From: Wengert, Thomas
Sent: Wednesday, May 4, 2022 7:28 AM
To: Keele Jr, Riley D
Cc: Clark, Robert; Dixon-Herrity, Jennifer
Subject: ANO-1 and ANO-2 - Final RAI #2 RE: License Amendment Requests to Implement Provisions of 10 CFR 50.69 (L-2021-LLA-0105/-0106)
Attachments: ANO-1 and ANO-2 Final Second Round RAI for 50-69 LAR.pdf

On April 21, 2022, 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 requests to modify the Arkansas Nuclear One, Units 1 and 2 (ANO-1 and ANO-2) licensing basis that would allow the implementation of the provisions of Title 10 of the *Code of Federal Regulations*, Part 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors."

The NRC staff held a conference call with the licensee staff on April 28, 2022, to clarify this request. During the call, the NRC staff agreed to make some wording changes to RAI 02.a(4).01 to further clarify the request. The NRC staff has also made some additional minor editorial and formatting changes in this final RAI to enhance clarity. Following the conference call, the licensee agreed to provide a response to this RAI by May 20, 2022. A publicly available version of this revised, final RAI (attached) will be placed in the NRC's Agencywide Documents Access and Management System (ADAMS).

From: Wengert, Thomas
Sent: Thursday, April 21, 2022 10:57 AM
To: Keele Jr, Riley D <rkeele@entergy.com>
Cc: Clark, Robert <RCLARK@entergy.com>; Dixon-Herrity, Jennifer <Jennifer.Dixon-Herrity@nrc.gov>
Subject: ANO-1 and ANO-2 - Draft RAI #2 RE: License Amendment Requests to Implement Provisions of 10 CFR 50.69 (L-2021-LLA-0105/-0106)

By letters dated May 26, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML21147A234 and ML21147A264), as supplemented by letter dated March 9, 2022 (ADAMS Accession No. ML22068A170), Entergy Operations Inc (Entergy, the licensee) requested that the U.S. Nuclear Regulatory Commission (NRC) modify the Arkansas Nuclear One, Units 1 and 2 (ANO-1 and ANO-2) licensing basis to allow for the implementation of the provisions of Title 10 of the *Code of Federal Regulations*, Part 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors." Entergy's proposed license amendment requests would allow alternative treatment requirements for equipment determined to be of low safety significance. The proposed changes are based on Nuclear Energy Institute (NEI) 00-04, "10 CFR 50.69 SSC Categorization Guideline," Revision 0, dated July 2005, which is endorsed by the U.S. Nuclear Regulatory Commission (NRC) in Regulatory Guide 1.201, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to Their Safety Significance," Revision 1 dated May 2006.

The NRC staff has reviewed the submittals and has determined that additional information is required for the staff to complete its review of this application. This request for additional

information (RAI) is identified as draft at this time to confirm your understanding of the information that the NRC staff needs to complete the evaluations. If the request for information is understood, please respond to this RAI within 30 days of the date of this request.

Please contact me if you would like to set up a conference call with the NRC staff to clarify this request for information.

Tom Wengert
Project Manager – Arkansas Nuclear One
NRR/DORL/LPL4
(301) 415-4037

Hearing Identifier: NRR_DRMA
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REQUEST FOR ADDITIONAL INFORMATION REGARDING

LICENSE AMENDMENT REQUEST

FOR APPLICATION TO TO ADOPT 10 CFR 50.69,

"RISK-INFORMED CATEGORIZATION AND TREATMENT OF STRUCTURES,

SYSTEMS, AND COMPONENTS FOR NUCLEAR POWER REACTORS"

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNITS 1 AND 2

DOCKET NOS. 50-313 AND 50-368

By letters dated May 26, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML21147A234 and ML21147A264), Entergy Operations, Inc. (the licensee) submitted license amendment requests (LARs or the applications) for the use of a risk-informed process for the categorization and treatment of structures, systems, and components (SSCs) at Arkansas Nuclear One, Units 1 and 2 (ANO-1 and ANO-2). The proposed license amendments would modify the ANO-1 and ANO-2 licensing basis by the addition of a license condition to allow for the implementation of the provisions of Title 10 of the *Code of Federal Regulations* (CFR), Part 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors."

