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

June 19, 2018

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 1 - ISSUANCE OF AMENDMENT RE: TECHNICAL SPECIFICATION CHANGES PURSUANT TO TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF-412, REVISION 3 (CAC NO. MG0009; EPID L-2017-LLA-0267)

Dear Sir or Madam:

The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment No. 260 to Renewed Facility Operating License No. DPR-51 for Arkansas Nuclear One, Unit 1 (ANO-1). The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated July 17, 2017.

The amendment establishes Conditions, Required Actions, and Completion Times in ANO-1 TS 3.7.5, "Emergency Feedwater (EFW) System," for the Condition where one steam supply to the turbine-driven EFW is inoperable concurrent with an inoperable motor-driven EFW train. The change is consistent with NRC-approved Technical Specifications Task Force (TSTF) Traveler, TSTF-412, Revision 3, "Provide Actions for One Steam Supply to Turbine Driven AFW [Auxiliary Feedwater]/EFW Pump Inoperable."

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

Sincerely,

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

Docket No. 50-313

Enclosures:
1. Amendment No. 260 to DPR-51
2. Safety Evaluation

cc: Listserv

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

ENTERGY OPERATIONS, INC.

DOCKET NO. 50-313

ARKANSAS NUCLEAR ONE, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 260
Renewed License No. DPR-51

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Entergy Operations, Inc. (the licensee), dated July 17, 2017, 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 license 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. DPR-51 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 260, are hereby incorporated in the renewed license. EOI shall operate the facility in accordance with the Technical Specifications.

3. The license 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

Robert J. Pascarelli, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility
Operating License No. DPR-51
and Technical Specifications

Date of Issuance: June 19, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 260

RENEWED FACILITY OPERATING LICENSE NO. DPR-51

ARKANSAS NUCLEAR ONE, UNIT 1

DOCKET NO. 50-313

Replace the following pages of the Renewed Facility Operating License No. DPR-51 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	INSERT
3	3

Technical Specifications

REMOVE	INSERT
3.7.5-1	3.7.5-1
3.7.5-2	3.7.5-2
3.7.5-3	3.7.5-3
---	3.7.5-4

(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 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;

(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 the 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; 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 2568 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 260, are hereby incorporated in the renewed license. EOI shall operate the facility in accordance with the Technical Specifications.

(3) Safety Analysis Report

The licensee's SAR supplement submitted pursuant to 10 CFR 54.21(d), as revised on March 14, 2001, describes certain future inspection activities to be completed before the period of extended operation. The licensee shall complete these activities no later than May 20, 2014.

(4) Physical Protection

EOI shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans, including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Arkansas Nuclear One Physical Security Plan, Training and Qualifications Plan, and Safeguards Contingency Plan," as submitted on May 4, 2006.

3.7 PLANT SYSTEMS

3.7.5 Emergency Feedwater (EFW) System

LCO 3.7.5 Two EFW trains shall be OPERABLE.

----------NOTE----------
Only one EFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable when entering Mode 1.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Turbine driven EFW train inoperable due to one inoperable steam supply. OR ----------NOTE---------- Only applicable if MODE 2 has not been entered following refueling. --- Turbine driven EFW pump inoperable in MODE 3 following refueling.	A.1 Restore affected equipment to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the LCO
B. One EFW train inoperable in MODE 1, 2, or 3 for reasons other than Condition A.	B.1 Restore EFW train to OPERABLE status.	72 hours AND 10 days from discovery of failure to meet the LCO

