to the extent practical. Components that are part of the reactor coolant pressure boundary and their supports must meet the requirements applicable to components that are classified as ASME Code Class 1. Other safety-related pressure vessels, piping, pumps and valves, and their supports must meet the requirements applicable to components that are classified as ASME Code Class 2 or 3.

Title 10 CFR 50.55a(g)(4) states, in part, that components that are classified as ASME Code Class 1, 2, and 3 must meet the requirements set forth in Section XI of the ASME Code. ASME Code, Section XI, Table IWD-2500-1, Examination Category D-B, Item D2.10, requires a system leakage test and a VT-2 visual examination for pressure retaining components. For buried components where a VT-2 visual examination cannot be performed, Table IWA-5244(b)(1) requires that the system pressure test for buried components that are isolable by means of valves shall consist of a test that determines the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the buried components.

Contrary to the above, from initial commercial operations to April 29, 2015, the licensee failed to establish a test program to assure that all testing required to demonstrate that the fuel oil transfer piping will perform satisfactorily in service is identified and performed in accordance with written procedures, which incorporate the requirements and acceptance limits contained in applicable design documents.

Specifically, the licensee did not establish inservice inspection examinations and testing required by 10 CFR 50.55a(g)(1) and (g)(4) and, as specified by ASME Code, Section XI, Tables IWD-2500-1 and IWA- 5244(b)(1), to detect degradation of the fuel oil piping above ground and buried between the fuel oil storage tanks and the emergency diesel generator day tanks. Since the violation is of very low safety significance and is documented in the licensee's corrective action program as Condition Report CR-ANO-2-2015-01092, it is being treated as a non-cited violation, consistent with Section 2.3.2.a of the Enforcement Policy. (NCV 05000313/2015002-04, 05000368/2015002-04; Failure to Perform Testing of Diesel Fuel Oil Transfer Piping)

Enclosure

## **Summary of the Licensee's Response**

In response to NCV 05000313/2015002-04, 05000368/2015002-04, Failure to Perform Testing of Diesel Fuel Oil Transfer Piping, the licensee provided a letter dated September 3, 2015, which contested the non-cited violation. The letter provided the basis for disputing the non-cited violation.

The licensee summarized its understanding of the specific points of the violation to be:

- Arkansas Nuclear One Units 1 and 2 had not established and maintained an adequate testing program for the fuel oil transfer piping to meet the requirements of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control."
- The failure to meet 10 CFR Part 50, Appendix B, Criterion XI, was caused by not including the subject piping in the ASME, Section XI, boundaries and by not performing the inspections of ASME, Section XI, as required by the regulations cited by the NRC in Section 1R08.b.2 of the subject inspection report.

The licensee denied that a violation of NRC requirements had occurred, in that, extending the Units 1 and 2 ASME, Section XI, boundaries to include the diesel fuel oil piping is beyond the plant's licensing basis and exceeds the requirements of the regulations cited within the non-cited violation. In addition, the licensee believed that the non-cited violation inappropriately applied the same regulation to both units without distinguishing the regulatory uniqueness of the units based on construction permit dates.

The licensee further stated that the safety evaluation issued by the NRC for approval of the extended operating period for both units determined that adequate actions were taken by the licensee for aging management of the diesel fuel oil system. Further, the aging management programs, combined with the surveillance testing required by the plant's technical specifications, provide adequate assurance that the fuel oil piping remains acceptable.

## **NRC Independent Review**

The NRC performed an independent review of the documentation associated with this finding. To evaluate the validity of the non-cited violation and address the licensee's response to the non-cited violation, the review examined two key areas:

- Reference to 10 CFR 50.55a(g)(1) in the non-cited violation
- Assessment of compliance with 10 CFR Part 50, Appendix B, Criterion XI

### **Reference to 10 CFR 50.55a(g)(1) in the Non-Cited Violation**

When reviewing documentation during the inspection, the inspector noted the design documents for both units' fuel oil systems were dated 1970. Based on this, and the licensee's lack of documentation demonstrating the Unit 2 diesel fuel oil system was designed under the Unit 2 construction permit (December 6, 1972), the inspector concluded that the systems were both designed under the Unit 1 construction permit (December 6, 1968).

However, with respect to the non-cited violation, the NRC has determined the date of the fuel oil system design documents is not relevant. The requirements of 10 CFR 50.55a(g)(1) and (g)(2) reference the date of the facility's construction permit, not the date the system in question was designed. Further, the NRC reviewed the Unit 2 Safety Evaluation Report, which stated, in part, "The date of the applicants [sic] construction permit (December 6, 1972) places this plant under 10 CFR 50.55a(g)(2)..." As a result, the NRC agrees with the licensee's contention that 10 CFR 50.55a(g)(1) does not apply to Unit 2. The NCV 05000368/2015002-04, as written, was incorrect.

