UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 12, 2022

ANO Site Vice President
Arkansas Nuclear One
Entergy Operations, Inc.
N-TSB-58
1448 S.R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1 - REGULATORY AUDIT SUMMARY CONCERNING LICENSE AMENDMENT REQUEST FOR TECHNICAL SPECIFICATION CHANGES DUE TO REVISED DOSE CALCULATIONS (EPID L-2021-LLA-0181)

Dear Sir or Madam:

By letter dated September 30, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21274A874), as supplemented by letters dated December 2, 2021 (ML21337A245) and June 2, 2022 (ML22153A464), Entergy Operations, Inc. (Entergy, the licensee) submitted a license amendment request (LAR) for Arkansas Nuclear One, Unit 1 (ANO-1), regarding proposed revisions to ANO-1 Dose Equivalent I-131 and the reactor coolant system (RCS) primary activity limits required by Technical Specification (TS) 3.4.12, “RCS Specific Activity.” In addition, the licensee proposed to revise the primary-to-secondary leak rate limit provided in TS 3.4.13, “RCS Operational Leakage.” These changes were proposed by the licensee due to non-conservative inputs used in the steam generator tube rupture accident, the main steam line break accident, and the control rod ejection accident dose calculations.

To support its review of the LAR, the U.S. Nuclear Regulatory Commission (NRC) staff conducted a regulatory audit via the use of an online reference portal set up by the licensee, and two teleconferences. The NRC staff reviewed calculations and analyses supporting the LAR and held discussions with Entergy staff and its representatives concerning the details of the supporting calculations and analyses. The audit summary is enclosed.

If you have any questions, please contact me at (301) 415-4037 or by email at Thomas.Wengert@nrc.gov.

Sincerely,

/RA/

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-313

Enclosure:
Audit Summary

cc: Listserv

REGULATORY AUDIT SUMMARY

CONCERNING THE LICENSE AMENDMENT REQUEST FOR TECHNICAL SPECIFICATION CHANGES DUE TO REVISED DOSE CALCULATIONS

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 1

DOCKET NO. 50-313

1.0 BACKGROUND

By letter dated September 30, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21274A874), as supplemented by letters dated December 2, 2021 (ML21337A245), and June 2, 2022 (ML22153A464), Entergy Operations, Inc. (Entergy, the licensee) submitted a license amendment request (LAR) for Arkansas Nuclear One, Unit 1 (ANO-1), regarding proposed revisions to ANO-1 Dose Equivalent I-131 and the reactor coolant system (RCS) primary activity limits required by Technical Specification (TS) 3.4.12, "RCS Specific Activity." In addition, the licensee proposed to revise the primary-to-secondary leak rate limit provided in TS 3.4.13, "RCS Operational Leakage." These changes were proposed by the licensee due to non-conservative inputs used in the steam generator tube rupture accident, the main steam line break accident, and the control rod ejection accident dose calculations.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's application and determined that a regulatory audit would assist in the timely completion of the licensing review process. The audit was conducted in accordance with the audit plan dated January 21, 2022 (ML22019A134).

2.0 AUDIT DATES AND LOCATION

The regulatory audit was conducted via an internet portal established by the licensee from January 31, 2022, to July 6, 2022.

3.0 AUDIT ACTIVITIES

The purpose of the audit was to (1) gain a more detailed understanding of the licensee's calculations and evaluations supporting the subject LAR, (2) identify any additional information that the licensee would need to submit to enable the NRC staff to reach a licensing decision, and (3) establish an understanding of the supporting details to allow the NRC staff to issue clear requests for additional information (RAIs) and for the licensee to provide timely and complete RAI responses.

The audit activities conducted by the NRC staff included a review of calculations, drawings, and analyses supporting the licensee's proposed license amendment. Audit conference calls were held between the licensee and the NRC staff on February 22, 2022, and March 4, 2022, for clarification of the documentation provided on the audit portal.

The licensee provided the following supporting calculations and evaluations for NRC staff review via the online reference portal:

- Upper Level Document, ULD-1-SYS-02 Revision 6, “ANO Unit 1 – Makeup and Purification High Pressure Injection”

- Calculation No. CALC-07-E-0020-05, “ANO-1 Steam Generator Tube Rupture Dose Analysis Using Alternate Source Terms,” Revision 1, May 31, 2021

- Calculation No. CALC-97-E-0020-16, Revision 0, “ANO-1 Reactor Coolant Sources for Radiological Analyses”

- Engineering Report: “The Application of the [American National Standards Institute/American Nuclear Society] ANSI/ANS-18.1 Methodology for Reactor Coolant Source Terms,” Revision 0

- Entergy Calculation No. 89-E-0164-05, “ANO-1 Maximum Reactor Building Sump Level,” Revision 6

- Entergy Drawing No. M1D-215, Sheet 1, “Emergency Feedwater Nozzle Component and Details,” Revision 302

- Engineering Report, ER-ANO-2002-1381-000, “ANO-1 Steam Generator Replacement,” Revision 0, December 6, 2002

- Calculation No. CALC-21-E-0007-01, “Computational Fluid Dynamics Calculation of Steam Generator Tube Rupture,” Revision 0, July 26, 2021

- Entergy Drawing No. M1D-218, Sheet 1, “ANO-1 [Enhanced Once-Through Steam Generator] EOTSG - Steam Generator Upper Shroud Details,” Revision 0

- Calculation No. CALC-02138E101-201, “ANO-1 [Replacement Steam Generator] RSG Dose,” Revision 0, September 15, 2005

- NRC Regulatory Issue Summary 2006-04, “Experience with Implementation of Alternative Source Terms,” March 7, 2006 (ML053460347)

- Federal Guidance Report No. 12, EPA-402-R-93-081, External Exposure to Radionuclides in Air, Water, and Soil,” September 1993 (ML111930454).

