



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

January 29, 2020

ANO Site Vice President  
Arkansas Nuclear One  
Entergy Operations, Inc.  
N-TSB-58  
1448 S.R. 333  
Russellville, AR 72802

**SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 - ISSUANCE OF AMENDMENT NO. 318  
RE: ADDITION OF TECHNICAL SPECIFICATION ACTIONS TO ADDRESS  
INOPERABILITY OF THE CONTAINMENT BUILDING SUMP  
(EPID L-2018-LLA-0573)**

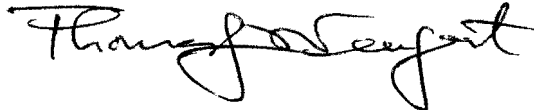
Dear Sir or Madam:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 318 to Renewed Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit 2 (ANO-2). The amendment consists of changes to the technical specifications (TSs) in response to your application dated December 19, 2018, as supplemented by letters dated April 30, 2019, and June 18, 2019.

The amendment revises the ANO-2 TSs by establishing Actions and Allowable Outage Times applicable to conditions where the ANO-2 containment building sump is inoperable. Specifically, the amendment revises Surveillance Requirement 4.5.2 in TS Section 3/4.5, "Emergency Core Cooling Systems (ECCS)," and TS 3.6.2.3, "Containment Cooling System." The amendment also adds new TS 3.6.4.1, "Containment Sump," in TS Section 3/4.6, "Containment Systems."

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas J. Wengert". The signature is fluid and cursive, with a prominent loop at the end.

Thomas J. Wengert, Senior Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosures:

1. Amendment No. 318 to NPF-6
2. Safety Evaluation

cc: Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

ENERGY OPERATIONS, INC.

DOCKET NO. 50-368

ARKANSAS NUCLEAR ONE, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 318  
Renewed License No. NPF-6

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Entergy Operations, Inc., dated December 19, 2018, as supplemented by letters dated April 30, 2019, and June 18, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-6 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 318, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications

3. This amendment is effective as of its date of issuance and shall be implemented within 90 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Jennifer L. Dixon-Herrity, Chief  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Renewed Facility  
Operating License No. NPF-6 and  
Technical Specifications

Date of Issuance: January 29, 2020

ATTACHMENT TO LICENSE AMENDMENT NO. 318  
RENEWED FACILITY OPERATING LICENSE NO. NPF-6  
ARKANSAS NUCLEAR ONE, UNIT 2  
DOCKET NO. 50-368

Replace the following pages of the Renewed Facility Operating License No. NPF-6 and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Renewed Facility Operating License

REMOVE

-3-

INSERT

-3-

Technical Specifications

REMOVE

3/4 5-4  
3/4 6-14  
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INSERT

3/4 5-4  
3/4 6-14  
3/4 6-18

- (4) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (5) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (6) EOI, pursuant to the Act and 10 CFR Parts 30 and 70 to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to conditions specified in the following Commission regulations in 10 CFR Chapter I; Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

EOI is authorized to operate the facility at steady state reactor core power levels not in excess of 3026 megawatts thermal. Prior to attaining this power level EOI shall comply with the conditions in Paragraph 2.C.(3).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 318, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

Exemptive 2nd paragraph of 2.C.2 deleted per Amendment 20, 3/3/81.

(3) Additional Conditions

The matters specified in the following conditions shall be completed to the satisfaction of the Commission within the stated time periods following issuance of the renewed license or within the operational restrictions indicated. The removal of these conditions shall be made by an amendment to the renewed license supported by a favorable evaluation by the Commission.

2.C.(3)(a) Deleted per Amendment 24, 6/19/81.

