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Richard L. Anderson
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10 CFR 50.90

2CAN091801

September 7, 2018

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

SUBJECT: Response to Request for Additional Information Related to the Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program (TSTF-425)
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

Dear Sir or Madam:

By letter dated February 6, 2018 (Reference 1), as supplemented by letter dated March 26, 2018, Entergy Operations, Inc. (Entergy), requested NRC approval of a proposed change to the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TSs). The proposed amendment would modify ANO-2 TSs by relocating specific surveillance frequencies to a licensee-controlled program with the implementation of Nuclear Energy Institute (NEI) 04-10, "Risk-Informed Technical Specification Initiative 5B, Risk-Informed Method for Control of Surveillance Frequencies," by adopting Technical Specification Task Force (TSTF)-425, Revision 3, "Relocate Surveillance Frequencies to Licensee Control - Risk Informed Technical Specification Task Force (RITSTF) Initiative 5."

By email dated July 18, 2018, the NRC informed Entergy that additional information is needed to support the Staff's continued review of the application. A clarification call between the NRC and the licensee was held on August 2, 2018. The final request for additional information (RAI) was received via email on August 2, 2018 (Reference 3) with a response required within 45 days. Enclosure 1 includes a summary of the (RAI) and Entergy's response.

In addition to the enclosed RAI response, Entergy is submitting revised TS markups, TS Bases markups, and TS clean pages that were updated following submittal of the Reference 1 TSTF-425 application. The corresponding TSTF-425 related changes are simply moved to the updated TS or TS Bases pages. These pages were updated via ANO-2 TS Amendment 310 (Reference 4) following submittal of the Reference 1 TSTF-425 application. The subject pages are included in Attachments 1, 2, and 3 of the enclosure.

No new regulatory commitments are included in this amendment request.

In accordance with 10 CFR 50.91, Entergy is notifying the State of Arkansas of this amendment request 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 Stephenie Pyle at 479-858-4704.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on September 7, 2018.

Sincerely,

ORIGINAL SIGNED BY RICHARD L. ANDERSON

RLA/dbb

Enclosure: Response to Request for Additional Information – Adoption of TSTF-425

REFERENCES:

1. Entergy letter dated February 6, 2018, *Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program (TSTF-425)*, Arkansas Nuclear One, Unit 2, 2CAN021802 (ML18038B354)

2. Entergy letter dated March 26, 2018, *Supplemental Information Supporting the Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program (TSTF-425)*, Arkansas Nuclear One, Unit 2, (2CAN031803) (ML18085A816)

3. NRC email dated August 2, 2018, *Final RAI RE: License Amendment Request to Adopt TSTF-425, Revision 3* (EPID L-2018-LLA-0047) (2CNA081801) (ML18218A501)

4. NRC letter dated June 19, 2018, *Arkansas Nuclear One, Unit 2 - Issuance of Amendment Re: Technical Specification Changes to Provide Actions for Emergency Feedwater Pump Inoperability consistent with NUREG-1432* (CAC No. MG0016; EPID L-2017-LLA-0268) (2CNA061801) (ML18134A253)

cc: Mr. Kriss Kennedy
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Enclosure to

2CAN091801

Response to Request for Additional Information
Adoption of TSTF-425

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

ADOPTION OF TSTF-425

By letter dated February 6, 2018 (Reference 1), as supplemented by letter dated March 26, 2018, Entergy Operations, Inc. (Entergy), requested NRC approval of a proposed change to the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TSs). The proposed amendment would modify ANO-2 TSs by relocating specific surveillance frequencies to a licensee-controlled program with the implementation of Nuclear Energy Institute (NEI) 04-10, "Risk-Informed Technical Specification Initiative 5B, Risk-Informed Method for Control of Surveillance Frequencies," by adopting Technical Specification Task Force (TSTF)-425, Revision 3, "Relocate Surveillance Frequencies to Licensee Control - Risk Informed Technical Specification Task Force (RITSTF) Initiative 5."

By email dated August 2, 2018 (Reference 3), the NRC informed Entergy that additional information is needed to support the Staff's continued review of the application. A clarification call between the NRC and the licensee was held on August 2, 2018.

In the course of further review, the NRC has determined that additional information is required with respect to the subject matter. The specific questions presented in the Reference 4 request for addition information (RAI) are repeated below for ease of review. Entergy's response is provided thereafter.