The NRC determined that all plants, regardless of construction permit date, are required to meet the inservice inspection requirements of 10 CFR 50.55a(g)(4) and (g)(5). The NRC noted that paragraph 10 CFR 50.55a(g)(1) states that pre-1971 construction permit plants must meet 10 CFR 50.55a(g)(4) and (g)(5) to the extent practical. By use of the words "to the extent practical," this requirement acknowledges that when the plants were designed there was no ASME, Section XI, and it may not be possible to meet all the inspection requirements of Section XI. The NRC also noted that 10 CFR 50.55a(g)(4) explicitly excludes the design and access provisions and preservice examination requirements specified in ASME, Section XI, thus, limiting the scope of Section XI requirements that must be met. Neither 10 CFR 50.55a(g)(1) or (g)(2) were intended to change the design basis of the plant. However, they are intended to ensure the scope of components tested for earlier licensed plants is similar to those licensed later.

The NRC reviewed guidance documents for insights on the classification of the diesel fuel oil transfer system. Regulatory Guide 1.26, "Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components," Revision 1, was issued in September 1974. The NRC noted that Regulatory Guide 1.26 and its subsequent revisions state that the guide should be applied to water-, steam-, and radioactive-waste-containing components. The guidance further states, "Other systems not covered by this guide, such as instrument and service air, diesel engines and their generators and auxiliary support systems, diesel fuel, emergency and normal ventilation, fuel handling, and radioactive waste management systems, should be designed, fabricated, erected, and tested to quality standards commensurate with the safety function to be performed."

In contrast, Standard Review Plan, NUREG-75/087, dated November 24, 1975, Section 3.2.2, "System Quality Group Classification, III. Review Procedures," states, in part, "There are also systems of light-water-cooled reactors important to safety that are not identified in Regulatory Guide 1.26 and which the NRC considers should be classified Quality Group C. Examples of these systems are: diesel fuel oil system; diesel generator cooling..." This demonstrates one of the inconsistencies identified in NRC guidance documents with respect to classification of the diesel fuel oil system.

The NRC reviewed the units' Safety Analysis Reports to determine whether the diesel fuel transfer piping was classified as equivalent to Class 3. The NRC determined that the Safety Analysis Reports were inconsistent, which contributed to the difficulty of evaluating the validity of the non-cited violation as written. For example, the Unit 2 Safety Analysis Report, Table 3.2-3, specifies the emergency diesel fuel transfer pump is Code Group C and classified as ASME III, Class 3.

The table includes a note that the Code Group applies to the process piping and components, not to the instrument sensing lines. This seems to be consistent with Safety Guide 26, "Quality Group Classifications and Standards," published March 23, 1972, which states, "The system boundary includes those portions of the system required to accomplish the specified safety function and connected piping up to and including the first valve (including a safety or relief valve) that is either normally closed or capable of automatic closure when the safety function is required." Taken together, the NRC initially concluded that the Unit 2 diesel fuel transfer pump piping was Code Group C and was classified by the licensee as ASME III, Class 3, in spite of it being designed to ASME B31.1. (Note: The Safety Analysis Report for Unit 1 does not contain this information on the Code Group and classification for the diesel fuel transfer pump.)

Relative to the non-cited violation in question, Unit 2 is subject to the requirements of 10 CFR 50.55a(g)(2) and, as previously stated, not required to comply with 10 CFR 50.55a(g)(1). The NRC determined that all plants, regardless of construction permit date, are required to meet the inservice inspection requirements of 50.55a(g)(4) and (g)(5). However, the NRC found that both units' licensing basis was unclear as to whether the diesel fuel oil transfer system is considered to be Code Class 3. In addition, industry standards and the NRC's guidance have changed over the years for the diesel fuel oil transfer system. For these reasons, the NRC concluded that referencing 10 CFR 50.55a(g)(1) and (g)(4) in the non-cited violation confused the issue and detracted from the underlying performance deficiency.

#### Assessment of Compliance with 10 CFR Part 50, Appendix B, Criterion XI

The violation was cited against 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," because the licensee did not have an adequate testing program for the fuel oil transfer piping. Notwithstanding ASME Code, Section XI, requirements, the failure to perform testing in accordance with written procedures that incorporate the requirements and acceptance limits contained in applicable design documents would be a nonconformance with 10 CFR Part 50, Appendix B, Criterion XI. The NRC noted that the fuel oil transfer piping for both units was safety-related Seismic Class 1 piping, designed and built to ASME Code B31.1.0 requirements.