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Turbine driven EFW train inoperable due to one inoperable steam supply. AND Motor driven EFW train inoperable.	C.1 Restore the steam supply to the turbine driven EFW train to OPERABLE status. OR C.2 Restore the motor driven EFW train to OPERABLE status.	24 hours 24 hours
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	6 hours 18 hours
E. ----------NOTE---------- Not applicable when the turbine driven EFW train is inoperable solely due to one inoperable steam supply. ---------- Two EFW trains inoperable in MODE 1, 2, or 3.	E.1 ----------NOTE---------- LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one EFW train is restored to OPERABLE status. ---------- Initiate action to restore one EFW train to OPERABLE status.	 Immediately
F. Required EFW train inoperable in MODE 4.	F.1 Initiate action to restore EFW train to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.5.1	Verify each EFW manual, power operated, and automatic valve in each water flow path and in both steam supply flow paths to the steam turbine driven pump, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.5.2	----------NOTE---------- Not required to be performed for the turbine driven EFW pump, until 24 hours after reaching ≥ 750 psig in the steam generators. ----------	
	Verify the developed head of each EFW pump at the flow test point is greater than or equal to the required developed head.	In accordance with the INSERVICE TESTING PROGRAM
SR 3.7.5.3	----------NOTE---------- Not required to be met in MODE 4 when steam generator is relied upon for heat removal. ----------	
	Verify each EFW automatic valve that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	18 months
SR 3.7.5.4	----------NOTE---------- Not required to be met in MODE 4 when steam generator is relied upon for heat removal. ----------	
	Verify each EFW pump starts automatically on an actual or simulated actuation signal.	18 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.5.5	Verify proper alignment of the required EFW flow paths by verifying manual valve alignment from the "Q" condensate storage tank to each steam generator.	Prior to entering MODE 2 whenever the unit has been in MODE 5, MODE 6, or defueled for a cumulative period of > 30 days
SR 3.7.5.6	Verify that feedwater is delivered to each steam generator using the motor-driven EFW pump.	18 months

UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 260 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-51

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 1

DOCKET NO. 50-313

1.0 INTRODUCTION

By application dated July 17, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17198F072), Entergy Operations, Inc. (Entergy, the licensee), submitted a license amendment request to adopt a previously-approved Technical Specifications Task Force (TSTF) Traveler for Arkansas Nuclear One, Unit 1 (ANO-1). Approved TSTF Travelers are generic changes to the Improved Standard Technical Specifications (STS) that may be adopted by facilities meeting the conditions associated with the change. The licensee proposed to establish Conditions, Required Actions, and Completion Times (CTs) in ANO-1 Technical Specification (TS) 3.7.5, "Emergency Feedwater (EFW) System," for the condition where one steam supply to the turbine-driven EFW pump is inoperable concurrent with an inoperable motor-driven EFW train. The licensee stated that the proposed change is consistent with U.S. Nuclear Regulatory Commission (NRC)-approved TSTF-412, Revision 3, "Provide Actions for One Steam Supply to Turbine Driven AFW [Auxiliary Feedwater]/EFW Pump Inoperable." The availability of this TS improvement was announced in the *Federal Register* on July 17, 2007 (72 FR 39089), as part of the consolidated line item improvement process.

By letter dated October 2, 2017 (ADAMS Accession No. ML17275A910), Entergy requested a licensing basis amendment, which would modify the TS Bases for TS 3.7.5. The proposed change to the TS Bases would expand the scope of inoperable equipment that would be considered as an inoperable steam supply to the turbine-driven EFW pump. Specifically, a condition resulting in inoperability of one of two sets of direct current (DC)-powered steam admission valves at the turbine would be classified as an inoperable steam supply to the turbine-driven EFW pump rather than an inoperable turbine-driven EFW pump. This proposed change does not conflict with the implementation of the above proposed changes to ANO-1 TS 3.7.5.

2.0 REGULATORY EVALUATION

2.1. Description of Auxiliary Feedwater System

The ANO-1 nuclear steam supply system is a Babcock and Wilcox (B&W) design with two once-through steam generators (OTSGs). The EFW system consists of one turbine-driven EFW pump, one motor-driven EFW pump, and associated piping, valves, and instrumentation. The steam supply for the turbine-driven EFW pump may be drawn from either or both OTSGs, with a normally-open alternating current (AC) motor-operated valve capable of isolating the turbine-driven pump steam supply line from each OTSG. Near the turbine-driven pump, the steam supply line splits into two trains of turbine steam admission valves, with each train consisting of bypass and full flow DC motor-operated valves in parallel. The motor-driven EFW pump is powered from the "A" train of the AC electrical distribution system. Each pump delivers EFW flow to either or both OTSGs.