RAI-PRA-01 – Facts and Observations (F&Os) Closure Process – Internal Event Findings

Attachment 2 of the LAR, "Documentation of PRA Technical Adequacy," provides finding-level F&Os for internal events that are still open. For a number of F&O dispositions, there is insufficient information in the application for NRC staff to conclude that the F&O is sufficiently resolved for this application.

F&O SY-B15-01 regarding assessment of Systems, Structures, and Components (SSCs) operating beyond environmental qualifications

Attachment 2 of the LAR (page 16) indicates that this finding applies to PRA supporting requirement (SR) SY-B15 of the PRA standard. SR SY-B15 of the 2009 ASME/ANS PRA standard requires that the PRA "[i]nclude operator interface dependencies across systems or trains, where applicable." The finding presented in the LAR against this SR discusses the lack of environmental qualification for SSCs in three systems, which seems more applicable to SR SY-B14. SR SY-B14 requires identification of SSCs that need to operate beyond their environmental qualification and requires inclusion of failures in the PRA that result from operation in adverse conditions (seven example adverse conditions are then listed). The disposition to this F&O states that the documentation for the Revision 6 PRA model will be updated to discuss: 1) walkdowns of credited equipment that were performed to identify potential susceptibility to flooding, spray, and a steam environment due to a pipe break, and 2) evaluation of the ability of systems to operate after loss of heating, ventilation, and air conditioning (HVAC). It is not clear from the response whether the environmental qualification concerns for SSCs in the three systems from the originating finding were resolved.

Provide a detailed description confirming that all of the required degraded environments listed in SY-B14 have been analyzed for the cited SSCs or explain how the exclusion of the degraded environment analysis does not impact the STI application.

Entergy Response:

The SR in question (SY-B15) was renumbered to SY-B14 after the ANO-2 peer review. The degraded environments listed in SY-B14 are examples, not requirements, and as such not all of the conditions listed will apply to all systems. For example, equipment located outside containment will not be subject to loss of coolant accident (LOCA) conditions inside containment.

The Revision 6 probabilistic risk assessment (PRA) documentation (currently in development to update the model of record) for each of the systems modeled for ANO-2 includes a new subsection to address the potential degraded environments applicable to that system (such an assessment was not previously included in the system analysis documentation but determined from walkdown notes). For the three systems on which the original finding was based (AC power, emergency feedwater, and service water), as well as all other systems, an assessment was made of the degraded environments that could occur at the system location. For example, for alternating current (AC) power, this assessment considers the impact of potential losses of HVAC, high energy line break, or other piping breaks (floods) in the vicinity of the emergency diesel generators, alternate AC diesel generator, switchgear, motor control centers, load centers, and breakers located throughout the plant. Degraded environments due to floods are explicitly addressed in the internal flood PRA, and degraded environments for the switchyard are captured in the loss of offsite power frequency. Where applicable, environmental qualifications for system components and room heat-up analyses for system locations are referenced. For systems with components located inside containment, such as containment spray, applicable in-containment degraded environments (e.g., LOCA conditions, sump strainer plugging) were previously considered and modeled as needed.

The assessment of the impacts of potential degraded environments for each system did not identify any changes needed to the model (the internal flood analysis update and refined modeling of HVAC were changes incorporated in the Revision 6 model to address other SRs). Therefore, the inclusion of information on potential degraded environments to address the F&O will not impact the surveillance test interval (STI) application.

RAI-PRA-02 – F&Os Closure Process – Internal Flooding - Open/Partially Open Internal Flooding Findings in the Process of Being Resolved

a) F&O IFEV-A7 (MCR A2-5859) regarding internal flood scenario screening (Page 31 of Attachment 2 to the LAR)

This finding description states, “[m]aintenance event screening is currently documented as a ~1E-05/yr [year] frequency,” and concludes that the quantitative screening criteria is not met. The disposition for this finding states that resolution of the F&O is only a documentation issue and that additional discussion of potential maintenance-related flooding mechanisms will be added to the documentation. It not clear to the NRC staff how the disposition addressed the F&O, given that the basis for screening maintenance-induced flooding is not provided. In light of these observations, address the following:

i. Describe the basis for applying the screening value of ~1E-05/yr frequency.

ii. Clarify whether all maintenance-induced flooding events above the ASME/ANS screening threshold have been incorporated into the internal flooding model of record.

b) F&O 19-5 regarding internal flooding operator action execution steps (Page 32 of Attachment 2 to the LAR)