## EMERGENCY CORE COOLING SYSTEMS

### SURVEILLANCE REQUIREMENTS

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4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

- a. In accordance with the Surveillance Frequency Control Program by verifying that the following valves are in the indicated positions with power to the 2CV-5101-1 and 2CV-5102-2 valve operators removed:

<u>Valve Number</u>	<u>Valve Function</u>	<u>Valve Position</u>
2CV-5101-1	HPSI Hot Leg Injection Isolation	Closed
2CV-5102-2	HPSI Hot Leg Injection Isolation	Closed
2BS-26	RWT Return Line	Open

- b. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.
- c. DELETED
- d. DELETED
- e. In accordance with the Surveillance Frequency Control Program, during shutdown, by:
1. Verifying that each automatic valve in the flow path actuates to its correct position on SIAS and RAS test signals.
  2. Verifying that each of the following pumps start automatically upon receipt of a Safety Injection Actuation Test Signal:
    - a. High-Pressure Safety Injection pump.
    - b. Low-Pressure Safety Injection pump.

## CONTAINMENT SYSTEMS

### CONTAINMENT COOLING SYSTEM

#### LIMITING CONDITION FOR OPERATION

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3.6.2.3 Two independent containment cooling groups shall be OPERABLE with two operational cooling units in each group.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION<sup>1</sup>:

- a. With one group of the above required containment cooling units inoperable and both containment spray systems OPERABLE, restore the inoperable group of cooling units to OPERABLE status within 7 days.
- b. With two groups of the above required containment cooling units inoperable and both containment spray systems OPERABLE, restore at least one group of cooling units to OPERABLE status within 72 hours. Restore both above required groups of cooling units to OPERABLE status within 7 days of initial loss.
- c. With one group of the above required containment cooling units inoperable and one containment spray system inoperable, restore the inoperable spray system to OPERABLE status within 72 hours. Restore the inoperable group of containment cooling units to OPERABLE status within 7 days of initial loss.

Otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours. LCO 3.0.4.a is not applicable when entering HOT SHUTDOWN.

Note 1: The containment spray systems may be considered OPERABLE with respect to ACTIONS a, b, and c above if solely inoperable due to containment accident generated and transported debris exceeding the analyzed limits and LCO 3.6.4.1, ACTION a, is being met.



## CONTAINMENT SYSTEMS

### CONTAINMENT SUMP

#### LIMITING CONDITION FOR OPERATION

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3.6.4.1 The containment sump shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With the containment sump inoperable due to containment accident generated and transported debris exceeding the analyzed limits, entry into the applicable ACTION(s) of LCO 3.5.2, "ECCS Subsystems –  $T_{avg} \geq 300$  °F," LCO 3.5.3, "ECCS Subsystems –  $T_{avg} < 300$  °F," and LCO 3.6.2.1, "Containment Spray System," is not required provided:
  1. Action is initiated immediately to mitigate containment accident generated and transported debris, and
  2. SR 4.4.6.2.1.a is performed once every 24 hours, and
  3. The containment sump is restored to OPERABLE status within 90 days.
- b. With the containment sump inoperable for reasons other than ACTION a:
  1. Immediately enter the applicable ACTIONS of LCO 3.5.2, "ECCS Subsystems –  $T_{avg} \geq 300$  °F" and LCO 3.5.3, "ECCS Subsystems –  $T_{avg} < 300$  °F," for emergency core cooling trains made inoperable by the containment sump, and
  2. Immediately enter the applicable ACTIONS of LCO 3.6.2.1, "Containment Spray System," for containment spray trains made inoperable by the containment sump, and
  3. Restore the containment sump to OPERABLE status within 72 hours.

Otherwise, be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

#### SURVEILLANCE REQUIREMENTS

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- 4.6.4.1.1 Verify, by visual inspection, that the containment sump does not show structural damage, abnormal corrosion, or debris blockage in accordance with the Surveillance Frequency Control Program.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 318 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 2

DOCKET NO. 50-368

1.0 INTRODUCTION

By application dated December 19, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18353B049), as supplemented by letters dated April 30, 2019, and June 18, 2019 (ADAMS Accession No. ML19120A084 and ML19169A222, respectively), Entergy Operations, Inc. (the licensee) requested changes to the technical specifications (TSs) for Arkansas Nuclear One, Unit 2 (ANO-2).