The ANO-1 EFW system is described in Section 10.4.8 of the ANO-1 Safety Analysis Report (SAR), Amendment 27 (ADAMS Accession No. ML17297B948). The EFW system assures a sufficient feedwater supply to the OTSGs to remove energy stored in the core and primary coolant when the normal feedwater system is not available and in some other circumstances. The EFW pumps are designed to start automatically in the event of a loss of both main feedwater pumps, actuation of the anticipated transient without scram mitigation system actuation circuitry, a safety injection signal, loss of all reactor coolant pumps, low OTSG pressure, or a low OTSG water level. The ANO-1 SAR describes EFW system credit in accident analyses for a steamline break accident and cooldown following a loss-of-coolant accident through a small break.

2.2 Licensee's Proposed Changes

Entergy proposed to modify ANO-1 TS 3.7.5, "Emergency Feedwater (EFW) System," to add an entry condition of the turbine-driven EFW train inoperable due to one inoperable steam supply and the motor-drive EFW train inoperable as a revised Condition C. The Required Action for revised Condition C would require either restoration of the steam supply to the turbine-driven EFW train to operable status or restoration of the motor-driven EFW train to operable status. The CT for revised Condition C would be 24 hours. The licensee also proposed conforming changes to existing Conditions C, D, and E to:

- rename existing Conditions C, D, and E as Conditions D, E, and F, respectively;
- modify renamed Condition D to apply when the Required Action and CTs of Condition A, B, or C are not met, rather than just when the Required Actions and CTs of Conditions A or B are not met; and
- add a note to renamed Condition E stating that it is "Not applicable when the turbine driven EFW train is inoperable solely due to one inoperable steam supply," in order to clearly differentiate Condition E from Condition C.

Finally, the licensee proposed editorial changes to Conditions A and B and modified the layout of the TSs resulting in some EFW system surveillance requirements (SRs) moving to a different page.

2.3 Regulatory Review

The proposed license amendment involves a change to the content of the TSs. The NRC staff reviews proposed TS changes for compliance with applicable regulations and conformance with associated regulatory guidance.

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(b) states, in part: "The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to §50.34." As stated in 10 CFR 50.34, "Contents of applications; technical information," the General Design Criteria (GDC) of Appendix A to 10 CFR Part 50 establish minimum requirements for the principal design criteria for water-cooled nuclear power plants similar in design to plants for which construction permits have previously been issued by the Commission. Pursuant to 10 CFR 50.34, the facility safety analysis report includes a description of the relation of the design bases to the principal design criteria. In addition, 10 CFR 50.36(c)(2) states, in part: "Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. 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."

Section 1.4 of the ANO-1 SAR includes the following discussion addressing GDC 34, "Residual Heat Removal" and its relationship to the EFW system design basis:

> 1.4.30 CRITERION 34 – RESIDUAL HEAT REMOVAL
>
> A system to remove residual heat shall be provided. The system safety function shall be to transfer fission product decay heat and other residual heat from the reactor core at a rate such that specified acceptable fuel design limits and the design conditions of the Reactor Coolant Pressure Boundary are not exceeded.
>
> Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities, shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished assuming a single failure.
>
> Discussion
>
> Reactor decay heat is removed through either one of the two steam generators until the RCS [Reactor Coolant System] is cooled to where the Decay Heat Removal System becomes operational. Steam generated by decay heat will supply the steam-driven emergency feedwater pump turbine and can also be vented to atmosphere and/or bypassed to the condenser. The steam generators can also be supplied feedwater from one condensate pump and the auxiliary feedwater pump or by the motor-driven emergency feedwater pump. The steam generators provide a long-term capability for decay heat removal.
>
> The main feedwater pumps supply water from the condensate pumps and the condenser hotwell to the steam generators. The emergency feedwater pumps take suction from either the Condensate Storage Tank or the Service Water

