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2CAN121303

December 12, 2013

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

SUBJECT: Response to Request for Additional Information
Adoption of Technical Specification Task Force (TSTF)-422, Revision 2
"Change in Technical Specifications End States (CE NPSD-1186)"
Docket No. 50-368
License No. NPF-6

REFERENCES:

1. Entergy letter dated March 26, 2013, *License Amendment Request – Adoption of Technical Specification Task Force (TSTF)-422, Revision 2, "Change in Technical Specifications End States (CE NPSD-1186)"* (2CAN031303) (ML13085A283)

2. NRC email dated November 22, 2013, *Arkansas Nuclear One, Unit 2 – RAI related to the adoption of (TSTF)-422, Revision 2, "Change in Technical Specifications End States (CE NPSD-1186)"* (TAC No. MF1199)

3. NRC letter dated November 7, 2013, *Potential Issues with Plant-Specific Adoption of Travelers TSTF-51, Revision 2, "Revise Containment Requirements during Handling Irradiated Fuel and Core Alternations," TSTF-286, Revision 2, Operations Involving Positive Reactivity Additions," and TSTF-471, Revision 1, "Eliminate Use of Term Core Alterations in Actions and Notes"* (ML13246A358)

Dear Sir or Madam:

By email dated November 22, 2013 (Reference 2), the NRC requested additional information associated with the Entergy Operations, Inc. (Entergy) request to amend the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TS) to incorporate the NRC-approved TSTF-422, Revision 2, "Change in Technical Specifications End States (CE NPSD-1186)." The proposed amendment would modify TSs to risk-inform requirements regarding selected Required Action End States.

The model NRC Safety Evaluation (SE) supporting TSTF-422 is based on the standard TS (STS) version contained in NUREG 1432, “Standard Technical Specifications – Combustion Engineering Plants.” The ANO-2 TSs have not been converted to the STS version. Therefore, the NRC has requested a detailed comparison of the ANO-2 structures, systems, and components (SSCs) for which a Mode 4 end state is requested, with the technical basis documented in the model SE. The Entergy response is included in the attachment to this letter.

The Reference 2 email also discussed specific ANO-2 TS pages submitted in the Reference 1 letter which included changes associated with a separate, unrelated TS amendment request that has not yet been approved by the NRC. On November 7, 2013 (Reference 3), the NRC issued a letter describing potential concerns with the TSTF travelers associated with this unrelated amendment request. Currently, the TSTF and nuclear industry fleet are working with the NRC to resolve these concerns. In phone conversation between ANO and the NRC TS Branch on November 26, 2013, it was determined that revised TS pages need not be submitted for TSTF-422 adoption at this time, in light of the efforts to promptly resolve the concerns listed in the Reference 3 NRC letter.

Additional information, as detailed in this letter, with respect to the original Entergy request (Reference 1) has been reviewed and Entergy has determined that the information does not invalidate the no significant hazards consideration discussed in the Reference 1 letter.

In accordance with 10 CFR 50.91(b)(1), a copy of this response is being provided to the designated Arkansas state official.

No new commitments have been identified in this letter.

If you have any questions or require additional information, please contact Stephenie Pyle at 479-858-4704.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on December 12, 2013.

Sincerely,

ORIGINAL SIGNED BY JEREMY G. BROWNING

JGB/dbb

Attachment: Response to Request for Additional Information – ANO-2 TSTF-422 End States Adoption

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Attachment to

2CAN121303

Response to Request for Additional Information
ANO-2 TSTF-422 End States Adoption

Response to Request for Additional Information
ANO-2 TSTF-422 End States Adoption

By email dated November 22, 2013 (Reference 2), the NRC requested additional information associated with the Entergy Operations, Inc. (Entergy) request to amend the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TS) to incorporate the NRC-approved TSTF-422, Revision 2, "Change in Technical Specifications End States (CE NPSD-1186)." The proposed amendment would modify TSs to risk-inform requirements regarding selected Required Action End States.

The NRC requested that the licensee review the Staff's assessment provided in the model Safety Evaluation (SE) and determine that its TS specified systems, functions, and nomenclature is equivalent to those addressed in the assessment, or discuss differences, if any. The technical basis for the approval of TSTF-422 was documented in the Staff's SE (Reference: ADAMS Accession No. ML011980047, dated July, 17, 2001). It is not clear that the licensee's proposed TS meet the technical basis, upon which, TSTF-422 was approved. The licensee either needs to demonstrate that the the TSTF-422 technical basis is met or provide an alternate basis for approval.

<u>Response</u>

A comparison of ANO-2 structures, systems, and components (SSCs) in relation to those evaluated in the aforementioned model SE is included below. Some SSCs or associated TSs discussed in the model SE are not applicable to ANO-2 and have not been proposed for adoption. These are discussed in Section 2.2 of the original amendment request (Reference 1, Attachment 1) and not repeated below. Only those SSCs/TSs being revised to include the new end state are compared to the model SE.

