

NRR-DMPSPeM Resource

From: Wengert, Thomas
Sent: Thursday, August 2, 2018 7:42 AM
To: PYLE, STEPHENIE L
Cc: BICE, DAVID B (ANO); Pascarelli, Robert; Hoffman, Raymond; Abramovitz, Mark
Subject: ANO-1 and 2 Final RAI RE: License Amendment Request to Adopt EAL Scheme Change Per NEI 99-01 Revision 6 (EPID L-2018-LLA-0082)
Attachments: ANO - Final RAI RE EAL Scheme Change LAR.pdf

On July 17, 2018, the U.S. Nuclear Regulatory Commission (NRC) staff sent Entergy Operations, Inc. (the licensee) the draft Request for Additional Information (RAI) identified below. This RAI relates to the license amendment request to adopt an emergency action level (EAL) scheme based on based upon NEI 99-01, Revision 6, at Arkansas Nuclear One (ANO), Units 1 and 2, as described below.

The NRC staff held a conference call with the licensee staff on August 1, 2018, to clarify this request. At the conclusion of the call, the licensee agreed to provide a response to this RAI within 45 days of this correspondence. A publicly available version of this final RAI (attached with "Draft" removed) will be placed in the NRC's Agencywide Documents Access and Management System (ADAMS).

From: Wengert, Thomas
Sent: Tuesday, July 17, 2018 10:32 AM
To: PYLE, STEPHENIE L
Cc: 'BICE, DAVID B (ANO)'; Pascarelli, Robert; Hoffman, Raymond
Subject: ANO-1 and 2 Draft RAI RE: License Amendment Request to Adopt EAL Scheme Change Per NEI 99-01 Revision 6 (EPID L-2018-LLA-0082)

By letter dated March 29, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML18094A154 [package]), Entergy Operations, Inc. (Entergy) requested U.S. Nuclear Regulatory Commission (NRC) approval for an emergency action level (EAL) scheme change for Arkansas Nuclear One (ANO), Units 1 and 2. Specifically, Entergy has requested to adopt the most recent industry EAL scheme development guidance that was provided in the Nuclear Energy Institute (NEI) document NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors" (ADAMS Accession Number ML12326A805). Entergy has proposed to revise its current EAL scheme to one based upon NEI 99-01, Revision 6.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the submittal and determined that additional information is required in order to complete the review. The staff's draft request for additional information (RAI) is provided as an attachment to this email. Please review and let me know if Entergy would like to have a conference call with the NRC staff to clarify this request. Also, let's discuss the timing for your response to this RAI.

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REQUEST FOR ADDITIONAL INFORMATION
LICENSE AMENDMENT REQUEST
EMERGENCY ACTION LEVEL SCHEME CHANGE
ENTERGY OPERATIONS, INC.
ARKANSAS NUCLEAR ONE, UNITS 1 AND 2
DOCKET NOS. 50-313, 50-368, AND 72-13

By letter dated March 29, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML18094A154 [package]), Entergy Operations, Inc. (the licensee or Entergy) requested U.S. Nuclear Regulatory Commission (NRC) approval for an emergency action level (EAL) scheme change for Arkansas Nuclear One (ANO), Units 1 and 2. The NRC staff has reviewed the submittal and determined that additional information is needed to complete the review, as indicated in the Request for Additional Information (RAI) below.

Regulatory Requirements/Background

The requirements of Section 50.47(b)(4) to Title 10 of the *Code of Federal Regulations* (10 CFR) state, in part, that:

A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee...

The most recent industry EAL scheme development guidance is provided in the Nuclear Energy Institute (NEI) document NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors" (ADAMS Accession Number ML12326A805). By letter dated March 28, 2013 (ADAMS Accession No. ML12346A463), the NRC endorsed NEI 99-01, Revision 6, as acceptable generic (i.e., non-plant-specific) EAL scheme development guidance. Entergy proposed to revise its current EAL scheme to one based upon NEI 99-01, Revision 6.

ANO RAI 1

Concerning plant or procedure changes that could impact the ANO EAL scheme, please address the following:

- a. Section 4.7, "EAL/Threshold References to AOP [*Abnormal Operating Procedure*] and EOP [*Emergency Operating Procedure*] Setpoints/Criteria," of NEI 99-01, Revision 6, states:

As reflected in the generic guidance, the criteria/values used in several EALs and fission product barrier thresholds may be drawn from a plant's AOPs and EOPs. This approach is intended to maintain good alignment between operational diagnoses and emergency classification assessments. Developers should verify that appropriate administrative controls are in place to ensure that a subsequent change to an AOP or EOP is screened to determine if an evaluation pursuant to 10 CFR 50.54(q) is required.