To support its review of this LAR, the U.S. Nuclear Regulatory Commission (NRC) staff conducted a virtual regulatory audit on November 8 and 9, 2021. The NRC staff reviewed documents and held discussions with the licensee. The regulatory audit summary can be found at ADAMS Accession No. ML22011A146. Subsequently, the NRC staff requested additional information by e-mail dated February 3, 2022 (ADAMS Accession No. ML22034A548). By letter dated March 9, 2022 (ADAMS Accession No. ML22068A170), the licensee provided responses to these requests for additional information (RAIs). To complete its review, the NRC staff requests additional information, as discussed below:

RAI 02.a(4).01 – FLEX as Key Source of Uncertainty

The licensee's responses to RAIs 02.a(4) and 02.b(4) (fire probabilistic risk assessment (FPRA) and full power internal events (FPIE) respectively) dated March 9, 2022, state that the uncertainties related to Diverse and Flexible Mitigation Capability (FLEX) modeling have no adverse impact to the risk insights in the ANO-2 categorization process. However, the sensitivity results based on the plant-specific risk analysis demonstrate that there are SSC categorizations that are impacted by this uncertainty. Specifically, as shown in the table on page 25 of Attachment 2 of the RAI response, the categorizations of two internal events SSCs were changed from low safety significance (LSS) to high safety significance (HSS), and the categorizations of eight internal events SSCs were changed from HSS to LSS. Similarly, as shown in the table on page 11 of Attachment 2 of the RAI response, the categorizations of six fire SSCs were changed from HSS to LSS and the categorizations of two fire SSCs were changed from LSS to HSS. Section 2.1.3 of NUREG-1855, Revision 1, states that a key source of uncertainty can be identified by quantitative analysis associated with alternative modeling methods and could impact the acceptance criteria for the application.

It is unclear to the NRC staff the licensee's basis for determining that the FLEX uncertainty is not a key source of uncertainty to be presented to the Integrated Decisionmaking Panel (IDP).

a) Separately for internal events and fire PRA, provide a list of the SSCs that were recategorized in the sensitivity studies.

b) Provide justification, based on the results of the sensitivity studies, that the uncertainty related to FLEX is not a key source of uncertainty for the categorization program.

c) As an alternative to Part (b), propose a mechanism to present the results of the FLEX uncertainty for both internal events and fire PRA SSCs to the IDP for their consideration.

RAI 02.a(5).01 - Use of Safety-Related Failure Rates for the Portable FLEX Diesel Generator in the Fire PRA

In its response to RAI 02.a(2), the licensee states that the failure rates for the portable FLEX diesel generator (DG), which is a non-safety related SSC, were estimated using the failure rates for station emergency diesel generators (EDGs), which are safety related SSCs. The licensee further states that only one FLEX DG train is credited, to account for some of the uncertainty of the data. Similarly, for ANO-1, the licensee states that only one FLEX feed pump is modeled for each portable equipment function in the model to bound the risk estimate that would otherwise require additional model complexity and introduce additional uncertainties.

It is unclear to the NRC staff if this approach is bounding for these non-safety related SSCs. In its response to RAI 02.a(5I), the licensee further states that the FLEX DG failure rate of 3.0E-02 is comparable to the 2015 supplement to the industry data failure rate of 3.1E-02 cited in NUREG/CR-6928, "Industry Average Performance for Components and Initiating Events at U.S. Commercial Nuclear Power Plants" for non-safety related station blackout (SBO) DGs. The NRC staff notes that there are three failure modes available for the EDG (i.e., fail-to-start, fail-to-load and run early, and fail-to-run late), whereas there are two failure modes for SBO DGs (i.e., fail-to-start and fail-to-run). It is unclear to the NRC staff which failure modes the licensee's response is addressing. Finally, the licensee's response to RAI 02.a(5II) states that the model update process will implement the latest industry guidance associated with the FLEX failure rates during the next model update. Based on discussions held during the regulatory audit, it is not clear to the NRC staff that the fire portion of the newly updated PRA will be updated prior to implementation of categorization.

a) Provide the specific failure modes and respective failure rates used in the ANO-2 model for the FLEX portable DG.

b) Provide justification that the DG failure rates provided in the Part (a) response are conservative for a non-safety related DG. Include in this discussion:

    1) How crediting only one train of the FLEX portable DGs, and the resulting 3.0E-02 failure probability, is bounding for a non-safety related DG.

    2) How crediting only one component (pump) for ANO-1 for each portable equipment function bounds the risk estimate.

c) As an alternative to Part (b), propose a non-safety related DG failure rate.

d) If the licensee determines that it is necessary to incorporate updated failure rates into the fire PRA models to be used in the categorization program, propose the mechanism by which the failure rates will be incorporated, and confirm that they will be incorporated before the implementation of categorization.