In the response letter, the licensee provided additional information on the testing of the fuel oil transfer piping that was not provided to the inspector during the inspection. This information included surveillance testing performed for the emergency diesel generator as defined by Unit 1 Technical Specification Surveillance Requirement 3.8.1.6. Technical Specification Surveillance Requirement 3.8.1.6 states, "Once every 31 days, verify the fuel oil transfer system operates to transfer fuel oil from storage tanks to the day tank." This is further explained in the technical specification surveillance requirement bases, which states, "This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, and the fuel delivery piping is not obstructed."

The licensee also referenced the equivalent Unit 2 surveillance testing performed for the emergency diesel generator as defined by Technical Specification Surveillance Requirement 4.8.1.1.2.a.3 and 4.8.1.1.2.a.13. Specifically, Technical Specification Surveillance

Requirement 4.8.1.1.2 states, "Each diesel generator shall be demonstrated OPERABLE: a. At least once per 31 days on a STAGGERED TEST BASIS by: 3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank." Additionally, Technical Specification Surveillance Requirement 4.8.1.1.2.c. states, "Each diesel generator shall be demonstrated OPERABLE: c. At least once per 18 months by: 13. Verifying that the fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross connection lines."

The licensee further stated that the emergency diesel generator operating procedures for both units contained specific instructions that require identification and disposition of leaks detected during or after surveillance tests. However, the NRC concluded that the described surveillances for Units 1 and 2 do not incorporate the requirements and acceptance limits contained in applicable design documents for the fuel oil transfer piping. The NRC also noted that portions of the piping are buried and leaks would not be evident.

The licensee's response letter stated that programs and procedures had been established for the purpose of maintaining the diesel fuel oil transfer piping system commensurate with its importance to safety. These procedures include monthly testing to verify the quality of the diesel fuel oil is maintained according to the industry guidelines, including verifying that moisture is not present. The NRC agrees that ensuring a lack of moisture in the stored fuel minimizes the risk of internal corrosion; however, testing the fuel oil quality does not demonstrate that the piping can meet its safety-related function.

The licensee also stated that the buried piping program verifies that the external coating of the buried portions of the piping is maintained to prevent degradation of the piping outer diameter, and functional testing of the relevant valves and pumps of the emergency diesel generating fuel oil system are included in the inservice testing program. The licensee stated that the safety evaluation issued by the NRC for approval of the extended operating period for both units determined that adequate actions were taken by the licensee for aging management of the diesel fuel oil system.

However, the NRC reviewed the license's renewal application and noted that the buried piping program only performs opportunistic inspections of the protective coating when plant maintenance or modifications uncover portions of the piping. Further, the purpose of these inspections is to ensure that a loss of material due to external surface corrosion is adequately managed. Therefore, the NRC concluded that the buried piping program inspections do not demonstrate the piping will perform satisfactorily in service. Specifically, these inspections do not demonstrate the structural integrity of the piping or that the piping continues to meet the design criteria for Seismic Class 1 components or the design criteria of ASME B31.1.

In summary, the licensee offered that the aging management programs combined with the surveillance testing required by the plant's technical specifications provided adequate assurance that the fuel oil piping remains acceptable. The NRC determined that the licensee's conclusion was incorrect and that a violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," did occur.



## **NRC Conclusion**

The violation was written to be applicable to both Units 1 and 2. The inclusion of reference to 10 CFR 50.55a(g)(1) in the violation was inappropriate as the construction permit dates for the units are different. The NRC concluded that the appropriate requirement for Unit 2 was 10 CFR 50.55a(g)(2), rather than 10 CFR 50.55(g)(1), as cited. However, 10 CFR 50.55a(g)(4) is applicable to both units.

During review of this issue, the NRC found that the licensing basis for both units was unclear on whether the diesel fuel oil transfer system should be considered equivalent to ASME Code Class 3. In addition, industry standards and the NRC's guidance have changed over the years for the diesel fuel oil system. For these reasons, the NRC concluded that referencing the testing requirements of 10 CFR 50.55a(g)(4) in the non-cited violation confused the issue and detracted from the underlying performance deficiency.

The licensee stated that the aging management programs combined with the surveillance testing required by the plant's technical specifications provided adequate assurance that the fuel oil piping remains acceptable. The NRC determined that the licensee's conclusion was incorrect and that a violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," did occur. Therefore, the non-cited violation is being upheld but revised to remove the references to 10 CFR 50.55a(g)(1) and 10 CFR 50.55a(g)(4).