1. Section 1.0 of the model SE provides a listing of operational modes with generic criteria defining each mode. ANO-2 operational modes are consistent with this listing (reference ANO-2 TS, Definitions Section, Table 1.1).

2. Section 2.0 of the model SE discusses use of Section 11 of NUMARC 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," in regard to maintenance or equipment out of service risk that must be evaluated as plant configuration and operational modes change. Entergy is committed to NUMARC 93-01 as discussed in the original amendment request (Reference 1), Section 2.2 of Attachment 1, and Attachment 2.

3. Section 3.0 of the model SE discusses use of, and commitment to, WCAP-16364-NP, Revision 2, "Implementation Guidance for Risk Informed Modification to Selected Required Action End States at Combustion Engineering NSSS Plants (TSTF-422)," in regard to maintenance or equipment out of service risk that must be evaluated as plant configuration and operational modes change. Entergy is committed to the use of this guidance as discussed in the original amendment request (Reference 1), Section 2.2 of Attachment 1, and Attachment 2.

4. Section 3.2 of the model SE requires adoption of a Note into each TS being changed by TSTF-422 to prevent inappropriate entry into Mode 4 from Mode 5 with specified equipment inoperable. ANO-2 has adopted this Note accordingly, as illustrated in the revised and markup TS pages included in the original amendment request (Reference 1, Attachments 3 and 4).

5. Section 3.2.2 of the model SE discusses changes associated with Engineered Safeguards Features Actuation System (ESFAS) logic and manual trip parameters. ANO-2 design is as described in the model SE; however, the modes of applicability are more restrictive for ANO-2 in some instances, due to the older vintage TSs. The ANO-2 TSs have not been converted to the standard TSs (STS) of NUREG-1432, "Standard Technical Specifications – Combustion Engineering Plants," on which TSTF-422 markups are based. The STS does not require operability of the Main Steam Isolation Signal (MSIS) or Containment Spray Actuation Signal (CSAS) in Mode 4. The model SE recognizes the latter, noting that the Mode 4 end state may be applicable to utilities where CSAS is required to be operable in Mode 4. The basis established in the model SE for applying a Mode 4 end state to the Containment Cooling Actuation Signal (CCAS) equally applies to the CSAS function. Lower stored energy in the Reactor Coolant System (RCS) and lesser core heat generation result in minimal containment pressure response following a loss of coolant accident (LOCA) or main steam line break (MSLB), which would be less than the current design containment strength. Ample instrumentation is also available to the Operator to diagnose the onset of the event and to take appropriate mitigating actions (actuation of the containment fan coolers and/or sprays) prior to a potential containment challenge. Note also that the ANO-2 Containment Spray system is not required to be operable in Mode 4 (Reference ANO-2 TS 3.6.2.1).

   Likewise, the MSIS function is designed to limit the containment pressure increase following a MSLB. Therefore, the basis provided above with regard to containment pressure is applicable to the MSIS function. The MSIS function may also limit the extent of RCS cooldown following a MSLB. Such an event would require entry to Mode 5 in order to maintain the affected SG depressurized (effectively eliminating the RCS cooldown). Boron concentrations are elevated in Mode 4 to maintain the TS required shutdown margins and all control rods are generally inserted (except the possibility of shutdown banks being withdrawn for added protection), which ensure reactivity effects of the RCS cooldown are minimal.

   Finally, the STS does not require MSIS or CSAS operability in Mode 4 for these same reasons. The STS Bases state:

   > *In MODES 4, 5, and 6, automatic actuation of these Functions is not required because adequate time is available to evaluate plant conditions and respond by manually operating the ESF components if required. ESFAS Manual Trip capability is required in MODE 4 for SIAS, CIAS, CCAS, and RAS even though automatic actuation is not required. Because of the large number of components actuated by these Functions, ESFAS actuation is simplified by the use of the Manual Trip push buttons. CSAS, MSIS, and EFAS have relatively few components, which can be actuated individually if required in MODE 4, and the systems may be disabled or reconfigured, making system level Manual Trip impossible and unnecessary.*

Based on the above, application of the Mode 4 end state to the MSIS and CSAS functions is consistent with the STS and the basis provided in the model SE for the remaining ESFAS functions.