The proposed changes would revise Surveillance Requirement (SR) 4.5.2, "Emergency Core Cooling System Surveillance Requirements," in TS Section 3/4.5, "Emergency Core Cooling Systems (ECCS)," and TS 3.6.2.3, "Containment Cooling System." The amendment also adds a new TS 3.6.4.1, "Containment Sump," to Section 3/4.6, "Containment Systems."

On March 12, 2019, the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff published a proposed no significant hazards consideration (NSHC) determination in the *Federal Register* (84 FR 8909) for the proposed amendment. Subsequently, by letters dated April 30, 2019, and June 18, 2019, the licensee provided additional information that expanded the scope of the amendment request as originally noticed in the *Federal Register*. Accordingly, the NRC published a second proposed NSHC determination in the *Federal Register* on September 10, 2019 (84 FR 47545) which superseded the original notice in its entirety.

2.0 REGULATORY EVALUATION

2.1 System Description and TS Changes

The TSs include limiting conditions for operation (LCOs), which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Specified with each stated condition of the LCO are required actions and completion times (CTs) to meet TS requirements.

### 2.1.1 TS 3/4.5.2, "ECCS Subsystems – $T_{avg} \geq 300$ °F"

The ECCS subsystems ensure that sufficient emergency core cooling capability will be available in the event of a loss-of-coolant accident (LOCA), assuming the loss of one subsystem through any single failure consideration. Either subsystem is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double-ended break of the largest reactor coolant system (RCS) cold leg pipe downward.

ANO-2 TS 3/4.5.2 is applicable in "Modes 1, 2, and 3 with pressurizer pressure  $\geq$  [greater than or equal to] 1700 psia [pounds per square inch absolute]," and requires that two independent ECCS subsystems be operable to ensure that sufficient ECCS flow is available, assuming a single failure affecting either train.

In addition, each ECCS subsystem provides long-term core cooling capability in the recirculation mode during the accident recovery period. The TS 3/4.5.2 LCO requires that each ECCS subsystem have an independent operable flow path capable of taking suction from the refueling water tank and automatically transferring suction to the containment sump when the refueling water tank is depleted.

TS 3/4.5.2 helps ensure that the following acceptance criteria for an ECCS, established by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," will be met following a LOCA:

- a. Maximum fuel element cladding temperature is less than or equal to ( $\leq$ ) 2200 degrees Fahrenheit (°F);
- b. Maximum cladding oxidation is  $\leq 0.17$  times the total cladding thickness before oxidation;
- c. Maximum hydrogen generation from a zirconium water reaction is  $\leq 0.01$  times the hypothetical amount generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;
- d. Core is maintained in a coolable geometry; and
- e. Adequate long-term core cooling capability is maintained.

TS 3/4.5.2 also limits the potential for a post-trip return to power following a main steam line break event and ensures that containment temperature limits are met.

### 2.1.2 TS 3.6.2.1, "Containment Spray System"

The containment spray system (CSS) ensures that the containment air temperature will be maintained within limits during normal operation and adequate heat removal capacity is available when operated in conjunction with the containment cooling system (CCS) during post-LOCA conditions. The TS 3/4.6.2.1 LCO includes a requirement that each CSS subsystem have an independent operable flow path capable of taking suction from the refueling water tank on a containment spray actuation signal and automatically transferring suction to the

containment sump when the refueling water tank is depleted. Each CSS subsystem flow path from the containment sump shall be via an operable shutdown cooling heat exchanger.

### 2.1.3 TS 3.6.2.3, "Containment Cooling System"

The CCS ensures that the containment air temperature will be maintained within limits during normal operation and adequate heat removal capacity is available when operated in conjunction with the CSSs during post-LOCA conditions.