System. During normal operations, the Condensate Storage Tank is sufficient to provide for decay heat removal after reactor shutdown with the condenser isolated for several hours until additional condensate grade water can be made available. The condenser is normally available so that water inventory is not depleted. During emergency operations, the safety grade Condensate Storage Tank has a 30 minute (minimum) supply of emergency feedwater protected by a tornado missile shield wall, giving operators ample time to align the emergency feedwater pump suctions to the Service Water System. The Reactor Coolant Pumps are provided with sufficient inertia to maintain adequate flow to prevent fuel damage if power to all pumps is lost. Natural circulation coolant flow will provide adequate core cooling after the pump energy has been dissipated. The Decay Heat Removal System will remove the decay heat until the RCS temperature is at a level at which refueling or maintenance may be safely performed. If leakage occurs during system operation, provisions are made for isolation. The Decay Heat Removal System serves as an engineered safeguards system for emergency core cooling; consequently, it is capable of operation from either onsite or offsite power supplies.

Guidance for NRC staff review of TSs is contained in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water] Edition," Section 16.0, Revision 3, "Technical Specifications" (ADAMS Accession No. ML100351425). The staff has prepared STS for each of the LWR nuclear steam supply systems and associated balance–of–plant equipment systems. The guidance specifies that the staff reviews whether the content and format of proposed TSs are consistent with the applicable STS. Where TS provisions depart from the reference TSs, the staff determines whether the proposed differences are justified by uniqueness in plant design or other considerations. The applicable current STS for ANO-1 are contained in NUREG-1430, "Standard Technical Specifications – Babcock and Wilcox Plants," Volume 1, Revision 4 (ADAMS Accession No. ML12100A177).

3.0 TECHNICAL EVALUATION

The model TS 3.7.5 included in NUREG-1430, Revision 4, is consistent with TSTF-412, Revision 3, and the TS is configured for a B&W plant with a three-train EFW system consisting of two turbine-driven EFW pumps and one motor-driven pump. Plant EFW systems often consist of three pumps, typically two motor-driven EFW pumps and one turbine-driven pump configured into three trains. The capacity of the EFW pumps varies by plant, typically with the turbine-driven pumps having the capacity to remove necessary heat for any design-basis accident or event requiring EFW system flow and the motor-driven pumps having between half the capacity and the full capacity of the turbine-driven pump. Motor-driven EFW pumps are typically powered from an independent Class 1E power supply, and each pump feeds one or more steam generators (SGs). Turbine-driven EFW pumps receive all necessary steam flow from either or both connected SGs and provide the required EFW to all SGs. The model safety evaluation (SE) for TSTF-412, Revision 3, published in the *Federal Register* on July 17, 2007 (72 FR 39089), was based on the most common EFW system configuration consisting of two motor-driven pumps and one turbine-driven pump.

The ANO-1 EFW system configuration differs from the configurations used for the model TS 3.7.5 in NUREG-1430, Revision 4, and the configuration considered for the model SE for TSTF-412, Revision 3. The ANO-1 EFW system consists of two EFW pumps, with one full-capacity turbine-driven pump and one full-capacity motor-driven pump. Both ANO-1 EFW pumps deliver flow to one or both OTSGs. The capability of ANO-1 EFW system is similar to

the configuration considered for the TSTF-412 model SE when the two motor-driven pumps have less than full capacity in that either the turbine-driven pump alone or all installed motor-driven pumps are capable of delivering all necessary EFW flow for the full spectrum of design-basis accidents and events. The distinction between the ANO-1 configuration and the TSTF-412 configuration is the probability and consequences of a single failure of a motor-driven pump. The ANO-1 motor-driven train would lose the capacity to provide any EFW flow, but the TSTF-412 configuration may retain sufficient capability to provide adequate EFW flow for a partial spectrum of events. However, the greater number of components in the TSTF-412 configuration slightly increases the probability of failure of one pump. Therefore, the NRC staff concluded that the model SE prepared for TSTF-412 is generally applicable to the proposed ANO-1 TS 3.7.5.