The finding cites several issues related to the calculation of human error probabilities (HEPs). They include: (1) lack of operator verifications to ensure as-built, as-operated Human Factor Events (HFEs) are modeled, (2) inconsistent timings assumptions that can affect HEP values, and (3) the use of non-proceduralized recovery actions for execution steps. The disposition states, "adjustments to some flooding HFE timing will be implemented." The disposition further states that these adjustments are not expected to impact flooding results, but are expected to be assessed in case-by-case STI evaluations.

i. Confirm whether the model of record (MOR) incorporates the updated HEP analysis and explain how the adjustment to the HEP updates do not impact the STI application.

ii. If the licensee has not incorporated the updated HEP analysis and cannot conclude there is no impact to the STI program, propose a mechanism to ensure the updates for the cited HEPs are completed and implemented in the PRA model used for STI applications prior to program implementation.

c) F&O 20-9 regarding dependency analysis seeding value (Page 35 of Attachment 2 to the LAR)

The finding states that it appears that the HFE values in the dependency analysis was not seeded with high enough values to ensure inclusion of all relative combinations. The disposition states, "[t]he impacted HFEs will be updated as needed in the Internal Flooding Assessment (IFA) model and documentation." It further states that the HEP seed values are expected to have minimal or no impact on the flooding results, but are expected to be assessed in case-by-case STI evaluations.

Explain how the process used to ensure the appropriate seeding value is implemented in the PRA model used for STI applications prior to program implementation.

Entergy Response:

a.i The screening value of ~1E-05/yr cited in the F&O text was developed using very conservative criteria. First, the calculation used the highest component maintenance unavailability value from the PRA model data, i.e., unavailability of the swing charging pump at 4.27E-02. That value is approximately an order of magnitude higher than a typical maintenance unavailability value.

Second, the screening value cited assumed that all maintenance activities that result in component unavailability involve activities that breach the pressure boundary. When calculating unavailability values, the period of maintenance unavailability begins when the hanging of clearance tags begins and ends after the tags are cleared and the system aligned for operation. However, the pressure boundary should not be breached until clearance tags are checked. The pressure boundary should be restored before clearing of tags is authorized. Furthermore, not all maintenance activities would be expected to breach the pressure boundary. For example, pump unavailability to change bearing oil or valve unavailability for motor operated valve (MOV) testing would not be expected to breach a fluid pressure boundary. Therefore, it is expected that less than about ten percent of maintenance unavailability actually breaches the pressure boundary. This factor was not included in the value cited in the F&O.

Consideration of a typical maintenance unavailability considering the fraction of total maintenance unavailability that could result in a breach of the fluid pressure boundary along with the previously-used probability that isolation failure occurs and is not detected and corrected would result in a maintenance-induced flood frequency that is two orders of magnitude less that the screening value cited in the F&O.

Although no data exists for the distribution of flow from maintenance-induced flood events, a reasonable assumption is that the flow rate that results from a maintenance-induced flood would follow the same trend as for random flood events. That is, events with high flow rates, e.g., greater than 2,000 gpm, have a frequency that is about two orders of magnitude less than events with low flow rates, e.g., less than 100 gpm.

Consideration of the factors discussed above could result in a frequency for maintenance-induced floods that is approximately two to four orders of magnitude lower than the 1E-05/yr value cited in the F&O or 1E-7/yr for events with smaller flow rates to 1E-09/yr for events with larger flow rates. These values are lower than the initiating event frequency values calculated considering only random pipe breaks in a similar flow range.

The effects of flooding are significantly different depending on whether the flood originates inside or outside the auxiliary building. Any flood that originates outside the auxiliary building cannot impact equipment inside the auxiliary building and vice-versa. For flooding events that originate outside the auxiliary building, both trains of Emergency Feedwater as well as once-through cooling are available to remove core decay heat. For flooding events that originate inside the auxiliary building, Main Feedwater, Auxiliary Feedwater, and Common Feedwater are available to remove core decay heat. Therefore, at least two trains of mitigating systems must fail in addition to the flood-induced failures to result in core damage for any maintenance-induced flood.