The ANO-2 CSS and CCS TS LCO requirements are contained in separate sections of the TSs. Actions associated with the ANO-2 CCS (TS 3.6.2.3) provide specific restoration times for inoperable CCS groups that are dependent on the operability of CSS trains. A containment sump made inoperable due to containment-accident-generated and -transported debris exceeding the analyzed limits would also affect the CCS TS LCO and could potentially result in an unnecessary plant shutdown. To avoid this and to support the intent of the change, the licensee proposed to add a note to ANO-2 CCS TS 3.6.2.3 to allow the CSS to be considered operable with respect to Actions in TS 3.6.2.3, if the CSS is solely inoperable due to containment-accident-generated and -transported debris exceeding the analyzed limits.

## 2.2 Proposed Changes to the Technical Specifications

The proposed changes would revise ANO-2 SR 4.5.2 and TS 3.6.2.3. The proposed changes also add a new TS 3.6.4.1 to Section 3/4.6. The proposed changes are described below.

### 2.2.1 Proposed Changes to SR 4.5.2, in TS 3/4.5.2

SR 4.5.2.c requires the following:

Each ECCS subsystem shall be demonstrated OPERABLE:

By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suction during LOCA conditions. This visual inspection shall be performed:

1. For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and
2. At least once daily of the areas affected within containment if containment has been entered that day, and during the final entry when CONTAINMENT INTEGRITY is established.

SR 4.5.2.d requires the following:

In accordance with the Surveillance Frequency Control Program by a visual inspection of the containment sump and verifying that the subsystem suction inlets are not restricted by debris and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or corrosion.

The licensee proposed to delete SR 4.5.2.c and reword and relocate SR 4.5.2.d to the new containment sump TS, as discussed in Section 2.2.3 of this safety evaluation (SE).

These changes are evaluated in Section 3.1 of this SE.

#### 2.2.2 Proposed Changes to TS 3.6.2.3

The licensee proposed to add the following note to the Actions of TS 3.6.2.3:

Note 1: The containment spray systems may be considered OPERABLE with respect to ACTIONS a, b, and c above if solely inoperable due to containment accident generated and transported debris exceeding the analyzed limits and LCO 3.6.4.1, ACTION a, is being met.

This change is evaluated in Section 3.2 of this SE.

#### 2.2.3 Proposed Addition of TS 3.6.4.1

The licensee proposed to add new TS 3.6.4.1 requiring the containment sump to be operable during Modes 1, 2, 3, and 4. This included new Action a that specifies that if the containment sump is inoperable due to containment-accident-generated and -transported debris exceeding the analyzed limits, entry into the applicable Actions of LCO 3.5.2, LCO 3.5.3, "ECCS Subsystems –  $T_{avg} < [\text{less than}] 300 \text{ }^\circ\text{F},$ " and LCO 3.6.2.1, is not required, provided the licensee: (1) initiates action to mitigate the containment-accident-generated and -transported debris immediately, (2) performs SR 4.4.6.2.1.a once per 24 hours, and (3) restores the containment sump to OPERABLE status within 90 days (Actions a.1, a.2, and a.3, respectively). Surveillance Requirement 4.4.6.2.1.a requires verification that the RCS operational leakage is within limits by performance of an RCS water inventory balance.

New Action b specifies that if the containment sump is inoperable for reasons other than Action a, then the licensee is required to immediately enter the applicable actions of LCO 3.5.2 and LCO 3.5.3 for emergency core cooling trains made inoperable by the containment sump, and immediately enter the applicable Actions of LCO 3.6.2.1 for containment spray trains made inoperable by the containment sump. Action b also requires the containment sump be restored to operable status within 72 hours.

The terminal action at the end of new TS 3.6.4.1 specifies that if Actions a and b are not met, then the licensee is required to be in hot standby within the next 6 hours and in cold shutdown within the following 30 hours.

The licensee proposed to reword and relocate SR 4.5.2.d from SR 4.5.2 to new SR 4.6.4.1.1. The new SR 4.6.4.1.1 requires the licensee to "Verify, by visual inspection, the containment sump does not show structural damage, abnormal corrosion, or debris blockage in accordance with the Surveillance Frequency Control Program."

This change is evaluated in Section 3.3 of this SE.