Please explain what controls are in place at ANO to ensure that a subsequent change to an AOP or EOP is screened to determine if an evaluation pursuant to 10 CFR 50.54(q) is required.

- b. Proposed EALs AA3.2 and HA5.1 are applicable only during Modes 3 and 4, based on current site operational requirements. Please explain what process is in place to ensure that plant equipment or procedural changes would be adequately screened to ensure that the EAL would be appropriately modified if needed.

ANO RAI 2

Section 4.4, "Presentation of Scheme Information to Users," of NEI 99-01, Revision 6, provides that an alternative method for presenting EAL scheme information may be developed for use, provided that it contains all the information needed to make a correct emergency classification. This information includes the Initiating Conditions (ICs), Operating Mode Applicability criteria, EALs, and Notes. The licensee provided an EAL Matrix Chart and Review Table (EAL Matrix) as an alternative presentation method. However, the EAL Matrix is not consistent with the proposed EAL Technical Basis document. This could lead to inaccurate or delayed emergency classifications. A partial list of examples of inconsistencies follows:

- a. The proposed EAL basis document Table 1A-1, "Unit 1 Effluent Monitor Classification Thresholds," provides that radiation monitor "RX-9830" is the fuel handling area release point monitor, while the EAL Matrix provides that radiation monitor "RX-9820" is the fuel handling area release point monitor.
- b. The proposed EAL basis document Table 2A-1, "Unit 2 Effluent Monitor Classification Thresholds," provides that radiation monitor "RX-9830" is the fuel handling area release point monitor, while the EAL Matrix provides that radiation monitor "RX-9820" is the fuel handling area release point monitor. Additionally, monitors 2RE-2330 (BMS Liquid Discharge), 2RE-4423 (Regenerative Waste Discharge), and 2RX-9820 (Containment Purge) are not consistent with the ANO EAL Basis document values.
- c. The proposed EAL basis document Table 2A-2, "Unit 1[2] Fuel Damage Radiation Monitors," provides radiation monitor 2RE-8915 (Spent Fuel Area). However, there is no corresponding monitor on the EAL Matrix. Additionally, the EAL Matrix shows 2RE-9825 as the instrument numbers for both the radwaste area monitors, as well as the containment high range monitor.
- d. The EAL Matrix Fission Product Barriers threshold value for an Alert has FS1.1 as an EAL identifier vice FA1.1.
- e. The proposed EAL Matrix shows that HS6.1 is only applicable when defueled vice in all modes. The ANO EAL Basis document shows all modes.

Please explain how the apparent differences between the EAL Matrix and the EAL basis document would not present human factors issues that could impact timely and accurate EAL assessments, or revise accordingly to address. (Note: the above items are intended to highlight NRC staff concerns and should not be considered as a complete list of potential issues.)

ANO RAI 3

The proposed EAL AU1.1 threshold values for an Unusual Event classification have substantially changed from the currently-approved EAL threshold values for ANO based on NEI 99-01, Revision 5 guidance. Considering that the guidance for AU1.1 is similar between Revision 5 and Revision 6 to NEI 99-01, the proposed changes in values do not appear to be reasonable. NRC staff could not determine a valid reason for the setpoint changes based on the information provided in the proposed EAL scheme change. Although it appeared that ANO used a similar methodology to determine RU1.1 threshold values as the Offsite Dose Calculation Manual (ODCM), the proposed values for several monitors are approximately 2 orders of magnitude lower than expected. (Note: this assumes that the General Emergency, Site Area Emergency, and Alert threshold values for ANO were properly calculated.)

The threshold values for AU1.1 are intended to address a potential reduction, as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period of time. Section A.4 to Appendix A of NEI 99-01, Revision 5, discusses the usage of ODCM values as threshold values for AU1. This attachment is still applicable to NEI 99-01, Revision 6.

Please explain why the ANO ODCM calculated values for effluent flow paths were not used as a basis for the ANO AU1.1 threshold values. This explanation should include a justification for using a shutdown source term, not apportioning the threshold values to account for multiple release stacks, and Notice of Unusual Event threshold values that differ from the proposed Alert values by a factor of approximately 100 to approximately 10,000.