The NRC staff developed the following evaluation of each proposed change to ANO-1 TS 3.7.5:

Limiting Condition for Operation (LCO) 3.7.5 Condition A (as proposed)

The licensee proposed modifying Condition A to refer to a turbine-driven EFW train inoperable due to one inoperable steam supply, instead of referring to the inoperability of one steam supply to a turbine-driven EFW pump. This editorial change makes Condition A train oriented instead of component oriented, consistent with the other Conditions that are included in STS 3.7.5, but has no substantive effect on the diagnosis of the condition or the implementation of the Required Actions. The train oriented approach is consistent with the preferred approach generally reflected in the STS, and, therefore, the proposed change is acceptable.

LCO 3.7.5, Condition B (as proposed)

The licensee proposed an editorial change to Condition B that moves the phrase "in MODE 1, 2, or 3" from the end of the Condition statement to immediately after the word "inoperable." This change is consistent with the STS wording and clarifies that the Condition applies when one EFW train is inoperable in Modes 1, 2, or 3. Therefore, the change is acceptable.

LCO 3.7.5, Condition C (as proposed)

The licensee proposed a new Condition C with either of two possible Required Actions (C.1 OR C.2) for the turbine-driven EFW train being inoperable due to one inoperable steam supply and the motor driven EFW train being inoperable at the same time. Required Action C.1 specifies restoration of the affected steam supply to the turbine-driven EFW train to operable status within 24 hours. Alternatively, Required Action C.2 specifies restoration of the inoperable motor driven EFW train within 24 hours.

As discussed in the model SE for TSTF-412, Revision 3, the proposed 24-hour CT is applicable to plants that may provide insufficient flow to the SGs to satisfy accident analyses assumptions if a main steamline break (MSLB) or feedwater line break (FLB) were to occur that renders the remaining steam supply to the turbine-driven EFW pump inoperable (a concurrent single failure is not assumed). Insufficient feedwater flow could result at plants with three EFW pumps if, for example, the single remaining operable EFW train does not have sufficient capacity to satisfy accident analyses assumptions or the operable EFW train only feeds the faulted SG (i.e., the SG that is aligned to the operable steam supply for the turbine-driven EFW pump). (This would typically apply to plants with two motor-driven EFW pumps when each motor-driven EFW pump delivers less than 100 percent of the required flow.) In accordance with TSTF-412, a 48-hour CT would be applicable when the remaining operable motor-driven EFW train is capable of

providing sufficient feedwater flow in accordance with accident analyses assumptions. (This would typically apply to plants when the remaining operable EFW pump delivers greater than or equal to 100 percent of the required flow.)

The STS typically allow a 72-hour or longer CT for Conditions where the remaining operable equipment is able to mitigate postulated accidents without assuming a concurrent single active failure. For TSTF-412, the 24-hour CT applies to the situation where the turbine-driven EFW train would be able to deliver adequate EFW flow for most postulated events, and would only be challenged by an MSLB or FLB that renders the remaining operable steam supply to the turbine-driven EFW pump inoperable. The selection of 24 hours for the CT is based on the remaining operable steam supply to the turbine-driven EFW pump and the continued functionality of the turbine-driven EFW train, the remaining operable motor-driven EFW train, and the low likelihood of an event occurring during this 24-hour period that would challenge the capability of the EFW system to provide adequate feedwater to the SGs. The proposed CT for this particular situation is consistent with what was approved for Waterford Steam Electric Station, Unit 3 (Waterford 3), by License Amendment No. 173 for a similar Condition (ADAMS Accession No. ML012840538), and it is consistent with the STS in that the proposed CT is much less than the 72 hours that is allowed for the situation where full accident mitigation capability is maintained. Therefore, the NRC staff agreed that the proposed 24-hour CT would be acceptable for this particular situation.