Furthermore, maintenance-induced floods would not be expected to cause any unique effects on the accident progression that were not considered for events caused by random pipe breaks. As shown in the calculations of the initiating event frequency values, there is a very large uncertainty for flooding events, particularly for events with a high flow rate. Given the uncertainty in the inputs for maintenance-induced flood events, that there are no unique effects on accident progression from maintenance-induced floods, and that there is a large uncertainty in the frequency of flooding events that occur due to random pipe breaks, use of the initiating event frequency calculated from random pipe breaks only is considered representative of maintenance-induced floods and no additional consideration of maintenance-induced flood frequency is needed for internal flooding events.

The internal flooding PRA initiating events analysis is being updated to reflect the information provided above.

a.ii Based on the discussion provided above, there are no maintenance-induced flooding events that exceed the ASME/AS screening criteria delineated in SR IE-C6.

b.i The update to the MOR for internal flooding is pending completion of the update to the internal events PRA model update which is expected fourth quarter 2018.

b.ii As mentioned above, the human reliability analysis (HRA) for internal flooding is not yet incorporated into the MOR, but will be incorporated after the internal events PRA model is updated in the fourth quarter 2018. Preliminary analyses show only very minor changes in the HEP values which are expected to have a negligible impact on the overall internal flooding results. A tracking item, (WT-WTHQN-2018-00229 CA-16) has been entered into the corrective action tracking system to ensure that the internal flooding PRA updates are completed before the models are used for STI extensions.

c. As mentioned above, the updated internal flooding PRA is not yet incorporated into the MOR, but will be incorporated after the internal events PRA model is updated in the fourth quarter 2018. The internal flooding PRA update logic model will be constructed using the internal events logic model as the basis. The internal flooding PA model will use the same method for seeding HEP values as the internal events PRA model, thereby ensuring the appropriate seeding values are used. The tracking item above, along with WT-WTHQN-2018-00229 CA-17, have been entered into the corrective action tracking system to ensure that the internal flooding PRA updates are completed and use the appropriate seeding values before the models are used for STI extensions.

RAI-PRA-03 - Identifying Key Assumptions and Uncertainties (Internal Events and Internal Flooding) that could impact the Application

Two of the F&Os presented in Attachment 2 of the LAR pertain to identification of key assumptions and uncertainty. The dispositions to these F&Os provide insufficient information for NRC staff to conclude that the F&O is sufficiently resolved for this application.

F&O QU-F4-01 and 20-4 pertains to model assumptions and uncertainties. (Pages 27 and 34 of Attachment 2 to the LAR)

The disposition for internal events F&O (i.e., QU-F4-01) states in part that, “Appendix 1 of the Sensitivity and Uncertainty includes a review of the sources of uncertainty using EPRI [Electric Power Research Institute] 1016737.” The disposition for the internal flooding F&O (i.e., 20-4) states, “is a documentation issue [and] will be included in the IFA documentation.” In light of these observations, address the following:

i. Describe the process used to determine the key assumption and sources of uncertainty for the internal events and internal flooding PRAs. The description should contain sufficient detail to identify: (1) whether all assumptions and sources of uncertainty related to all aspects of the PRA analysis were evaluated to determine whether they were “key,” and (2) the criteria that were used to determine whether the modeling assumptions and sources of uncertainty were considered “key.”

ii. Also, explain how the approach adequately resolves the concerns raised in F&Os QU-F4-01 and 20-4.

Entergy Response:

i. As discussed in Section 7.3 of NUREG-1855, only relevant sources of uncertainties and related assumptions with the potential to challenge the acceptance guidelines for an application are considered key. Therefore, in the context of the ANO-2 PRA MOR, *key* assumptions and sources of uncertainty cannot be determined. However, the ANO-2 PRA MOR sensitivity and uncertainty analysis does review the model assumptions made for the PRA in order to identify candidate sensitivity analyses to assess those uncertainties that may impact the MOR results. The ANO-2 PRA MOR assumptions are reviewed for applicability against the generic sources of model uncertainty identified in EPRI 1013491, "Guideline for Treatment of Uncertainty in Risk-Informed Applications," and EPRI 1016737, "Treatment of Model and Parameter Uncertainty for Probabilistic Risk Assessments," consistent with the guidance in NUREG-1855. This review was performed for all elements of the internal events PRA (IE, AS, SY, etc.) during the Revision 5 MOR update. The sources of uncertainty determined to be relevant to the ANO-2 PRA MOR based on this review of the assumptions were characterized and further evaluated with a total of 19 sensitivity cases. A similar review has been conducted for the Revision 6 internal flooding update (currently in development to update the model of record).