ANO RAI 4

ANO removed 2RX-9840 (Post Accident Sampling Building), 2RX-9845 (Auxiliary Building Extension), and 2RX-9850 (Low Level Radwaste Storage Building) from the proposed AU1.1. These are monitored effluent paths that are not accounted for in the proposed ANO scheme, but are in use in the current approved scheme.

Please provide a justification to explain why all continuous radioactivity releases from monitored gaseous effluent pathways were not included in the proposed ANO EAL scheme change, or revise accordingly. (Note: considering that ALL effluent flow path radiation monitor readings are typically significantly lower than two times the ODCM limit, simply providing that an effluent path had low values for some amount of time is not adequate justification for eliminating one or more monitored effluent flow paths.)

ANO RAI 5

ANO calculation EP-CALC-ANO 1701 states that AU1.3 will still be valid. However, AU1.3 was not provided in the ANO EAL scheme change.

If monitors 2RX-9840, 2RX-9845 and 2RX-9850 were intended to be assessed by AU1.2 vice AU 1.3, please explain how a timely and accurate classification can be made for effluent flow paths that may not have an active discharge permit.

ANO RAI 6

The proposed EAL CU3.1, contains the condition, "...due to the loss of RCS cooling," which is not consistent with NEI 99-01, Revision 6. This could result in potential misclassification for an event that causes RCS temperature to rise above 200 degrees Fahrenheit (°F) when decay heat removal capability has not been lost.

Please provide justification, in greater detail, for adding the condition, "...due to the loss of RCS cooling," to the EAL CU3.1 threshold value, or revise accordingly.

ANO RAI 7

The proposed EAL CA1.1 threshold values equate to levels that are approximately at the bottom of the hot leg. The guidance provided by NEI 99-01, Revision 6, states "... [t]he minimum level that supports operation of normally used heat removal systems (e.g., Residual Heat Removal or Shutdown Cooling)."

Please explain what unique ANO design features support a CA1.1 threshold value that is substantially lower than the value at which the heat removal systems can operate, or revise accordingly.

ANO RAI 8

The proposed EAL CA3.1 contains the condition "...due to the loss of RCS [*reactor coolant system*] cooling," which is not consistent with NEI 99-01, Revision 6. This deviation could result in potential misclassification for an event other than a loss of RCS cooling that leads to an unplanned RCS pressure increase.

Please provide justification in greater detail for this deviation, or revise accordingly.

ANO RAI 9

For proposed EALs CU5.1 and SU7.1, State and local agency communications methods include the INFORM notification system (INFORM). Based on the information provided, the NRC staff could not determine whether INFORM was independent of the telephone systems provided on Table 1[2]C-5 or if INFORM supported two-way communications. Additionally, usage of the INFORM system was not identified in the emergency plan.

Please provide a justification for including the INFORM notification system as a State and local agency communication method. This justification should explain whether or not INFORM is independent of the provided telephone systems and if INFORM supports two-way communications.

ANO RAI 10

Proposed EALs FA1.1, FS1.1 and FG1.1 are assessed using threshold values that are provided by Table 1[2]F-1, "Fission Product Barrier Threshold Matrix."

- a. The proposed Reactor Coolant System Barrier (RCB) 2 and Containment Barrier (CNB) 1 threshold values do not appear to be directly tied to having an RCS leak that is greater than the capacity of a charging pump, as indicated by either direct indications from control room

panels or with the methodology provided by the excessive RCS leakage AOP. Using either a direct reading of RCS leakage or the AOP criteria to determine RCS leakage for both the RCS leakage AOP and the RCS barrier potential loss would facilitate timely and accurate assessment. As proposed, it appears that a mass balance must be performed to assess RCS leak rate.

Please explain how ANO can assess RCB2 and CNB1 in a timely and accurate manner, given the proposed RCB2 and CNB1 threshold value wording, or revise accordingly.

- b. The proposed Unit 1 RCB3 threshold appears to be more aligned with a “typical” pressurized water reactor (PWR) vice site-specific values for ANO Unit 1.

ANO Unit 1 provides a threshold value that requires both the pressurized thermal shock limits of RT14 being applicable and an RCS pressure versus temperature that is to the left of the Nil Ductility Transition Temperature/Low Temperature Overpressure (NDTT/LTOP) limit lines provided by EOP Figure 3. However, it appears that either of these conditions could indicate that an extreme challenge to the RCS pressure barrier exists.

