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10 CFR 50.90

2CAN062001

June 17, 2020

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

Subject: Response to Request for Additional Information Related to License Amendment
Request Associated with Technical Specification Deletions, Additions, and
Relocations

Arkansas Nuclear One, Unit 2
NRC Docket No. 50-368
Renewed Facility Operating License No. NPF-6

By letter dated December 16, 2019 (Reference 1), Entergy Operations, Inc. (Entergy), requested NRC approval of a proposed change to the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TSs) to enhance consistency with NUREG-1432, "Standard Technical Specifications – Combustion Engineering Plants," Revision 4. During the course of review, the NRC determined additional information was required to complete the review process.

The NRC notified Entergy of the request for additional information (RAI) on June 1, 2020 (Reference 2). The RAI provides a 30-day response period.

Entergy's RAI response is included in the attached enclosure. The responses do not impact the no significant hazards consideration provided in the original amendment request (Reference 1).

No new regulatory commitments are included in this submittal.

In accordance with 10 CFR 50.91, Entergy is notifying the State of Arkansas of Entergy's RAI response by transmitting a copy of this letter and enclosure to the designated State Official.

If there are any questions or if additional information is needed, please contact Riley Keele, Manager, Regulatory Assurance, Arkansas Nuclear One, at 479-858-7826.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on June 17, 2020.

Respectfully,

ORIGINAL SIGNED BY RON GASTON

Ron Gaston

RWG/dbb

Enclosure: Response to Request for Additional Information Related to License Amendment Request Associated with Technical Specification Deletions, Additions, and Relocations

References:

1. Entergy Operations, Inc. (Entergy) letter to U. S. Nuclear Regulatory Commission (NRC), *License Amendment Request related to Technical Specification Deletions, Additions, and Relocations*, Arkansas Nuclear One, Unit 2 (2CAN121901) (ML19350B324), dated December 16, 2019.
2. NRC email to Entergy, *ANO-2 Final RAI RE: License Amendment Request Concerning Proposed Technical Specification Additions, Deletions, and Relocations (EPID L-2019-LLA-0284)*, (2CNA062001) (ML20154K762), dated June 1, 2020.

cc: NRC Region IV Regional Administrator
NRC Senior Resident Inspector – Arkansas Nuclear One
NRC Project Manager – Arkansas Nuclear One
Designated Arkansas State Official

Enclosure

2CAN062001

**Response to Request for Additional Information Related to License Amendment Request
Associated with Technical Specification Deletions, Additions, and Relocations**

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION RELATED TO LICENSE
AMENDMENT REQUEST ASSOCIATED WITH TECHNICAL SPECIFICATION DELETIONS,
ADDITIONS, AND RELOCATIONS**

By letter dated December 16, 2019 (Reference 1), Entergy Operations, Inc. (Entergy), requested NRC approval of a proposed change to the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TSs) to enhance consistency with NUREG-1432, "Standard Technical Specifications – Combustion Engineering Plants," Revision 4. During the course of review, the NRC determined additional information was required to complete the review process.

The NRC notified Entergy of the request for additional information (RAI) on June 1, 2020 (Reference 2). The RAI provides a 30-day response period.

Each question associated with the subject RAI is repeated below followed immediately by Entergy's response to the specific question.

Background from NRC RAI

The licensee proposed to delete TS Limiting Condition for Operation (LCO) 3.1.1.3, "Boron Dilution," and the associated ACTION statement and SRs in SR 4.1.1.3. The APPLICABILITY for LCO 3.1.1.3 is ALL MODES (i.e., Modes 1 through 6). The licensee stated that the deletion of the TS for Boron Dilution is justified because the minimum required reactor coolant flow for boron dilution can be assured under LCOs 3.4.1.1 (Modes 1 and 2), 3.4.1.2 (Mode 3), 3.4.1.3 (Modes 4 and 5), and 3.9.8.1 (Mode 6). The NRC staff reviewed these other TSs and determined that the following additional information is needed in order to complete its safety review of this proposed change.