   During the TSTF-425 implementation process, candidate STI changes will be reviewed against the relevant sources of uncertainty identified for the ANO-2 PRA MOR. Those sources of uncertainty determined to have the potential to challenge the acceptance criteria for the STI change will be identified as key, and sensitivity studies performed in accordance with NEI 04-10.

ii. F&O QU-F4-01 found that the selection process for determining important assumptions and sources of uncertainty was not delineated. The sensitivity and uncertainty analysis report subsequently developed for the Revision 5 PRA MOR update follows the approach described in NUREG-1855 to identify and characterize relevant sources of uncertainty and related assumptions, using the candidates in EPRI reports 1013491 and 1016737 referenced by the NUREG. This satisfies the SR to document the characterization of the sources of model uncertainty and related assumptions.

   F&O 20-4 found that there was no documentation of modeling uncertainties provided in any of the Revision 5 internal flooding notebooks. Subsequently, Revision 6 of the internal flooding analysis (currently in development to update the model of record) has developed a sources of uncertainty report that also follows the approach described in NUREG-1855 to identify and characterize relevant sources of uncertainty and related assumptions, using the candidates in EPRI reports 1013491 and 1016737. This satisfies SR IFPP-B3 (and similar) to document sources of model uncertainty and related assumptions (as identified in QU-E1 and QU-E2) associated with the internal flood analysis.

RAI-PRA-04 – Fire HRA Methodology Revision

a) F&O HR-G7-01 pertains to joint human error probability (Page 77 of Attachment 2 to the LAR)

The finding states, in part, that "the dependency approach does not consider availability of resources." The disposition states, "[a] review was performed of the most challenging scenario with respect to manpower requirements, control room abandonment, which confirmed that available manpower is sufficient to support multiple HEPs (HFEs) in a cutset for the control room abandonment cutsets." The disposition also states that the Human Reliability Analysis (HRA) methodology was updated using NUREG-1921, "EPRI/NRC-RES Fire Human Reliability Analysis Guidelines." It is not clear to the NRC staff how reviewing the resources associated with one scenario (albeit the most challenging) for adequate availability resources substitutes not considering the availability of resources in the dependency analysis. The NRC staff notes that manpower limitations can occur for HFEs that have overlapping execution windows.

Explain how the other fire scenarios that include both internal events and fire operator actions are not impacted by resource limitations, as defined by NUREG-1921.

b) F&O CF-A1-01, ES-C1-01, ES-D1-01, ES-D1-02, HRA-A2-01, HRA-A4-02, PRM-B2-01, PRM-B9-01, and HR-G3-01 pertain to revised HRA methodology. (Pages 43, 44, 52, 54, 55, 64, 66, 69, 70, and 76 of Attachment 2 to the LAR)

The licensee stated that, for these F&Os, the HRA methodology was revised to follow the guidance of NUREG-1921, "EPRI/NRC-RES Fire Human Reliability Analysis Guidelines."

i. Justify that the HRA revision to NUREG-1921 does not constitute an ASME/ANS PRA Upgrade. Include a description of the HRA methodology originally used in the ANO-2 PRA models and how it was changed to be in alignment with guidance in NUREG-1921.

ii. If the HRA methodology update is determined to meet the definition of a PRA upgrade per the ASME/ANS 2009 PRA standard, clarify that a focused-scope peer review has been conducted on HRA updates determined to be PRA upgrades and that all resulting findings along with their dispositions have been provided with this LAR.

Entergy Response:

a. The original disposition to this F&O was performed as an interim measure until ANO-2 revised the HRA analysis to use EPRI's HRA Calculator. The ANO-2 fire HRA methodology has incorporated the HRA Calculator for use in analyzing the HEPs for the ANO-2 Fire PRA model of record.

While the original analysis used the HRA Toolbox, which did not account for HRA dependencies in relation to available resources, the HRA calculator does assess the availability of operators in relation to the timing of the event to determine if there is dependence. The HRA Calculator considers simultaneous HFEs by considering whether there are sufficient resources to support the required actions. This determination can be performed by comparing the required tasks with the number of crew (workload). If the resources are inadequate, the "No" branch on the "Adequate Resources" branch is selected, which implies complete dependence. If it can be shown

that there are adequate resources to support both HFEs and that the scenario is feasible, the "Yes" branch on the "Adequate Resources" branch is selected. Use of this tool resolves the peer review concerns regarding the assessment of dependency factors such as availability of operator resources for each of the fire scenarios analyzed.

