



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

May 7, 2024

Fadi Diya
Senior Vice President and
Chief Nuclear Officer
Ameren Missouri
Callaway Energy Center
8315 County Road 459
Steedman, MO 65077

SUBJECT: CALLAWAY PLANT, UNIT NO. 1 – AUDIT PLAN TO SUPPORT REVIEW OF
STEAM GENERATOR LICENSE RENEWAL RESPONSE TO COMMITMENT
NOS. 34 AND 35 (EPID L-2024-LRO-0009)

Dear Fadi Diya:

By letter dated December 20, 2023 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML23354A244), Union Electric Company, doing business as Ameren Missouri (the licensee), submitted to the U.S. Nuclear Regulatory Commission (NRC) a response to license renewal Commitment Nos. 34 and 35 for the Callaway Plant, Unit No. 1 (Callaway). In March 2015, the NRC published NUREG-2172, "Safety Evaluation Report Related to the License Renewal of Callaway Plant, Unit 1," which documents the technical review of the Callaway license renewal application (ML15068A342).

The NRC staff reviewed the Callaway submittal regarding the license renewal resolution for Commitment Nos. 34 and 35 and determined that a regulatory audit would be necessary to support its review of the submittal. A regulatory audit is a planned activity that includes the examination and evaluation of primarily non-docketed information. The audit will be conducted to increase the staff's understanding of the submittal and identify information that will need to be docketed to support staff's regulatory findings.

The NRC staff plans to conduct the audit from May 20, 2024, through August 30, 2024, in accordance with the enclosed audit plan.

F. Diya

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If you have any questions, please contact me at 301-415-8371 or via email at Mahesh.Chawla@nrc.gov.

Sincerely,

/RA/

Mahesh L. Chawla, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosure:
Audit Plan

cc: Listserv

AUDIT PLAN
TO SUPPORT REVIEW OF LICENSE RENEWAL RESPONSE
TO COMMITMENT NOS. 34 AND 35
UNION ELECTRIC COMPANY
CALLAWAY PLANT, UNIT 1
DOCKET NO. 50-483

1.0 BACKGROUND

By letter dated December 20, 2023 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML23354A244), Union Electric Company doing business as Ameren Missouri (the licensee), submitted to the U.S. Nuclear Regulatory Commission (NRC) a response to license renewal Commitment Nos. 34 and 35 for the Callaway Plant, Unit No. 1 (Callaway). In March 2015, the NRC published NUREG-2172 "Safety Evaluation Report Related to the License Renewal of Callaway Plant, Unit 1," Volume 1, which documents the technical review of the Callaway license renewal application (ML15068A342).

In accordance with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," and NUREG-2172, appendix A, "License Renewal Commitments," the NRC staff will perform an audit to gain a better understanding of: (1) how the Callaway steam generator reactor coolant system (RCS) pressure boundary is adequately maintained in the presence of divider plate weld cracking, and (2) how the susceptibility of the Callaway steam generator tube-to-tubesheet welds to primary water stress corrosion cracking (PWSCC).

2.0 REGULATORY AUDIT BASES

License renewal requirements are specified in 10 CFR Part 54. In March 2015, the NRC published NUREG-2172, a final safety evaluation report to the license renewal of Callaway.

In NUREG-2172, appendix A, "Callaway Plant Unit 1 License Renewal Commitments," Callaway Commitment No. 34 provided the licensee three options to fulfill this commitment. The licensee has chosen Option 2: Analysis, which requires Callaway to:

Perform an analytical evaluation of the steam generator divider plate welds in order to establish a technical basis which concludes that the steam generator RCS pressure boundary is adequately maintained with the presence of steam generator divider plate weld cracking. The analytical evaluation will be submitted to the NRC for review and approval.

Callaway Commitment No. 35 provided the licensee three options to fulfill this commitment. The licensee has chosen Option 2: Analysis, which requires Callaway to:

Perform an analytical evaluation of the steam generator tube-to-tubesheet welds either determining that the welds are not susceptible to PWSCC or redefining the

reactor coolant pressure boundary of the tubes, where the steam generator tube-to-tubesheet welds are not required to perform a reactor coolant pressure boundary function. The redefinition of the reactor coolant pressure boundary will be submitted as part of a license amendment request requiring approval from the NRC. The evaluation for determination that the welds are not susceptible to PWSCC and do not require inspection will be submitted to the NRC for review.