RAI-SNSB-1 – ACTION for Boron Dilution Under LCO 3.1.1.3

Provide a justification for the proposed deletion of TS 3.1.1.3, when the other ACTIONS cited above, assuring the minimum required reactor coolant flow for boron dilution (e.g., LCO 3.4.1.1 in Modes 1 and 2), become controlling and replace the required ACTION for LCO 3.1.1.3. Specifically, the ACTION statement for TS LCO 3.4.1.1 does not include the word "immediately," while the ACTION statement for LCO 3.1.1.3 currently does. Please justify this difference.

Entergy Response

The ACTION statement of LCO 3.1.1.3 states:

With the flow rate of reactor coolant through the reactor coolant system < 2000 gpm, immediately suspend all operations involving a reduction in boron concentration of the Reactor Coolant System.

To appropriately respond to the RAI, it is important to consider the TS definitions (reference ANO-2 TS Table 1.1) for operating Modes 1 and 2. The reactor is critical in both modes ($k_{\text{eff}} \geq 0.99$). Secondly, it is important to note when the Core Protection Calculators (CPCs) become active. The CPCs will automatically trip the reactor if less than four Reactor Coolant Pumps (RCPs) are operating. The ANO-2 TSs require the CPCs to automatically become

active as power is raised through 10⁻²% power (reference ANO-2 TS Table 3.3-1, Functional Unit 13, Note c) unless raised to < 1% power during physics tests as permitted by TS 3.10.3 (discussed below).

In addition, ANO-2 is not permitted to operate in Modes 1 or 2 with less than four RCPs. The ANO-2 Operating License 2.C.(3)(c) states:

EOI **[Entergy Operations, Inc.]** shall not operate the reactor in operational Modes 1 and 2 with fewer than four reactor coolant pumps in operation, except as allowed by Special Test Exception 3.10.3 of the facility Technical Specifications. **[acronym definition added]**

ANO-2 TS 3.10.3 allows, in part, suspension of the requirements of LCO 3.4.1.1 in support of physics tests. However, there is no known circumstance when this exception to LCO 3.4.1.1 has been used with respect to operation with less than four RCPs in service. All physics testing with the reactor critical at ANO-2 is performed with all four RCPs in service. The TS 3.10.3 exception is only utilized to suspend certain requirements of TS Tables 2.2-1 and 3.3-1, none of which involve the number of RCPs in operation.

Although there is a normally short, but undefined, period between the time in which the reactor reaches a critical state and when the CPCs become active, four RCPs must be in operation to maintain compliance with the aforementioned ANO-2 Operating License (given that there is no physics test that employs the TS 3.10.3 exception to operate in Modes 1 or 2 with less than four RCPs in service).

Based on the above, there is no need to address a cessation of boron dilution activities within the ACTIONS of LCO 3.4.1.1 since operation in Modes 1 and 2 with less than four RCPs in service is effectively prohibited.

With respect to the ACTIONS of LCOs 3.4.1.2 (RCS Loops – Mode 3) and 3.4.1.3 (RCS Loops – Modes 4 and 5), the term immediately is not specified; however, the ACTIONS do not provide a response time but simply state to suspend boron dilutions. With no time limit specified, it is implied that the action must be taken immediately (generally defined as "without delay"). Therefore, the relevant ACTIONS of LCOs 3.4.1.2 and 3.4.1.3 effectively assure boron dilutions are immediately suspended.

RAI-SNSB-2 – SRs 4.4.1.1, 4.4.1.2, and 4.4.1.3 for Boron Dilution

Provide a justification for the proposed deletion of TS 3.1.1.3, when SR 4.4.1.1, SR 4.4.1.2, and SR 4.4.1.3, cited above, become controlling. Specifically, the current SR for LCO 3.1.1.3 (i.e., SR 4.1.1.3) states:

The flow rate of reactor coolant through the reactor coolant system shall be determined to be [greater than or equal to 2000 gallons per minute] within one hour prior to the start of and in accordance with the Surveillance Frequency Control Program during a reduction in the Reactor Coolant System boron concentration **once per hour**. **[bold emphasis added]**

However, current SRs 4.4.1.1, 4.4.1.2, and 4.4.1.3 do not include this same surveillance frequency of once per hour. Please justify this difference.

