



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

April 27, 2022

Mr. James Barstow
Vice President, Nuclear Regulatory
Affairs and Support Services
Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 – SUMMARY OF
REGULATORY AUDIT REGARDING THE LICENSE AMENDMENT REQUEST
TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-505,
REVISION 2, “PROVIDE RISK-INFORMED EXTENDED COMPLETION
TIMES - RITSTF INITIATIVE 4B” (EPID L-2021-LLA-0145)

Dear Mr. Barstow:

By letter dated August 5, 2021 (Agencywide Documents Access and Management System Accession No. ML21217A174), Tennessee Valley Authority (TVA) requested an amendment to the Renewed Facility Operating Licenses for Sequoyah Nuclear Plant, Units 1 and 2, to revise Technical Specifications to adopt risk-informed completion times based on Technical Specifications Task Force (TSTF) Traveler TSTF-505, Revision 2, “Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b.”

To support its review, the U.S. Nuclear Regulatory Commission (NRC) staff conducted a virtual regulatory audit from September 30, 2021, through March 31, 2022, to support its review of the license amendment request. During the regulatory audit, the NRC staff reviewed documents and held discussions with members of TVA and its representatives. The regulatory audit summary is enclosed with this letter.

J. Barstow

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If you have any questions, please contact me at (301) 415-1383 or Perry.Buckberg@nrc.gov.

Sincerely,

Perry H. Buckberg, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosure:
Regulatory Audit Summary

cc: Listserv

OFFICE OF NUCLEAR REACTOR REGULATION

REGULATORY AUDIT SUMMARY

IN SUPPORT OF LICENSE AMENDMENT REQUEST TO ADOPT TSTF-505

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

1.0 BACKGROUND

By application dated August 5, 2021 (Agencywide Documents Access and Management System Accession No. ML21217A174), Tennessee Valley Authority (TVA, the licensee) submitted a license amendment request (LAR) for Sequoyah Nuclear Plant, Units 1 and 2 (Sequoyah). The amendment would revise technical specification (TS) requirements to permit the use of risk-informed completion times for actions to be taken when limiting conditions for operation are not met. The proposed changes are based on Technical Specifications Task Force (TSTF) Traveler TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times – RITSTF [Risk-Informed TSTF] Initiative 4b," dated July 2, 2018 (ADAMS Accession No. ML18183A493). The U.S. Nuclear Regulatory Commission (NRC) issued a final model safety evaluation approving TSTF-505, Revision 2, on November 21, 2018 (ADAMS Package Accession No. ML18269A041).

Information that the NRC staff relies upon to make the safety determination must be submitted on the docket. However, the NRC staff may review supporting information retained as records under Title 10 of the *Code of Federal Regulations* (10 CFR) 50.71 and/or 10 CFR 54.37, which, although not required to be submitted as part of the licensing action, would help the NRC staff better understand the licensee's submitted information. To support its review of the LAR, the NRC staff issued a regulatory audit plan on September 15, 2021 (ADAMS Accession No. ML21246A053). The purpose of the audit is to review the documentation related to the subject of its application (e.g., calculations and reports) that were not submitted on the Sequoyah docket, to acquire additional understanding about the amendment request, and to determine whether additional information is needed to be docketed to complete the NRC staff's safety evaluation.

2.0 AUDIT ACTIVITIES

The NRC audit team consisted of NRC staff and NRC contract support from the Pacific Northwest National Laboratory (PNNL). Attachment 1 of this audit summary lists the individuals that took part in or attended the audit. The NRC audit team held a virtual entrance meeting with the licensee on September 30, 2021, and the virtual regulatory audit was conducted from September 30, 2021 through March 31, 2022. Throughout the audit period, the NRC audit team would use an internet-based portal provided by the licensee to review primarily non-docketed information related to the application. On December 1, 2021, the NRC staff submitted audit questions to the licensee (ADAMS Accession No. ML21336A394). A formal, virtual audit meeting with the licensee was held from January 25 – 28, 2022 to facilitate technical discussions of audit questions and disciplines according to the audit plan.