The situation defined by proposed Condition C at ANO-1 differs from that considered for TSTF-412 because ANO-1 has only one motor-driven EFW train and there would be no remaining operable motor-driven EFW train. However, in the analysis described above, the remaining operable motor-driven EFW train is not credited with the capability to deliver adequate EFW flow to the SGs, and the turbine-driven EFW train is relied upon to deliver adequate EFW flow for all design-basis accidents and events other than the small subset of events that render the lone operable steam supply to the turbine-driven pump inoperable. Therefore, the analysis for the 24-hour completion time from the TSTF-412 model SE applies also to the situation at ANO-1 when entering proposed Condition C.

When conditions warrant that proposed Condition C be entered at ANO-1, the turbine-driven EFW pump train with one inoperable steam supply would be capable of delivering adequate EFW flow to satisfy accident analysis assumptions for the full spectrum of design basis accidents other than the few low-probability events that would render the remaining steam supply inoperable. The events for which adequate feedwater flow would not be available in this condition are events resulting in loss of pressure boundary integrity affecting the OTSG that is delivering steam to the operable steam supply line; these events are of sufficiently low probability that the appropriate action is to shut down the reactor after some short time rather than continue to operate at power indefinitely while attempting to restore greater EFW capability (which is the required action when sufficient EFW flow is unavailable for more frequent occurrences such as a loss of main feedwater flow). A shutdown action is appropriate because the remaining capability of the turbine-driven EFW pump would provide sufficient EFW flow for transients that could be induced by shutdown of the reactor, such as a loss of main feedwater. Apart from the condition under which the plant would be shut down, the proposed Required Action C.1 or C.2 would restore capability to deliver adequate EFW flow for the full spectrum of design basis accidents and events. As addressed in the model SE for TSTF-412, the proposed 24 hour Completion Time for implementing either Required Action is commensurate with the remaining capability to deliver adequate EFW flow for all but a small subset of events that would render the remaining operable steam supply inoperable. In addition, the proposed Condition C, Required Action C.1 or C.2, and associated Completion

Time are consistent with the STS presented in NUREG-1430, Revision 4. Therefore, the proposed new Condition C is acceptable.

STS 3.7.5, Condition D (as proposed)

The licensee proposed renaming current Condition C as Condition D. This Condition has been modified to incorporate changes brought on by the addition of new Condition C. Condition D has been modified to also apply when the CT that is specified for new Condition C is not met and would now apply to the situation where the Required Action and associated Completion Time of Condition A, B, or C are not met. The NRC staff considers this to be appropriate and consistent with existing STS 3.7.5 requirements to place the plant in a mode where the Condition does not apply when the Required Actions and associated CTs are not met.

The Required Actions associated with this Condition were renamed from C.1 AND C.2 to D.1 AND D.2 but not otherwise changed. Required Action D.1 requires the plant to be in Mode 3 in 6 hours, and Required Action D.2 requires the plant to be in Mode 4 in 18 hours. This change is purely editorial, as no other changes are involved. Therefore, this proposed change is acceptable.

STS 3.7.5, Condition E (as proposed)

Because current Condition C is renamed as Condition D, current Condition D is renamed as Condition E. Condition E applies to the condition where two EFW trains are inoperable in MODE 1, 2, or 3, which is similar to new Condition C, because both the turbine-driven and motor-driven EFW trains are inoperable. However, new Condition C limits its applicability to the condition where the turbine-driven EFW train is inoperable due to one inoperable steam supply. In order to clearly differentiate Condition E from Condition C, the licensee proposed adding a note stating that Condition E is not applicable when the turbine-driven EFW train is inoperable solely due to one inoperable steam supply. As a clarification, the NRC staff considers this change editorial in nature, and, therefore, the proposed change is acceptable.

The Required Action associated with this Condition was renamed from D.1 to E.1, but not otherwise changed. Required Action E.1 requires immediate action to restore one EFW train to operable status. This change is purely editorial, as no other changes are involved. Therefore, this proposed change is acceptable.

STS 3.7.5, Condition F (as proposed)

Because current Condition D is renamed as Condition E, current Condition E is renamed as Condition F. The associated Required Action is correspondingly renamed as Required Action F.1. These changes are purely editorial, as no other changes are involved, and are acceptable.