### 2.3 Applicable Regulatory Requirements Guidance

#### 2.3.1 Regulatory Requirements

Under 10 CFR 50.92(a), determinations on whether to grant an applied-for license amendment are to be guided by the considerations that govern the issuance of initial licenses or construction permits to the extent applicable and appropriate. Both the common standards for licenses and

construction permits in 10 CFR 50.40, and those specifically for issuance of operating licenses in 10 CFR 50.57(a)(3), provide that there must be “reasonable assurance” that the activities at issue will not endanger the health and safety of the public.

The regulations at 10 CFR 50.36(a)(1) require each applicant for a license authorizing operation of a utilization facility to include in the application proposed TSs. Section 50.36(a)(1) of 10 CFR also states, in part, that “A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the technical specifications.”

The regulations at 10 CFR 50.36(b) require:

Each license authorizing operation of a ... utilization facility ... will include technical specifications. The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to [10 CFR 50.34, “Contents of applications; technical information”]. The Commission may include such additional technical specifications as the Commission finds appropriate.

The categories of items required to be in the TSs are provided in 10 CFR 50.36(c). As required, in part, by 10 CFR 50.36(c)(2)(i), the TSs will include LCOs, which are “the lowest functional capability or performance levels of equipment required for safe operation of the facility.” The regulation at 10 CFR 50.36(c)(2)(i) requires, in part, that “When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.”

The regulation at 10 CFR 50.36(c)(3) requires TSs to include SRs, which “are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.”

### 2.3.2 Regulatory Guidance

The guidance that the NRC staff considered in its review of this license amendment request included the following:

- NUREG-0800, Revision 3, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition,” Chapter 16.0, Section 16, “Technical Specifications,” dated March 2010 (ADAMS Accession No. ML100351425), which provides guidance on review of TSs.
- NUREG-1432, Revision 4, “Standard Technical Specifications, Combustion Engineering Plants,” Volume 1, “Specifications,” and Volume 2, “Bases,” dated April 2012 (ADAMS Accession Nos. ML12102A165 and ML12102A169, respectively).

### 3.0 TECHNICAL EVALUATION

#### 3.1 Proposed Changes to TS 4.5.2

The licensee proposed to delete SR 4.5.2.c and reword and relocate SR 4.5.2.d from SR 4.5.2 to the new TS 3.6.4.1. Therefore, the licensee proposed deletion of TSs 4.5.2.c and 4.5.2.d. In its letter dated December 19, 2018, the licensee stated, in part:

... SR 4.5.2.c is an administrative control associated with the ANO foreign material exclusion (FME) program and with closeout of the containment building following any personnel access to the building. This SR existed in the original version of the ANO-2 TSs and was not addressed in TSTF [Technical Specifications Task Force]-567 because it does not exist in the ISTS [improved standard technical specification].

The licensee also stated that FME procedures provide instruction to prevent foreign material from becoming a concern for or entering a structure, system, or component (SSC), and also provide instruction for inspections of SSCs prior to returning the SSC to service. On page 7 of the enclosure to its letter dated December 19, 2018, the licensee describes the ANO-2 procedures that provide these instructions.

The licensee further stated that FME controls are generally associated with maintenance and inspection activities and that it is incumbent upon the licensee to ensure any SSC is properly restored and configured prior to return to service. This not only includes ensuring foreign material has not been introduced into an SSC, but also requires other basic verifications such as proper oil levels in pumps, correct system alignments, proper venting and filling of systems, and post-maintenance testing, where appropriate. These licensee responsibilities are not generically included in the TSs.

On page 7 of the enclosure to its letter dated December 19, 2018, the licensee stated, in part:

ANO-2 SR 4.5.2.c is an FME control that verifies the status of the containment building prior to establishing containment integrity as required by the TSs. As discussed above, ANO FME controls also perform a second inspection of the containment building cleanliness prior to the approach to criticality and controls are also established for any containment building entry following the establishment of containment integrity.

New SR 4.6.4.1.1 does not limit the visual inspection to the suction inlet, trash racks and screens as currently required by the TSs, but instead requires inspection of the entire containment sump system. The containment sump system consists of the containment drainage flow paths (drains that enter the reactor building sump directly contain screens, caps, and/or strainers), the containment sump strainers, and the inlet to the ECCS and CSS piping.