Technical discussions were focused on the following major areas: probabilistic risk assessment (PRA), external hazards, fire protection, TSs, electrical engineering, and instrumentation and controls (I&C). On January 28, 2022, the NRC staff provided a brief conclusion of the formal, virtual audit meeting including audit objectives that were met and details on the path forward. There were no open items from audit discussions and no deviations from the audit plan. Non-docketed information provided by the licensee in response to audit questions and the formal meeting is listed in Attachment 2 of this audit summary. TVA committed to issuing a supplement to the application to provide documentation of certain audit discussion points on the docket. Though the formal audit meeting ended on January 28, 2022, NRC staff interactions with the licensee continued until March 22, 2022. In lieu of an exit meeting, the NRC's licensing project manager's March 22, 2022, discussions with the licensee regarding the supplement completed the regulatory audit related activities.

3.0 RESULTS OF THE AUDIT

The licensee plans to supplement its application. The NRC staff will review the licensee's supplement to assess if any additional information is needed to complete its review of the LAR.

Attachments:

1. List of Participants
2. List of Documents Reviewed During Audit

List of Participants

U.S. Nuclear Regulatory Commission (NRC) Audit Team

<u>Name</u>	<u>Role, Branch</u>
Buckberg, Perry	Project Manager, NRR/DORL/LPL2-2
Hilsmeier, Todd	Team Lead, PRA Licensing Reviewer, NRR/DRA/APLA
Wrona, David	Plant Licensing Branch Chief, NRR/DORL/LPL2-2
Pascarelli, Robert	PRA Licensing Branch A Chief, NRR/DRA/APLA
Patel, Jigar	PRA Licensing Reviewer, NRR/DRA/APLA
Dinh, Thinh	PRA Licensing Reviewer, NRR/DRA/APLB
Iqbal, Naeem	PRA Licensing Reviewer, NRR/DRA/APLB
Valentin-Olmeda, Milton	PRA Licensing Reviewer, NRR/DRA/APLC
Wu, De	PRA Licensing Reviewer, NRR/DRA/APLC
West, Khadijah	Technical Specifications Reviewer, NRR/DSS/STSB
Wagage, Hanry	Containment Systems Reviewer, NRR/DSS/SCPB
Hernandez, Raul	Containment Systems Reviewer, NRR/DSS/SCPB
Sun, Summer	Nuclear Systems Performance Reviewer, NRR/DSS/SNSB
Kleeh, Edmund	Electrical Engineering Reviewer, NRR/DEX/EEEE
Foli, Adakou	Electrical Engineering Reviewer, NRR/DEX/EEEE
Carte, Norbert	Instrumentation & Controls Reviewer, NRR/DEX/EICB
Ashcraft, Joseph	Instrumentation & Controls Reviewer, NRR/DEX/EICB
Bedi, Gurjendra	Mechanical Engineering Reviewer, NRR/DEX/EMIB
Hsu, Kaihwa	Mechanical Engineering Reviewer, NRR/DEX/EMIB
Cumblidge, Stephen	Piping and Head Penetrations Reviewer, NRR/DNRL/NPHP
Coles, Garill	Contractor for NRR/PRA, PNNL

Acronyms:

NRR – Office of Nuclear Reactor Regulation; DORL – Division of Operating Reactor Licensing; LPL2-2 – Plant Licensing Branch 2-2; DRA – Division of Risk Assessment; APLA – Probabilistic Risk Assessment (PRA) Licensing Branch A; APLB – PRA Licensing Branch B; APLC – PRA Licensing Branch C; DSS – Division of Safety Systems; STSB – Technical Specifications Branch; SCPB – Containment and Plant Systems Branch; SNSB – Nuclear Systems Performance Branch; DEX – Division of Engineering and External Hazards; EEEB – Electrical Engineering Branch; EICB – Instrumentation & Controls Branch; EMIB – Mechanical Engineering and Inservice Testing Branch; DNRL – Division of New and Renewed Licenses; NPHP – Piping and Head Penetrations Branch; PNNL – Pacific Northwest National Laboratory

Tennessee Valley Authority Team

Johnson, Jacob
Kindred, Gerry
Kearnaghan, Daniel
Victor, William
Parashak, Paul
Taylor, Andrew
Dolan, Brad
Rogowski, David
Lovelace, Nicholas
McDonald, Jeffrey
Bowman, Mark
Ballard, John
Allaire, Armand
Ragan, Guy
Womack, Tamatha
Simbles, Edward
Joglar, Francisco

List of Documents Reviewed During Audit

The licensee provided an extensive list of supporting documents (e.g., analyses, calculations, reports, drawings, and procedures) on the Sequoyah Nuclear Plant document portal available during the audit period. Below lists the documents available on the portal that the NRC audit team reviewed during the audit.