- Entergy Engineering Report No. CALC-ANO1-NE-20-00001, “ANO-1 Cycle 30 Safety Analysis Ground Rules,” Revision 1, September 17, 2020

- ANSI/ANS-18.1-1999, “American National Standard Radioactive Source Term for Normal Operation of Light Water Reactors,” September 21, 1999

- Entergy Drawing No. M1D-203, Sheet 1, “ANO-1 EOTSG - Steam Generator Longitudinal Section and Opening Sections,” Revision 0

- Entergy Calculation No. CALC-21-E-0007-02, “Flashing Fraction During EOTSG Tube Rupture Event,” Revision 0, May 28, 2022

- Entergy Calculation No. 07-E-0020-05, “ANO-1 Steam Generator Tube Rupture Dose Analysis Using Alternate Source Terms,” Revision 1, July 28, 2021

- Entergy Drawing No. M1D-216, Sheet 1, “ANO-1 EOTSG - Steam Generator Internals Assembly,” Revision 0

- Entergy Calculation No. CALC-21-E-0007-02, “Flashing Fraction During EOTSG Tube Rupture Event,” July 27, 2021

- Entergy Engineering Report ECH-SA-21-00001, “The Application of the ANSI/ANS-18.1 Methodology for Reactor Coolant Source Terms,” May 18, 2021

- Engineering Report ER-ANO-2002-1381-000, “ANO-1 Steam Generator Replacement,” Revision 0, December 6, 2002

- Entergy Calculation No: CALC-21-E-0007-01, “Computational Fluid Dynamics Calculation of Steam Generator Tube Rupture,” Revision 0, July 26, 2021

- Entergy Calculation No. CALC-07-E-0020-05, “ANO-1 Steam Generator Tube Rupture Dose Analysis Using Alternate Source Terms,” Revision 1, May 31, 2022[1] (Proprietary)

- Entergy Calculation No. CALC-21-E-0007-02, “Flashing Fraction During EOTSG Tube Rupture Event,” Revision 0, May 28, 2022[2] (Proprietary)

4.0 RESULTS OF THE AUDIT

During the audit, the NRC staff did not make any regulatory decisions regarding the LAR under staff review. At the conclusion of the audit call on March 4, 2022, the NRC staff informed the licensee that it would be issuing an RAI following the completion of its review of the audit portal information. In addition, the NRC staff requested that the licensee provide any calculation revisions on the audit portal, if required based on the staff’s questions during the audit. By letter dated April 18, 2022 (ML22108A164), the NRC staff issued an RAI to the licensee. By letter dated June 2, 2022, the licensee provided a response to the NRC staff’s RAI and informed the staff that revised calculations had been placed on the audit portal for NRC review (as noted above). The NRC staff noted that the audit facilitated the staff’s timely review of the LAR.

[1] Entergy Calculation No. CALC-07-E-0020-05, Revision 1, was revised by the licensee during the audit period and submitted to the audit portal for NRC staff review on June 2, 2022.
[2] Entergy Calculation No. CALC-21-E-0007-02, Revision 0, was revised by the licensee during the audit period and submitted to the audit portal for NRC staff review on June 2, 2022.

5.0 AUDIT PARTICIPANTS

NRC Participants from the Office of Nuclear Reactor Regulation

- Noushin Amini, Division of Safety Systems (DSS)/Nuclear Systems Performance Branch (SNSB)
- Robert Beaton, DSS/SNSB
- Joshua Kaizer, DSS/Nuclear Methods and Fuel Analysis Branch (SFNB)
- Thomas Wengert, Division of Operating Reactor Licensing (DORL)/Plant Licensing Branch IV (LPL4)

Licensee and Contractor Participants

- Riley Keele, Entergy Licensing
- Joe Cole, Entergy Licensing
- Bob Clark, Entergy Licensing
- Terrence Brimfield, Entergy Safety Analysis
- Greg Broadbent, Entergy Safety Analysis
- Matt Bindeman, Entergy Safety Analysis
- Ling-Yu Song, MPR (Contractor)
- Marwan Charrouf, MPR (Contractor)

6.0 EXIT BRIEFING

On July 6, 2022, Thomas Wengert of the NRC informed Bob Clark of Entergy, via telephone, that the NRC staff did not need to review any additional calculations or evaluations and, accordingly, the audit was concluded.

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NAmini, NRR
RBeaton, NRR
JKaizer, NRR

ADAMS Accession No. ML22174A334 ***by email**

OFFICE	NRR/DORL/LPL4/PM*	NRR/DORL/LPL4/LA*	NRR/DSS/SNSB/BC*
NAME	TWengert	PBlechman	SKrepel
DATE	7/1/2022	7/1/2022	7/11/2022
OFFICE	NRR/DSS/SFNB/BC*	NRR/DORL/LPL4/BC*	NRR/DORL/LPL4/PM*
NAME	RLukes	JDixon-Herrity	TWengert
DATE	7/11/2022	7/11/2022	7/12/2022

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