Conforming Changes and Variations from TSTF-412

The NRC staff evaluated the following conforming changes and variations from TSTF-412, Revision 3, that were not previously addressed in this SE.

1. TSTF-412 LCO 3.7.5 Condition C states:

   > One turbine driven EFW train inoperable due to one inoperable steam supply.

   The licensee proposed to remove the first word "One" from the new Condition C. ANO-1 has only one turbine-driven and one motor-driven EFW pump, both which are 100 percent capacity trains. TSTF-412 was written to accommodate plants that may have two turbine-driven and/or two motor driven EFW pumps. The licensee finds it unnecessary to include "One" and proposed to modify the condition to prevent confusion as the operators attempt to apply the TS to ANO-1. The NRC staff concludes that the licensee's proposed variation to Condition C is editorial in nature and that the licensee's proposed TS changes are consistent with the intent of TSTF-412, Revision 3 and, therefore, acceptable.

2. The licensee proposed to add "EFW" to new Required Action C.1. Because new Condition C and Required Action C.2 use "EFW" in the description, as well, this change is necessary to maintain consistency. The NRC staff concludes that the licensee's proposed addition to Condition C is editorial in nature and that the licensee's proposed TS changes are consistent with the intent of TSTF-412, Revision 3 and, therefore, acceptable.

3. New Condition D in TSTF-412 adds a bracketed portion stating:

   > [OR Two EFW trains inoperable in MODE 1, 2, or 3 for reasons other than Condition C.]

   The licensee proposed to not adopt this bracketed information because the ANO-1 design consists of two trains and only one pump per train. The condition of having both EFW trains inoperable is addressed by the newly proposed Condition E, which states, "Two EFW trains inoperable in MODE 1, 2, or 3." Plant maneuvers should be avoided during periods when both EFW trains are inoperable. Adopting the bracketed information would put the plant in this condition based on the ANO-1 EFW design. The NRC staff concludes that the licensee's proposed non-adoption of bracketed information in new Condition D is acceptable and is consistent with the intent of TSTF-412, Revision 3.

4. The licensee proposed to add "ACTIONS (continued)" to the top of ANO-1 TS page 3.7.5-2. The NRC staff finds this addition editorial in nature and therefore is acceptable.

5. The licensee proposed to move SRs 3.7.5.1 and 3.7.5.2 from ANO-1 TS page 3.7.5-2 to page 3.7.5-3. The NRC staff concludes that this change is editorial in nature and, therefore, is acceptable.

6. The licensee proposed to move SRs 3.7.5.5 and 3.7.5.6 from page 3.7.5-3 to new page 3.7.5-4. The NRC staff concludes that this change is editorial in nature and, therefore, is acceptable.

Summary of Technical Evaluation

The proposed changes are consistent with NRC practices and policies as generally reflected in the STS and as reflected by applicable precedents that have been approved. The NRC staff concludes that the requirements of 10 CFR 50.36(c)(2) continue to be met, because the minimum performance level of equipment needed for safe operation of the facility, as specified in TS 3.7.5 LCO, remains unchanged and appropriate remedial measures are specified if the LCO is not met. It is also consistent with the guidance of Section 16.0 of NUREG-0800, in that the proposed change is generally consistent with the STS incorporated in NUREG-1430, with allowances for design differences present at ANO-1. Therefore, the NRC staff has determined that the proposed changes to STS 3.7.5 are acceptable.

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 May 10, 2018. 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. 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 involve no significant hazards consideration, published in the *Federal Register* on October 10, 2017 (82 FR 47036), 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 Contributors: S. Jones
T. Sweat

Date: June 19, 2018

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1 - ISSUANCE OF AMENDMENT RE: TECHNICAL SPECIFICATION CHANGES PURSUANT TO TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF-412, REVISION 3 (CAC NO. MG0009; EPID L-2017-LLA-0267) DATED JUNE 19, 2018

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ADAMS Accession No. ML18115A282 ***by memorandum**

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NAME	TWengert	PBlechman	RDennig	VCusumano
DATE	05/10/18	05/04/18	04/19/18	5/11/18
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