Probabilistic Risk Assessment Documents

Application Specific Documents

- TVA Report, SQN-0-21-001, Report on example RICT calculations, September 29, 2021.
- TVA Report, SQN-0-21-126, "Sequoyah Nuclear: Review of Sources of Uncertainty for the RICT LAR," September 28, 2021
- TVA Report, SQN-0-21-058, Report on One Top Multiple Hazard Model (OTMHM), May 3, 2021.

Internal Events PRA

- Westinghouse report, LTR-RAM-II-11-010, "RG 1.200 PRA Peer Review Against the ASME/ANS PRA Standard Requirements for the Sequoyah Nuclear Plant Probabilistic Risk Assessment," March 18, 2011.
- TVA Report, SQN-0-19-006, "Sequoyah Units 1 & 2 Internal Events Probabilistic Risk Assessment Peer Review Findings Closure – Review Update," January 22, 2020.
- TVA report, Calc Number MDN00000020100204, Revision 6, "SQN Probabilistic Risk Assessment – Human Reliability Analysis (HRA)."
- TVA report, Calc Number MDN-000-099-2010-0230, Revision 2, "SQN Probabilistic Risk Assessment – Reactor Protection System," August 24, 2020.
- TVA report, Calc Number MDN0003602018000089, Revision 0, "SQN PRA – FLEX Diesel Generators," November 26, 2018.
- TVA report, Calc Number MDN-000-067-2010-0222, Revision 2, "SQN Probabilistic Risk Assessment – Essential Raw Cooling Water System," August 21, 2020.
- TVA report, Calc Number MDN-000-032-2010-0227, Revision 1, "SQN Probabilistic Risk Assessment – Compressed Air System," August 21, 2012.
- TVA report, Calc Number MDN-000-999-2010-0220, Revision 2, "SQN Probabilistic Risk Assessment – 6900V Electric Power & Switchyard," September 8, 2020.
- TVA report, Calc Number MDN-000-070-2010-0217, Revision 3, "SQN Probabilistic Risk Assessment – Component Cooling System," August 24, 2020.
- TVA report, Calc Number MDN-000-082-2010-0236, Revision 2, "SQN Probabilistic Risk Assessment – Diesel Generators," August 24, 2020.
- TVA report, Calc Number MDN-000-999-2010-0237, Revision 2, "SQN Probabilistic Risk Assessment – 250 Volts and Below," August 24, 2020.
- TVA report, Calc Number MDN-000-201-2010-0235, Revision 2, "SQN Probabilistic Risk Assessment – 480V AC Electric Power System," August 24, 2020.

Fire PRA

- TVA Report, SQN-0-21-049, "Peer Review of the Sequoyah Units 1 & 2 Fire Probabilistic Risk Assessment," April 5, 2021.
- TVA Report, SQN-0-20-039, "Sequoyah Nuclear Plant, Fire PRA Finding Level Fact and Observation Closure by Independent Assessment," May 20, 2020.
- TVA report, Calc Number MDN000NA2019000628, Revision 3, "SQN Fire PRA – Fire Risk Quantification," January 14, 2021.
- TVA report, Calc Number MDN000NA2016000319, Revision 3, "SQN Fire Probabilistic Risk Assessment - Fire Ignition Frequency Analysis," May 21, 2020.
- TVA report, Calc Number MDN000NA2019000464, Revision 2, "SQN Fire PRA – Cable Routing," May 21, 2020.
- TVA report, Calc Number MDN000NA2019000469, Revision 2, "SQN Fire PRA – Single Compartment Fire Modeling," May 21, 2020.
- TVA report, Calc Number MDN0009992016000321, Revision 3, "SQN Fire PRA – Fire PRA Component Selection," May 21, 2020.
- TVA report, Calc Number MDN000NA2019000468, Revision 1, "SQN Fire PRA – Multi-Compartment Analysis," April 10, 2020.
- TVA report, Calc Number MDN000NA2019000467, Revision 3, "SQN Fire PRA – Human Reliability Analysis (HRA)," January 8, 2021.