F&O HR-G7-01 has been resolved by the use of the HRA Calculator to account for dependence between operator actions and account for the number of operators available to take action.

b.i Earlier versions of the HRA methodology used in support of the Fire PRA model development had used a simplified flow chart for the incorporation of factors for adjusting HEP values. The selected factor considered whether the action was in-control room vs. ex-control room, time available, cue available, and complexity of the action.

In order to comply with the guidance in NUREG/CR-1921, these factors were removed and the HRAs for the Fire PRA model were developed in consideration of the cues, timing, manpower, stress, etc. The ANO-2 HRA revision and update to this new methodology was considered a methodology upgrade and a focused-scope peer review was performed. The discussion in the 3rd bullet of Section 3.3.2 of the license amendment request (LAR) submittal letter, 2CAN021802, discusses a peer review that was performed in June of 2014 to evaluate this upgrade in accordance with the ASME/ANS standard. The conclusion of the peer review was that the ANO-2 fire HRA was performed consistent with the guidance set forth in NUREG/CR-1921.

b.ii As stated in previous response, the update of the HRA methodology to conform with NUREG/CR-1921 is considered an upgrade and a focused-scope peer review was performed in June of 2014. As a result of this peer review, it was found that the ANO-2 fire HRA was performed consistent with the guidance set forth in NUREG/CR-1921. The two findings from this peer review along with the respective dispositions were provided in Table 2 of Attachment 2 of the LAR. The disposition in this table pertaining to HR-G7-01 should be updated to depict the response provided in RAI-PRA-04, Part a). This response should discuss the use of the HRA calculator to evaluate HRA dependencies and address the combination of events in relation to the number of available operators.

RAI-PRA-05 - External Hazards

Attachment 2, Section 3.5 of the LAR does not explain how the risk from external hazards evaluated in the ANO-2 Individual Plant Examination of External Events was updated to reflect new information when used in performing a qualitative or bounding analysis in support of STI extension evaluations in accordance with NEI 04-10, Section 4, Step 10.

Describe the process for monitoring for and incorporating new information into the qualitative or bounding analyses performed for external hazards. Include justification that this process is sufficient to support the Surveillance Frequency Control Program (SFCP) and reflect the as-built, as-operated plant configuration. Specifically, describe monitoring for and incorporating new information for the high winds and tornado, hurricane, external flooding, and seismic hazards analyses, such as the need to update the site-specific ground motion response spectra.

Entergy Response:

Entergy procedure EN-DC-151, "PSA Maintenance and Update," details the process for maintaining and updating all Entergy PRA models, including those for ANO-2. As described in Section 5.2 of that procedure, any new information identified by a PSA engineer should be evaluated for model impact and a model change request (MCR) created and entered into the MCR database. Each MCR is assigned a grade on creation. An MCR graded as "A" is defined as "Extremely important and necessary to assure the technical adequacy of the PRA or quality of the PRA" and requires that a condition report be generated to document the issue. Per the procedure, an interim PRA model update should be scheduled as soon as possible after the identification of an "A" level MCR or more than 25 open "B" level MCRs. Any new information that would result in a significant change in the external events risk is expected to be identified as an "A" level MCR and would result in a PRA model update as soon as possible. In addition, per EN-DC-151, updates to separate PRA models for seismic, fire, external flooding, high winds, toxic chemicals, etc., are considered during each periodic internal events PRA update to meet any plant-specific commitments or applications. The subsequently updated external events analyses could then be used for the SFCP evaluations.

RAI-PRA-06 - Very Early Warning Fire Detection Systems (VEWFDS) utilized in the PRA

By letter dated November 17, 2016 (ADAMS Accession No. ML16253A111), the NRC staff informed the industry that, "[i]f a licensee is performing a periodic or interim PRA update, performing a fire risk evaluation in support of self-approval, or submitting a future risk-informed license amendment request, the staff's expectation is that they will assess the impact of new operating experience and information [e.g., NUREG-2180] on their PRA analyses and incorporate the change as appropriate per Regulatory Guide 1.200, Revision 2."

i. Explain when the guidance in NUREG-2180 will be fully incorporated into the PRA modeling or provide justification that the exclusion of the updated VEWFDS methodology has no impact on the STI evaluations.

ii. If the licensee identifies that this change will impact the STI application, then propose a mechanism that ensures the VEWFDS methodology will be updated to the PRA model used for STI calculations prior to program implementation.