Entergy Response*SR 4.4.1.1*

Surveillance Requirement (SR) 4.4.1.1 is associated with operation of Reactor Coolant System (RCS) loops in Modes 1 and 2. Based on the response to RAI -SNSB-1 above, verification of RCS flow in Modes 1 and 2 is not necessary in relation to boron dilutions. SR 4.4.1.1 requires verification that all four RCPs are in operation largely to meet the aforementioned Operating License condition prior to performing an approach to criticality (i.e., prior to entry into Mode 2 during plant startup). Therefore, with consideration of the response of RAI -SNSB-1 above, a once per hour verification of RCS flow in Modes 1 and 2 is not required to ensure boron dilutions are not performed with less than adequate flow in the RCS.

Note that SR 4.4.1.1 will continue to require four RCPs in service in accordance with the Surveillance Frequency Control Program (SFCP). The SFCP currently requires performance of SR 4.4.1.1 every 12 hours, the same frequency required by the SR prior to adoption of the SFCP. The 12-hour frequency is also consistent with NUREG 1432, Revision 4 (although bracketed).

SR 4.4.1.2.2

SR 4.4.1.2.2 requires at least one RCP to be in operation in Mode 3 (RCS temperature ≥ 300 °F). As stated in Entergy's Reference 1 license amendment request (LAR), the flowrate of one RCP is significantly greater than the 2000 gpm minimum flow assumed for performance of boron dilution activities. The loss of an RCP would result in Control Room alarm and, if the only RCP operating at the time, rising RCS temperature. Operations personnel would recognize the loss of RCS flow within moments, if not immediately, and the ACTIONS of LCO 3.4.1.2 entered at that time, which require boron dilutions to be suspended. Since loss of RCS flow in Mode 3 will be promptly recognized and appropriate action taken, it is not necessary to stipulate a one-hour flow verification requirement within SR 4.4.1.2.

Note that SR 4.4.1.2.2 will continue to require verification of RCP operation in accordance with the SFCP. The SFCP currently requires performance of SR 4.4.1.2.2 every 12 hours, the same frequency required by the SR prior to adoption of the SFCP. The 12-hour frequency is also consistent with NUREG 1432, Revision 4 (although bracketed).

SR 4.4.1.3.4

SR 4.4.1.3.4 requires at least one RCP or one Shutdown Cooling (SDC) loop to be in operation in Modes 4 and 5. The loss of an RCP is discussed above and would be readily recognized by Operations personnel. Therefore, a once per hour verification of RCS flowrate is not necessary when relying on an RCP for decay heat removal.

SDC flow is maintained by a flow indicating controller located on a Control Room panel immediately accessible to control board operators. If SDC is in service, both low and high flow alarms (the latter to prevent vortexing in the RCS drop leg to the SDC system) would alert Operators immediately to any significant flow transient. By procedure, the low alarm setpoint is set at ≥ 2100 gpm or within 300 gpm of current flow, whichever is greater. System pressure and pump amperage alarms are also established as required by procedure.

As stated in Entergy's Reference 1 LAR, SDC can be provided by either a Low Pressure Safety Injection (LPSI) pump or a Containment Spray pump. Although SR 4.4.1.3.4 does not specify a minimum flowrate, several procedures stipulate the minimum 2000 gpm flowrate for boron dilutions and procedures also caution against operating a LPSI pump at flows < 2000 gpm to avoid pump cavitation, vibration, and bearing wear. When a Containment Spray pump is used for SDC, procedures require maintaining a flow rate between 2300 and 2500 gpm.

SR 4.4.1.3.4 will continue to require verification of flow in accordance with the SFCP. The SFCP currently requires performance of SR 4.4.1.3.4 every 12 hours, the same frequency required by the SR prior to adoption of the SFCP. The 12-hour frequency is also consistent with NUREG 1432, Revision 4, (although bracketed).

Based on the above administrative requirements, the continuous display of SDC flow in the Control Room, and the detrimental SDC pump effects if operated below 2000 gpm, Entergy does not consider a once per hour TS-required verification of flow rate to be necessary during operation in Modes 4 and 5.

REFERENCES

1. Entergy Operations, Inc. (Entergy) letter to U. S. Nuclear Regulatory Commission (NRC), *License Amendment Request related to Technical Specification Deletions, Additions, and Relocations*, Arkansas Nuclear One, Unit 2 (2CAN121901) (ML19350B324), dated December 16, 2019.
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