3.0 REGULATORY AUDIT SCOPE AND METHODOLOGY

The licensee performed an analytical evaluation specific to the Callaway steam generators because it could not be determined if the steam generators were bounded by the industry analyses, Electric Power Research Institute (EPRI) Steam Generator Management Program Report 3002002850, "Investigation of Crack Initiation and Propagation in the Steam Generator Channel Head Assembly," that the staff accepted for the divider plate PWSCC evaluation in License Renewal (LR) Interim Staff Guidance (ISG) LR-ISG-2016-01, "Changes to Aging Management Guidance for Various Steam Generator Components" (ML16237A383).

The NRC staff is unable to determine from the information submitted whether the licensee's analysis establishes an adequate technical basis for (1) concluding that the steam generator reactor coolant boundary would be maintained in the presence of divider plate cracking, and (2) evaluating the susceptibility of the steam generator tube-to-tubesheet welds to PWSCC. The audit team will view documentation and calculations the licensee referenced as technical support, focusing on the key assumptions, methodology, and inputs.

4.0 AUDIT ACTIVITIES

For the audit, the NRC staff will review the licensee's submittal dated December 20, 2023, and documentation on the licensee's electronic portal (ePortal). The staff will have the opportunity to have technical discussions with the licensee to gain context, clarity, and information on the documentation to support the staff's review. The audit is coordinated to support the development of the reviewers reasonable assurance for the safety findings to be documented in the safety evaluation.

The Division of Operating Reactor Licensing (DORL) Plant Licensing Branch 4 (LPL 4) project manager will coordinate all communications with the licensee. NRC technical staff requests for communication with the licensee will require approval of their respective technical branch chief and the DORL branch chief. Following completion of the audit, an audit report will be issued.

5.0 INFORMATION AND OTHER MATERIAL NECESSARY FOR THE REGULATORY AUDIT

Throughout the audit, the NRC staff will review the supporting documents as appropriate and requested, on the ePortal. The staff may request additional documents to be added to the ePortal over the course of the audit. The staff requests for ePortal additions shall be made, as needed, to the DORL project manager, who will provide the requests to the licensee.

6.0 AUDIT TEAM

Team Member	Branch/Division
David Rudland	Division of New and Renewed Licenses (DNRL)
Andrew Johnson	Corrosion and Steam Generators Branch (NCSG)/DNRL
Gregory Makar	NCSG/DNRL
Paul Klein	NCSG/DNRL
Mahesh Chawla	DORL/LPL4

7.0 LOGISTICS

The attachment to this audit plan provides a list of documents needed for this audit. The audit will be conducted using telecommunications from May 20 2024, through August 30, 2024. Entrance and exit briefings will be held at the beginning and end of the audit.

8.0 DELIVERABLES

An audit summary will be prepared within 90 days of the completion of the audit. If the NRC staff identifies information during the audit that is needed to support its regulatory decision, the staff will issue a request for additional information to the licensee after completion of the audit.

Attachment:
List of Documents

List of Documents

References From Enclosure 1 of the Submittal Dated December 20, 2023 (Agencywide Document Access and Management System (ADAMS) Package Accession No. ML23354A244) for Callaway Plant, Unit No. 1

- Framatome Document 51-9268036-000, “EPRI [Electric Power Research Institute] SGMP [Steam Generator Management Program] for Channel Head Aging of the Framatome RSG [Replacement Steam Generator] Designs” (Reference 2).
- Framatome Document 32-9360111-000, “Framatome RSG Channel Head and Tubesheet Stress Analysis for Flaw Evaluation” (Reference 3).
- Framatome Document 32-9364633-000, “Framatome RSG Channel Head and Tubesheet Flaw Tolerance Evaluation” (Reference 4).
- Framatome Document 32-9055891-007, “Fatigue and PWSCC [Primary Water Stress Corrosion Cracking] Crack Growth Evaluation Tool AREVACGC” (Reference 7).
- EPRI-Framatome Project Agreement 10012545, “Divider Plate Cracking Assessment for Framatome Replacement Steam Generators,” EPRI Task ID 1-072913-04-01, May 29, 2020 (Reference 13).

License Renewal Other Documentation

- Documentation of inputs for the calculation of the tube-to-tubesheet chromium content described in section 2.0 of enclosure 2 of the submittal dated December 20, 2023 (e.g., a summary of the manufacturing completion reports that provide the detailed chromium contents).

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ADAMS Accession No.: ML24122A150

OFFICE	NRR/DORL/LPL4/PM	NRR/DORL/LPL4/LA	NRR/DNRL/NCSSG/BC
NAME	MChawla	PBlechman	SBloom
DATE	4/30/2024	5/1/2024	5/6/2024
OFFICE	NRR/DNRL/NLRP/BC	NRR/DORL/LPL/BC	NRR/DORL/LPL4/PM
NAME	LGibson	JRankin	MChawla
DATE	5/7/2024	5/7/2024	5/7/2024

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