Based on the above licensee procedures, the NRC staff finds that the proposed deletion of SR 4.5.2.c is acceptable since the licensee has established appropriate administrative controls for the inspection of containment drains, the containment sump, and the general areas of the containment building to ensure that any trash, debris, or foreign materials present in the containment building are within analyzed limits. In addition, new SR 4.6.4.1.1 continues to ensure that the requirements imposed by current SR 4.5.2.c are met.

In addition, the NRC staff finds that the proposed rewording and relocation of SR 4.5.2.d to SR 4.6.4.1.1 is acceptable since the existing requirements are either unchanged or expanded and continue to ensure the containment sump is unrestricted (i.e., unobstructed) and stays in proper operating condition. The proposed change meets the requirements of 10 CFR 50.36(c)(3) because it provides a SR to assure that the necessary quality of systems and components are maintained, that facility operation will be within safety limits, and that the LCOs will be met.

### 3.2 Proposed Changes to TS 3.6.2.3

The licensee proposed to add a note to the Actions of TS 3.6.2.3 stating that "The containment spray systems may be considered OPERABLE with respect to ACTIONS a, b, and c [(of TS 3.6.2.3)] if solely inoperable due to containment accident generated and transported debris exceeding the analyzed limits and LCO 3.6.4.1, Action a, is being met."

The NRC staff finds the proposed addition of the note acceptable since it supports the intent of the new containment sump TS, which allows an extended risk-informed CT, and helps avoid an unnecessary shutdown when one or more containment cooling groups are inoperable coincident with the containment sump being inoperable solely due to containment-accident-generated and -transported debris exceeding the analyzed limits.

### 3.3 Proposed Addition of TS 3.6.4.1

#### 3.3.1 Evaluation of the New TS

The containment sump supports the post-accident operation of the ECCS and CSS. However, only the current ECCS TSs contain SRs related to the containment sump, and the TSs do not specify required actions that specifically address an inoperable containment sump. If the containment sump was found to be inoperable, as an ECCS and CSS support system, those respective LCOs would not be met. In order to address concerns related to containment sump operability due to debris accumulation described in Generic Safety Issue 191, "Assessment of Debris Accumulation on PWR [Pressurized-Water Reactor] Sump Performance," the licensee proposed to add a new specification to address containment sump inoperability and create a condition for when the sump is inoperable due to analyzed containment-accident-generated and -transported debris.

As stated, in part, in the Commission's "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Plants," (Policy Statement) published in the *Federal Register* on July 22, 1993 (58 FR 39132), "It is the intent of this criterion to capture into Technical Specifications only those structures, systems, and components that are part of the primary success path of a safety sequences analysis. Also captured by this criterion are those support and actuation systems that are necessary for items in the primary success path to successfully function." Also, the Policy Statement states that, "The primary success path of a safety sequence analysis consists of the combination and sequences of equipment needed to operate (including consideration of the single failure criteria), so that the plant response to Design Basis Accidents and Transients limits the consequences of these events to within the appropriate acceptance criteria." During all accidents that require recirculation, the containment sump provides a source of borated water to the ECCS and CSS pumps. As such, it supports residual heat removal, emergency core cooling, containment cooling, and containment atmosphere cleanup during an accident. It also provides a source of negative reactivity. In addition, it



supports long-term core cooling following any accident that requires recirculation from the containment sump.

Based on the below evaluation, the NRC staff determined that the proposed TS satisfies the requirements of 10 CFR 50.36(c)(2) because the LCO specifies the lowest functional capability or performance levels of equipment required for safe operation of the facility. There is reasonable assurance that the required actions to be taken when the LCO is not met can be conducted without endangering the health and safety of the public.

### 3.3.2 Evaluation of the Applicability

The new TS requires the containment sump to be operable during Modes 1, 2, 3, and 4. ANO-2's ECCS and CSS TSs are applicable during Modes 1, 2, 3, and 4.