External Hazards

- TVA Report, SQN-0-21-119, "Peer Review of the Sequoyah Nuclear Plant, Units 1 & 2, Seismic Probabilistic Risk Assessment," September 14, 2021.
- TVA Report, SQN-0-21-120, "Sequoyah SPRA F&O Independent Assessment & Focused Scope-Peer Review," September 14, 2021.

Plant Procedures

- TVA Procedure, NEDP-26, Revision 13, "Probabilistic Risk Assessment," June 10, 2021.
- TVA Procedure, NPG-SPP-09.11, Revision 4, "Probabilistic Risk Assessment Program," August 28, 2018.
- TVA Procedure, NPG-SPP-07.3.4, Revision 11, "Protected Equipment," September 22, 2021.
- TVA Procedure, NPG-SPP-09.11.1, Revision 13, "Equipment Out of Service Management," January 30, 2020.
- TVA Procedure, NPG-SPP-07.3, Revision 36, "Work Activity Risk Management Process," August 18, 2021.

Electrical Engineering Documents

One Line Diagrams

- SQN-2-45N724-1-CC(1) - 6.9 kV Shutdown Board
- SQN-2-45N724-2-CC(1) - 6.9 kV Shutdown Board
- SQN-2-45N724-3-CC(1) - 6.9 kV Shutdown Board
- SQN-2-45N724-4-CC(1) - 6.9 kV Shutdown Board
- SQN-2-45N721-1-CC(1) - 6.9 kV Unit Board
- SQN-2-45N721-2-CC(1) - 6.9 kV Unit Board
- SQN-2-45N721-3-CC(1) - 6.9 kV Unit Board
- SQN-2-45N721-4-CC(1) - 6.9 kV Unit Board

Plant Procedures for risk management actions

- NPG-SPP-07.1.6
- NPG-SPP-07.3.4
- NPG-SPP-09.11.1
- 0-GO-16
- NPG-SPP-07.2.11
- NPG-SPP-07.3

120 VAC Vital Instrument Boards

- SQN-0-45N706-1-CC-A(1)
- SQN-0-45N706-2-CC-A(1)
- SQN-0-45N706-3-CC-A(1)
- SQN-0-45N706-4-CC-A(1)

125 VDC Vital Battery Boards

- SQN-0-45N703-4-CC-A
- SQN-0-45N703-5-CC-A
- SQN-0-45N703-6-CC-A
- SQN-0-45N703-7-CC-A
- SQN-0-45N703-8-CC-A
- SQN-0-45N703-1-CC-A(1)
- SQN-0-45N703-2-CC-A(1)
- SQN-0-45N703-3-CC-A(1)

250 VDC Battery System

- SQN-1-45N704-1-CC-A(1)
- SQN-2-45N704-2-CC-A(1)

480V C&A Vent Boards

- SQN-0-45N756-4-CC-A
- SQN-0-45N756-6-CC-A
- SQN-0-45N756-1-CC-A(1)
- SQN-0-45N756-2-CC-A(1)
- SQN-0-45N756-3-CC-A(1)
- SQN-0-45N756-5-CC-A(1)
- SQN-0-45N756-7-CC-A(1)
- SQN-0-45N756-8-CC-A(1)

480v Diesel Aux Boards

- SQN-0-45N732-1-CC-A(1)
- SQN-0-45N732-2-CC-A(1)
- SQN-0-45N732-4-CC-A(1)

480v MROV Boards

- SQN-0-45N751-4-CC-A
- SQN-0-45N751-6-CC-A
- SQN-0-45N751-8-CC-A
- SQN-0-45N751-1-CC-A(1)
- SQN-0-45N751-2-CC-A(1)
- SQN-0-45N751-5-CC-A(1)

480v Reactor Vent Boards

- SQN-0-45N755-1-CC-A
- SQN-0-45N755-3-CC-A
- SQN-0-45N755-2-CC-A(1)
- SQN-0-45N755-4-CC-A(1)