For the Unit 1 RCB3 threshold value, please provide a justification for including an “AND” logic to the PTS limits of RT14 and the NDTT/ LTOP limit lines of EOP Figure 3. (Note: this justification should explain differences between RT14 and EOP Figure 3 and explain why both conditions are required as a threshold value when either condition appears to be a severe challenge to the integrity of the RCS pressure boundary.)

- c. The proposed Unit 2 RCB3 threshold appears to be more aligned with a “typical” PWR vice site-specific values for ANO Unit 2. ANO Unit 2 provides a threshold value that requires both an uncontrolled RCS cooldown and an RCS pressure/temperature that is to the left of the pressure-temperature (P-T) limit lines provided by Standard Attachment 1. It appears that operating the unit in the region to the left of the P-T limit lines provided by Standard Attachment 1, by itself, could indicate that an extreme challenge to the RCS pressure barrier exists.

For the unit 2 RCB3 threshold value, please provide a justification for including “AND” logic to an uncontrolled RCS cooldown and the P-T limits of Standard Attachment 1.

ANO RAI 11

The Fuel Clad Barrier (FCB) 4, RCB4, and EAL SS6.1 threshold values include the condition “HPI [*High Pressure Injection*] [Once Through] cooling initiated.” For some PWRs, implementation of procedural guidance would provide cooling by injecting water into the RCS and removing that water, such that core cooling is established. The proposed wording implies that not only are the steam generators ineffective for heat removal, but that an alternate heat removal path has been established. This is not consistent with the guidance in NEI 99-01, Revision 6, which provides a threshold value of “[i]nadequate heat removal capability via steam generators as indicated by (site-specific indications).”

Please explain how a timely and accurate assessment can be performed for FCB4, RCB4, and SS6.1 with the proposed condition requiring HPI [Once Through] cooling initiation, rather than the HPI [Once Through] cooling procedure implementation, or revise accordingly.

ANO RAI 12

The threshold value for FCB5 is based on 300 microcuries/gram dose equivalent I-131 which typically corresponds to 2 percent to 5 percent fuel cladding damage. For ANO, this corresponds to fuel cladding damage of 1.49 percent for Unit 1 and 1.13 percent for Unit 2.

Please explain why the proposed FCB5 EAL radiation monitor threshold values do not correspond to 2 percent to 5 percent of cladding damage.

ANO RAI 13

Please justify using a containment hydrogen concentration of greater than 3 percent for the proposed CNB7 threshold value, as this is not consistent with the explosive mixture provided by NEI 99-01, Revision 6. (Note: the proposed threshold value of containment hydrogen concentration of greater than 3 percent could result in an early or unwarranted General Emergency declaration.)

ANO RAI 14

The proposed HA1.1 and HS1.1 definitions of the owner controlled area (OCA) and the protected area (PA) appear to be the same. The definition of the OCA indicates that it is demarcated by a vehicle barrier system and a security fence with access controlled by an access control point. The PA is “[a]n area encompassed by physical barriers (i.e., the security fence) and to which access is controlled.” As such, it appears that HA1.1 and HS1.1 have similar threshold value criteria that could cause a delayed or inaccurate EAL classification.

Please explain how ANO can perform a timely and accurate assessment of HA1.1 and HS1.1 with the proposed definitions, or revise accordingly.

ANO RAI 15

The proposed EALs HU4.1 and HU4.2 appear to cover a wider range of areas than that provided by NEI 99-01, Revision 6 (EAL HU4). Please provide justification that all areas identified for this EAL contain equipment needed for safe operation, safe shutdown or safe cool-down, or revise as necessary to support accurate and timely assessment.

ANO RAI 16

The proposed EAL HU4.2 - Tables 1H-1, “Unit 1 Fire Areas,” and 2H-1, “Unit 2 Fire Areas,” include all elevations of the Reactor Building. This could result in an event declaration due to the spurious actuation of a single fire alarm. Based on the information provided in the license amendment request, the NRC staff could not determine if the containment fire detection system at ANO, in combination with the ANO containment ventilation system, supported the inclusion of the Reactor Building as a fire area for EAL HU4.2.

Please provide sufficient justification that demonstrates why, or why not, including the Reactor Building Table 1[2]H-1 could not result in unnecessary event declarations. If this justification demonstrates that including the Reactor Building is not appropriate as a fire area for HU4.2, please modify accordingly.