Entergy Response:

i. ANO-2 committed to installation of incipient fire detection in the ANO-2 Control Element Drive Mechanism (CEDM) room as part of the transition to NFPA-805. However, after the NRC removed the endorsement of FAQ 08-0046, effective July 29, 2016, ANO-2 removed all credit for this system in the Fire PRA model. Quantification results indicated that other plant modifications made during the transition to NFPA-805 provided sufficient risk reduction to meet the acceptance criteria without taking credit for the incipient detection system. Therefore, the guidance in NUREG-2180 will not be incorporated into the Fire PRA model and there is no impact on STI evaluations for the exclusion of the VEWFDS in the Fire PRA model.

ii. The model provides bounding estimates of risk for the systems in which incipient detection is installed. These bounding estimates provide acceptable risk results and if VEWFDS had been credited in accordance with the guidance of NUREG-2180, it would

have served only to reduce the risk estimates further. Therefore, STI evaluations, using the existing model, will provide bounding risk estimates. There are no plans to implement or incorporate the guidance in NUREG-2180 at this time.

The preceding information is consistent with discussions held between the NRC and the licensee on August 2, 2018.

In addition to the above RAI response, Entergy is submitting revised TS markups, TS Bases markups, and TS clean pages that were updated following submittal of the Reference 1 TSTF-425 application. The corresponding TSTF-425 related changes are simply moved to the updated TS or TS Bases pages. These pages were updated via ANO-2 TS Amendment 310 (Reference 4) following submittal of the Reference 1 TSTF-425 application. The subject pages are included in Attachments 1, 2, and 3 of the enclosure. However, one page submitted in the original Reference 1 application no longer needs to be included in the package. Entergy requests both the markup and revised version of this page be removed from further NRC review:

TS Page 3/4 7-5: All surveillance requirements moved to TS Page 3/4 7-6 via Amendment 310. TS Page 3/4 7-6 was included in the original Reference 1 submittal and is updated accordingly in Attachments 1 and 2 of this enclosure.

In addition, TS Bases Page B 3/4 7-2 which was included in the original Reference 1 submittal is now replaced with TS Bases Page B 3/4 7-2c (included in Attachment 3 of this enclosure), again due to implementation of TS Amendment 310.

REFERENCES:

1. Entergy letter dated February 6, 2018, *Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program (TSTF-425)*, Arkansas Nuclear One, Unit 2, 2CAN021802 (ML18038B354)
2. Entergy letter dated March 26, 2018, *Supplemental Information Supporting the Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program (TSTF-425)*, Arkansas Nuclear One, Unit 2, (2CAN031803) (ML18085A816)
3. NRC email dated August 2, 2018, *Final RAI RE: License Amendment Request to Adopt TSTF-425, Revision 3* (EPID L-2018-LLA-0047) (2CNA081801) (ML18218A501)
4. NRC letter dated June 19, 2018, *Arkansas Nuclear One, Unit 2 - Issuance of Amendment Re: Technical Specification Changes to Provide Actions for Emergency Feedwater Pump Inoperability consistent with NUREG-1432* (CAC No. MG0016; EPID L-2017-LLA-0268) (2CNA061801) (ML18134A253)

ATTACHMENTS:

1. Proposed Technical Specification Changes (markup)
2. Revised Technical Specification Pages
3. Proposed Technical Specification Bases Changes (Information Only)

ENCLOSURE ATTACHMENT 1 to

2CAN091801

PROPOSED TECHNICAL SPECIFICATION CHANGES (MARK-UP)

4.7.1.2 Each EFW pump shall be demonstrated OPERABLE:

a In accordance with the Surveillance Frequency Control Program ~~At least once per 31 days~~ by:

1. 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.

b. In accordance with the INSERVICE TESTING PROGRAM by:

1. Verifying the developed head of each EFW pump at the flow test point is greater than or equal to the required developed head. This surveillance requirement is not required to be performed for the turbine-driven EFW pump until 24 hours after exceeding 700 psia in the steam generators.

c In accordance with the Surveillance Frequency Control Program ~~At least once per 18 months~~ by:

1. Verifying that each automatic valve in the flow path actuates to its correct position on actual or simulated MSIS and EFAS.