The NRC staff finds that the proposed Applicability is acceptable because the Applicability is consistent with the Applicability of the ECCS and CSS TSs, the containment sump supported systems.

### 3.3.3 Evaluation of Action a

The licensee has analyzed the susceptibility of the ECCS and CSS to the adverse effects of post-accident debris blockage and operation with debris-laden fluids. The licensee has established limits on the allowable quantities of containment-accident-generated debris that could be transported to the containment sump based on its current plant configuration. In the current TSs, if unanalyzed debris sources are discovered inside containment, if errors are discovered in debris-related analyses, or if a previously unevaluated phenomenon that can affect containment sump performance is discovered, the containment sump, and the supported ECCS and CSS, may be inoperable and the TSs would require a plant shutdown with no time provided to evaluate the condition.

To address this situation and to provide sufficient time to evaluate the condition, the licensee proposed Action a, which is applicable when the containment sump is inoperable due to containment-accident-generated and -transported debris exceeding the analyzed limits. Under Action a, the operability of the containment sump with respect to debris is based on a quantity of debris evaluated and determined to be acceptable by the licensee. Conditions not evaluated under Action a (containment-accident-generated and -transported debris) and that affect the quantity of analyzed debris will be evaluated using new Action b.

Under Action a, entry into the applicable actions of LCOs 3.5.2, 3.5.3, and 3.6.2.1, are not required provided Actions a.1, a.2 and a.3 are met.

Action a.1 mandates immediate action to be initiated to mitigate the condition. The licensee's proposed TS Bases for Action a.1 provided the following examples of mitigating actions:

- Removing the debris source from containment or preventing the debris from being transported to the containment sump;
- Evaluating the debris source against the assumptions in the analysis;
- Deferring maintenance that would affect availability of the affected systems and other LOCA mitigating equipment;

- Deferring maintenance that would affect availability of primary defense-in-depth systems, such as containment coolers;
- Briefing operators on LOCA debris management actions; or
- Applying an alternative method to establish new limits.

The NRC staff finds that the proposed Action a.1 and its CT are acceptable because they place urgency on the initiation of the appropriate actions that could mitigate or reduce the impact of the identified conditions.

Concurrently, Action a.2 mandates SR 4.4.6.2.1.a, the RCS water inventory balance, to be performed at an increased frequency of once per 24 hours. An unexpected increase in RCS leakage could be indicative of an increased potential for an RCS pipe break, which could result in debris being generated and transported to the containment sump.

The NRC staff finds that the proposed Action a.2 and its CT are acceptable because the more frequent monitoring allows operators to act in a timely fashion to minimize the potential for an RCS pipe break while the containment sump is inoperable.

In addition, Action a.3 requires the inoperable containment sump to be restored to operable status in 90 days.

The NRC staff finds that the proposed Action a.3 and its CT are acceptable because they provide a reasonable amount of time to diagnose, plan and possibly reduce the severity of, or mitigate the unanalyzed debris condition and prevent a loss of ECCS and CSS safety function. In addition, 90 days is adequate given the conservatism in the containment debris analysis and the proposed compensatory actions required to be implemented immediately by Action a.1. Also, as discussed later in Section 3.3.6 of this SE, the new SR will require visual inspection of the containment sump system (including the containment drainage flow paths, any design features upstream of the containment sump that are credited in the containment debris analysis, the containment sump strainers, and the inlet to the ECCS and CSS piping for evidence of structural degradation, potential for debris bypass, and presence of corrosion or debris blockage) to ensure no loose debris is present and there is no evidence of structural distress or abnormal corrosion.

#### 3.3.4 Evaluation of Action b

Action b specifies the required Actions for when the containment sump is inoperable for reasons other than containment-accident-generated and -transported debris exceeding the analyzed limits.