Finally, Section 3.2.2 of the model SE does not include reference to the diesel generator loss of voltage start functions. The STS contains these requirements in a separate specification (3.3.7). The equivalent Loss of Power function for ANO-2 is contained in the same TS Table 3.3-6 as the other ESFAS functions. Therefore, ANO-2 TS Table 3.3-6, Action 9, applies to the Loss of Power function as it does for the other ESFAS functions. In support of adopting the Mode 4 end state for those ESFAS functions described in the model SE, Action 9 has been modified accordingly. However, this has no impact on the ANO-2 Loss of Power function since this function is only required in Modes 1, 2, and 3. The current Action 9 wording would permit 30 hours to exit the mode of applicability (i.e., enter Mode 4) upon entry into Mode 3. The revised Action 9 requires entry into Mode 4 within 6 hours following entry into Mode 3. The Action 9 changes supporting adoption of TSTF-422 continue to require exiting the mode of applicability for the Loss of Power function by requiring entry into Mode 4. Because the proposed change is more restrictive than that currently associated with the Loss of Power function, the change is acceptable.

6. Section 3.2.4 of the model SE discusses inoperability of radiation detectors relied upon to automatically isolate and place the Control Room in the emergency ventilation mode of operation. The ANO-2 Control Room contains two channels of safety related radiation detection consistent with that described in the model SE. The STS, however, only requires one channel to be operable while the ANO-2 TSs require both channels to be operable. As a result, the model SE specifically addresses a condition where no channels are operable and the Control Room has not been placed in the emergency ventilation mode of operation (equivalent to ANO-2 TS Table 3.3-6, Action 17). The model SE does not describe a similar scenario that would be applicable to ANO-2 where one channel is inoperable for greater than 7 days and the Control Room has not been placed in the emergency ventilation mode of operation in Modes 1, 2, 3, and 4 (ANO-2 TS Table 3.3-6, Action 20), or a condition where one or more channels is inoperable and the Control Room has not been placed in the emergency ventilation mode of operation during the movement of irradiated fuel (ANO-2 TS Table 3.3-6, Action 21). Nevertheless, the basis for a Mode 4 end state remains valid regardless of the specified conditions that would drive a plant shutdown due to Control Room radiation detection channel inoperability. Therefore, ANO-2 TS Table 3.3-6, Actions 17, 20, and 21 are modified to include the Mode 4 end state, consistent with the intent of the model SE and TSTF-422.

   In addition to the above, the model SE states that the Control Room ventilation system is also actuated by a Safety Injection Actuation Signal (SIAS). Likewise, the supporting implementation guidance (Reference 3) recommends maintaining operability of the SIAS function for Control Room ventilation under the aforementioned conditions while operating in a Mode 4 end state. The ANO-2 Control Room ventilation system does not receive an SIAS. Following a valid SIAS, the containment will be isolated as building pressure increases to the Containment Isolation Actuation Signal (CIAS) setpoint. Control Room radiation levels are not expected to change solely due to a LOCA. Radiation detection is relied upon to determine when conditions exist that warrant isolation of the Control Room. Consistent with the model SE basis associated with the SIAS function, a Mode 4 end state is acceptable due to the lower energy contained in the RCS, which with respect to the Control Room atmosphere, further limits the potential for high radiation levels to exist outside the containment building. Consistent with the model SE basis for a Mode 4 end state associated with inoperable Control Room radiation detection channels, other radiation detection is available throughout the plant to alert Operators of adverse conditions. Because accident scenarios evolve at a much slower rate in Mode 4, sufficient time is available for Operators to manually place the Control Room in the emergency ventilation mode of operation (all actions performed inside the Control Room). Based on the above, application of the Mode 4 end state with one or more Control Room radiation detections inoperable is acceptable without reliance on automatic realignment initiated by an SIAS.

7. Section 3.2.7 of the model SE is associated with RCS cooling loop operability during shutdown conditions. ANO-2 design is consistent with that described in the model SE, having four RCS cooling loops and two Shutdown Cooling (SDC) trains, two of which must be operable in Mode 4. This same requirement is applicable in Mode 5 for ANO-2; however, this difference is unrelated to discussions of remaining in Mode 4 when less than the required compliment of cooling loops is operable. In addition, the ANO-2 TS (3.4.1.3) does not contain the STS recognition that cooldown to Mode 5 may be inappropriate when no SDC loop is operable. Adoption of TSTF-422 resolves this deficiency by permitting continued operation in Mode 4 while expediting action to establish at least one SG available for natural circulation cooling, regardless of what combination of cooling loops are inoperable. If operating in Mode 5, the adoption of the TSTF-422 Note associated with TS 4.0.3.b will prevent entry into Mode 4 when the required number of cooling loops are not operable. Therefore, the discussion and basis provided in the model SE is applicable to the RCS cooling loops described in ANO-2 TS 3.4.1.3.

8. Section 3.2.8 of the model SE is associated with the containment personnel airlocks. ANO-2 has two personnel airlocks, each having two doors and a single interlock between the two doors in a given airlock. The TS requirements are also consistent with the STS and TSTF-422. Therefore, the basis provided in the model SE for adopting a Mode 4 end state associated with inoperable airlock doors or interlocking mechanism is applicable to ANO-2.