2. Verifying each EFW pump starts automatically on an actual or simulated EFAS.

d. By verifying proper alignment of the required EFW flow paths by verifying flow from the condensate storage tank to each steam generator. This SR is required to be verified prior to entering MODE 2 whenever plant has been in MODES 4, 5, 6, or defueled for > 30 days.

ENCLOSURE ATTACHMENT 2 to

2CAN091801

REVISED TECHNICAL SPECIFICATION PAGES

4.7.1.2 Each EFW pump shall be demonstrated OPERABLE:

a In accordance with the Surveillance Frequency Control Program by:

1. 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.

b. In accordance with the INSERVICE TESTING PROGRAM by:

1. Verifying the developed head of each EFW pump at the flow test point is greater than or equal to the required developed head. This surveillance requirement is not required to be performed for the turbine-driven EFW pump until 24 hours after exceeding 700 psia in the steam generators.

c In accordance with the Surveillance Frequency Control Program by:

1. Verifying that each automatic valve in the flow path actuates to its correct position on actual or simulated MSIS and EFAS.

2. Verifying each EFW pump starts automatically on an actual or simulated EFAS.

d. By verifying proper alignment of the required EFW flow paths by verifying flow from the condensate storage tank to each steam generator. This SR is required to be verified prior to entering MODE 2 whenever plant has been in MODES 4, 5, 6, or defueled for > 30 days.

ENCLOSURE ATTACHMENT 3 to

2CAN091801

PROPOSED CHANGES TO TECHNICAL SPECIFICATION BASES PAGES

(Information Only)

SURVEILLANCE REQUIREMENTS (continued)

SR 4.7.1.2.c.1 is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The Surveillance ~~18 month~~ F~~f~~requency controlled under the Surveillance Frequency Control Program is based on the need to perform the SRs under the conditions that apply during a unit outage and the potential for an unplanned transient if the SRs were performed with the reactor at power. The ~~18 month~~ Frequency is acceptable based on the design reliability and operating experience of the equipment.

SR 4.7.1.2.d ensures that the EFW system is properly aligned by verifying the flow path from the condensate storage tank (CST) to each SG prior to entering MODE 2 operation, after more than 30 days below MODE 3. OPERABILITY of the EFW flow paths must be verified before sufficient core heat is generated that would require the operation of the EFW system during a subsequent shutdown. The Frequency is reasonable, based on engineering judgment, and other administrative controls to ensure that flow paths remain OPERABLE. To further ensure EFW system alignment, the OPERABILITY of the flow paths is verified following extended outages to determine that no misalignment of valves has occurred. This SR ensures that the flow path from the CST to the SGs is properly aligned.

3/4.7.1.3 CONDENSATE STORAGE TANK

The design of the ANO-2 condensate storage system includes two non-seismic condensate storage tanks (2T41A and 2T41B). In addition, ANO-2 is capable of being aligned to the seismically qualified condensate storage tank (T41B). Each of these tanks is designed to provide condensate-grade water to the suction of the emergency feedwater system (EFW) pumps. The service water system (SWS) provides the assured source of water for EFW.

The allowance to align to the non-safety, non-seismically-qualified condensate storage tanks (2T41A and 2T41B) has been retained for operational flexibility. The minimum volume for 2T41A/B is consistent with the original technical specification (TS) requirements. In the event of a failure of one of these tanks in conjunction with an EFW actuation, EFW pump suction will be automatically re-aligned to draw from the SWS. Should the EFW be aligned to the Unit 1 tank (T41B), the automatic suction re-alignment to SWS may be disabled, provided remote-manual alignment capability is maintained (reference 0CAN030101). Therefore, the OPERABILITY requirements for the SWS - EFW system isolation valves listed in SR 4.7.1.3.2 do not include the automatic re-alignment to SWS capability when EFW is aligned to T41B.

TS 3.7.1.3 and corresponding Bases describe the required condensate storage tank (CST) volumes and conditions where automatic realignment to the SWS suction source is required. TS 3.7.1.3 does not describe the operability requirements for the SWS or the EFW system. Therefore, an inoperable SWS suction supply to an EFW pump constitutes inoperability of the associated EFW train and TS 3.7.1.2 is applicable in such cases.

The T41B CST is seismically qualified and a portion of the tank is protected from tornado missiles. The protected volume of water in the tank can provide a source of EFW for both units for at least 30 minutes. Thirty minutes is adequate for the operators to manually switch the EFW suction alignment to the SWS, if required.