Action b states that if the containment sump is inoperable for reasons other than Action a, then the licensee is required to immediately and concurrently enter the applicable actions of LCOs 3.5.2 and 3.5.3, for emergency core cooling trains made inoperable by the containment sump (Action b.1), and LCO 3.6.2.1, for containment spray trains made inoperable by the containment sump (Action b.2). Action b.3 also applies concurrently and requires the containment sump be restored to operable status within 72 hours.

Since Actions b.1 and b.2 direct entry to the corresponding support systems (i.e., ECCS and CSS), TS Actions b.1 and b.2 retain the existing TS Actions for ECCS and CSS trains made inoperable by an inoperable containment sump for reasons other than containment-accident-generated and -transported debris exceeding the analyzed limits.

The NRC staff finds that the proposed change is acceptable because it continues to provide remedial Actions for when the containment sump is inoperable for reasons other than Action a and ensures safe operation of the plant. In addition, the proposed CT is acceptable because it provides a reasonable time for repairs, and there is a low probability of an accident occurring during this period that would require the use of the containment sump.

### 3.3.5 Evaluation of Terminal Action

If operators are unable to restore the containment sump to operable status under Actions a or b, the terminal action at the end of new TS 3.6.4.1 requires the unit to be in hot standby within the next 6 hours and in cold shutdown within the following 30 hours.

The NRC staff finds this proposed terminal action acceptable because it requires the operators to place the unit in a condition in which the LCO no longer applies. In addition, the proposed CTs allow a reasonable amount of time to decrease from operational Mode 1, full power conditions to operational Mode 5, cold shutdown in an orderly manner and without challenging plant systems.

### 3.3.6 Evaluation of New SR 4.6.4.1.1

The licensee proposed a new SR in the new containment sump TS. This SR was originally located in TS 4.5.2.d. The frequency of the new SR is in accordance with the Surveillance Frequency Control Program.

The new SR requires verification, by visual inspection, that the containment sump does not show structural damage, abnormal corrosion, or debris blockage.

The new SR is stated in generic terms and expands the scope of the required visual inspection to include the entire containment sump system. The entire containment sump system consists of the containment drainage flow paths, the containment sump strainers, and the inlet to the ECCS and CSS piping.

The NRC staff finds the proposed new SR acceptable because the scope of the proposed surveillance is more comprehensive than that for the existing SR. In addition, the proposed frequency is acceptable since it is the same as that currently required by the TSs. Therefore, the NRC staff finds that, as required by 10 CFR 50.36(c)(3), the necessary quality of systems will be maintained in accordance with the associated LCOs.

### 3.3.7 Conclusion Regarding Proposed Containment Sump TS

The new containment sump TS retains and expands the existing TS requirements with the exception of the addition of Action a. Action a provides a condition for an inoperable containment sump due to containment-accident-generated and -transported debris exceeding the analyzed limits.

The NRC staff reviewed the proposed changes against the regulations and finds that the changes continue to meet the applicable requirements of 10 CFR 50.36 for the reasons discussed above and, thus, provide reasonable assurance that these revised TSs will have the requisite requirements and controls to operate safely. Therefore, the NRC staff finds that the proposed TS changes are acceptable.

#### 3.4 Technical Evaluation Conclusion

The NRC staff determined that the proposed TS changes meet the standards for TSs in 10 CFR 50.36 and are acceptable. As required by 10 CFR 50.36(c)(2), the LCOs specify the lowest functional capability or performance levels of equipment required for safe operation of the facility. The proposed changes to the SR assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met, and satisfy 10 CFR 50.36(c)(3).

#### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arkansas State official was notified of the proposed issuance of the amendment on August 13, 2019. The State official had no comments.

#### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes SRs. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves NSHC published in the *Federal Register* on September 10, 2019 (84 FR 47545), and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

#### 6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: C. Tilton, NRR

Date: January 29, 2020

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 - ISSUANCE OF AMENDMENT NO. 318  
RE: ADDITION OF TECHNICAL SPECIFICATION ACTIONS TO ADDRESS  
INOPERABILITY OF THE CONTAINMENT BUILDING SUMP  
(EPID L-2018-LLA-0573) DATED JANUARY 29, 2020

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