9. Section 3.2.9 of the model SE is associated with containment isolation valves (CIVs). The ANO-2 design and TS requirements are consistent with the STS and TSTF-422. Therefore, the basis provided in the model SE for adopting a Mode 4 end state associated with inoperable CIVs is applicable to ANO-2.

10. Sections 3.2.10 and 3.2.11 of the model SE are associated with limits on containment pressure and temperature during normal operations. These limits are contained in separate specifications in the STS, but in a single specification (TS 3.6.1.4) for ANO-2. With respect to ANO-2, operation within the limits established in the TS ensures that initial containment pressure and temperature are within values assumed in the accident analyses prior to event initiation. Accidents which may occur in Mode 4 evolve more slowly and, due to the low energy state of the RCS, are not expected to challenge the containment building. The basis provided in the model SE for adopting a Mode 4 end state associated with containment pressure and temperature limits is applicable to ANO-2.

11. Section 3.2.12 of the model SE is associated with containment spray and cooling systems. Like that described in the model SE and STS, ANO-2 has two containment spray and two containment cooling trains (each containment cooling train contains two cooling units).

The requirements for these systems are contained in a single STS. The two systems have separate specifications at ANO-2 (TSs 3.6.2.1 and 3.6.2.3), but the operability requirements and required actions are consistent with that of the STS. In addition, the model SE basis for establishing a Mode 4 end state for combinations of inoperability permitted by TSTF-422 is applicable to ANO-2.

12. Section 3.2.15 of the model SE is associated with the Service Water (SW) system. The ANO-2 design is consistent with the model SE discussion and the STS, having two loops which support the SDC heat exchangers and emergency suction to the Emergency Feedwater pumps, among many other components. SW also cools Component Cooling Water (CCW), which in turn cools the Reactor Coolant Pump seals, but is not the makeup source to CCW. Based on the above, the model SE basis supporting a Mode 4 end state for one inoperable SW loop is applicable to ANO-2.

13. Sections 3.2.18 and 3.2.19 of the model SE are associated with the Control Room Emergency Ventilation System (CREVS) and the Control Room Emergency Air Conditioning System (CREACS). These requirements are contained in a single specification in the ANO-2 TSs (3.7.6.1). The ANO-2 design is consistent with the model SE description and the STS, having two CREVS and two CREACS trains. The basis supporting a Mode 4 end state with inoperable CREVS, CREACS, or Control Room boundary is applicable to ANO-2. In addition, ANO-2 is committed to the implementation guidance (Reference 3) which acts to reduce risk during prolonged operation in Mode 4 when the aforementioned equipment is inoperable.

14. Section 3.2.22 of the model SE is associated with AC power sources while operating in Modes 1, 2, 3, or 4. The ANO-2 design is consistent with the model SE discussion and the STS, having two required offsite power sources and two onsite Emergency Diesel Generators (EDGs). TSTF-422 provides a Mode 4 end state for any combination of AC power source inoperability. The basis provided in the model SE recognizes the importance of the SGs during a station blackout. Based on the ANO-2 AC power system design and consistency with the STS, application of a Mode 4 end state for any combination of AC power source inoperability is acceptable. In addition, ANO-2 is committed to the implementation guidance (Reference 3) which acts to reduce risk during prolonged operation in Mode 4 when the aforementioned equipment is inoperable. Note also that ANO has a non-safety related station blackout diesel capable of supplying one safety related AC power train on both ANO units simultaneously.

15. Section 3.2.23 of the model SE is associated with DC power sources while operating in Modes 1, 2, 3, or 4. The ANO-2 design is consistent with the model SE discussion and the STS, having two safety related DC batteries and distribution trains. The basis provided in the model SE for adopting a Mode 4 end state associated with RCS cooling capability via the SGs is applicable to ANO-2.

The above information provides the basis for application of the Mode 4 end state established via TSTF-422 to those ANO-2 SSCs and TSs comparable to the STS as revised by TSTF-422. Further discussion of similarities and differences is contained in the original amendment request (Reference 1).

REFERENCES

1. Entergy letter dated March 26, 2013, *License Amendment Request – Adoption of Technical Specification Task Force (TSTF)-422, Revision 2, "Change in Technical Specifications End States (CE NPSD-1186)"* (2CAN031303) (ML13085A283)

2. NRC email dated November 22, 2013, *Arkansas Nuclear One, Unit 2 – RAI related to the adoption of (TSTF)-422, Revision 2, "Change in Technical Specifications End States (CE NPSD-1186)"* (TAC No. MF1199) (ML13235A005)

3. WCAP-16364-NP, Revision 2, *Implementation Guidance for Risk Informed Modification to Selected Required Action End States at Combustion Engineering NSSS Plants (TSTF-422)*, dated May 2010 (ADAMS Accession Number ML102500295)