480v Shutdown Boards

- SQN-0-45N749-1-CC-A
- SQN-0-45N749-3-CC-A
- SQN-0-45N749-2-CC-A
- SQN-0-45N749-4-CC-A(1)

Control Power Key Diagrams

- SQN-0-45N700-1-CC-A
- SQN-0-45N700-2-CC-A(1)

Diesel Generators

- SQN-0-45N727-CC-A

Key Diagrams – Station Auxiliary Power

- SQN-0-15E500-1-CC-A(1)
- SQN-0-15E500-2-CC-A(1)
- SQN-0-15E500-3-CC-A(1)

Shared Systems and Shared Loads

- MDN-000-067-2010-0222 R2 ERCW(1)
- MDN00003220100227 Plant Compressed Air(1)
- MDN-000-999-2010-0220 R2 Electrical 6900V(1)
- MDN-000-070-2010-0217 R03 component cooling water(1)
- MDN-000-082-2010-0236 R2 Emergency Diesel Generators(1)
- MDN-000-999-2010-0237 Electrical - 250 V and below(1)
- MDN-000-201-2010-0235 R2 Electrical – 480 V(1)

TS 3.3.5 LOP Relays

- | | | |
|-------------------|-------------------|-------------------|
| - SQN-0-45N767-11 | - SQN-0-45N765-8 | - SQN-0-45N765-5 |
| - SQN-0-45N767-7 | - SQN-0-45N765-2 | - SQN-0-45N765-15 |
| - SQN-0-45N767-8 | - SQN-0-45N767-5 | - SQN-0-45N765-11 |
| - SQN-0-45N767-6 | - SQN-0-45N767-4 | - SQN-0-45N765-16 |
| - SQN-0-45N767-9 | - SQN-1-45-724-1 | - SQN-0-15E500-2 |
| - SQN-0-45N767-10 | - SQN-2-45N724-3 | - SQN-0-45N765-14 |
| - SQN-0-45N765-4 | - SQN-0-45N765-1 | - SQN-0-15E500-1 |
| - SQN-0-45N765-9 | - SQN-1-45N724-2 | - SQN-2-45N724-4 |
| - SQN-0-45N765-7 | - SQN-0-45N765-13 | - SQN-0-45N765-18 |
| - SQN-0-45N765-3 | - SQN-0-45N765-10 | - SQN-0-45N767-2 |
| - SQN-0-45N767-3 | - SQN-0-45N765-19 | - SQN-0-45N767-1 |

TS 3.3.5 Loss of Power Relays – Diesel Generators

- | | | |
|-------------------|-------------------|------------------|
| - SQN-0-45N767-7 | - SQN-0-45N771-1 | - SQN-0-45N767-5 |
| - SQN-0-45N767-8 | - SQN-0-45N771-2 | - SQN-0-45N767-4 |
| - SQN-0-45N767-6 | - SQN-0-45N767-3 | - SQN-0-15E500-2 |
| - SQN-0-45N767-9 | - SQN-0-45N767-2 | - SQN-0-45N732-1 |
| - SQN-0-45N767-11 | - SQN-0-45N727 | - SQN-0-45N732-2 |
| - SQN-0-45N771-4 | - SQN-0-45N767-10 | - SQN-0-15E500-1 |
| - SQN-DC-V-11-8 | - SQN-0-45N767-1 | - SQN-0-45N771-3 |

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 – SUMMARY OF REGULATORY AUDIT REGARDING THE LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-505, REVISION 2, “PROVIDE RISK-INFORMED EXTENDED COMPLETION TIMES - RITSTF INITIATIVE 4B” (EPID L-2021-LLA-0145)
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DATE	04/20/2022	04/20/2022	04/22/2022	04/25/2022
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NAME	SRosenberg (SVasavada for)	MWaters	MWendell	SKrepel
DATE	04/22/2022	04/25/2022	04/26/2022	04/25/2022
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NAME	BWittick	VCusumano	ITseng	MMitchell
DATE	04/23/2022	04/22/2022	04/22/2022	04/22/2022
OFFICE	NRR/DORL/LPLII-2/BC	NRR/DORL/LPLII-2/PM		
NAME	DWrona	PBuckberg		
DATE	04/27/2022	04/27/2022		

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