

From: Mahesh Chawla
Sent: Tuesday, January 24, 2023 3:41 PM
To: Elwood, Thomas B
Cc: Jennifer Dixon-Herrity; Scott Krepel; Brandon Wise; Kent Wood; Joshua Wilson; Vic Cusumano; Dennis Galvin
Subject: Final - Request for Additional Information - Callaway Plant, Unit 1 - LAR for proposed changes to TS for SFP - EPID: L-2022-LLA-0132
Attachments: Final_RAIs for Callaway SFP NCS LAR_Rev.1.docx

Dear Mr. Elwood,

By letter dated August 29, 2022 (Agencywide Documents and Access and Management System (ADAMS) Package Accession No. ML22242A122) Union Electric Co. dba Ameren Missouri (the licensee) submitted a license amendment request (LAR) that proposed changes to the Technical Specifications (TSs) for Callaway Plant (Callaway), unit 1. The proposed LAR would revise Technical Specification (TS) TS 3.7.16, "Fuel Storage Pool Boron Concentration"; TS 3.7.17, "Spent Fuel Assembly Storage"; Figure 3.7.17-1, "Minimum Required Fuel Assembly Bumup as a Function of Initial Enrichment to Permit Storage in Regions 2 and 3"; and TS 4.3.1, "Criticality."

The NRC staff has reviewed the LAR and determined that additional information was needed to complete the review. A draft request for additional information (RAI) was transmitted to you on 1/9/23, following which a clarification call was held on 1/23/23. During the clarification call, it was mutually agreed to delete the first RAI, and split the second RAI in two parts, which resulted in RAI # 1 and 2. The revised draft (RAI) was transmitted to you on 1/24/23. In an email you confirmed the acceptance of the revised version and informed us that you will be able to provide NRC your response on the docket by February 21, 2023. Attached is the revised RAI as the final version. Thanks

Sincerely,

Mahesh Chawla, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
ph: 301-415-8371
Docket No. 50-483

C	DORL/LPL4/PM	DORL/LPL4/BC
M	MChawla	JDixon-Herrity

1/24/23	1/24/23
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U.S. NUCLEAR REGULATORY COMMISSION
REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE REVIEW OF
PROPOSED AMENDMENT TO FACILITY OPERATING LICENSE NO. NPF-30

UNION ELECTRIC COMPANY

CALLAWAY PLANT UNIT 1

DOCKET NO. 50-483

EPID: L-2022-LLA-0132

1.0 INTRODUCTION

By letter dated August 29, 2022 (Agencywide Documents and Access and Management System (ADAMS) Package Accession No. ML22242A122) Union Electric Co. (the licensee) submitted a license amendment request (LAR) that proposed changes to the Technical Specifications (TSs) for Callaway Plant (Callaway), unit 1. The NRC staff has reviewed the license amendment request (LAR) and determined that additional information is needed to complete the review.

2.0 REGULATORY BASES

The LAR proposes changes to TS related to spent fuel storage. The applicable regulations include:

10 CFR 50.68(b)(4), which requires:

“If credit is taken for soluble boron, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95 percent probability, 95 percent confidence level, if flooded with borated water, and the k-effective must remain below 1.0 (subcritical), at a 95 percent probability, 95 percent confidence level, if flooded with unborated water.”

GDC 62, which requires:

“Criticality in the fuel storage and handling system shall be prevented by physical systems or processes, preferably by use of geometrically safe configurations.”

10 CFR 50.36(c)(4), which requires:

“Design features to be included [in the technical specifications] are those features of the facility such as materials of construction and geometric arrangements, which, if altered or modified, would have a significant effect on safety...”

3.0 REQUEST FOR ADDITIONAL INFORMATION

RAI #1

There appear to be inconsistencies with the allowable storage configurations between the TS requirements and the proposed rules for permissible loading. As described in Section 3.4.3, the rules for the permissible loading preclude potentially more restrictive interface conditions. TS 4.3.1.1.d does not specifically preclude these interface conditions. Thus, the rules for permissible loading appear to be more restrictive than TS 4.3.1.1.d.

Additionally, TS 4.3.1.1.d does not reference the rules for permissible loading, and the storage configuration description of TS 4.3.1.1.d does not perfectly match what would be allowed under the rules for permissible loading. Because the rules for permissible loading are not part of the TS, they are not a TS requirement and are not enforceable.

Please explain why the proposed TS sufficiently describes the allowable storage configuration and precludes the interface conditions described in Section 3.4.3. Revise the proposed TS to preclude such configurations or provide an analysis of such configurations demonstrating continued compliance with 10 CFR 50.68(b).

RAI #2

Section 3.4.6, “Combined Qualifications,” of the LAR describes the potential ambiguity of using terms such as “unrestricted” or “checkerboard” to describe spent fuel pool (SFP) assembly storage configurations. The licensee instead provided a set of permissible loading rules to determine if a cell may contain a Region 1 assembly, Region 2 assembly, or no assembly at all based on the face-adjacent neighbors of that cell. The rules remove any ambiguity associated with “uniform” or “checkerboard” descriptions of storage configurations. However, the rules are not sufficient to preclude unanalyzed storage configurations. Figure 1 is an example of a storage configuration which is acceptable according to the rules but does not appear to be analyzed in the nuclear criticality safety (NCS) analysis the licensee provided. The storage configuration seen in Figure 1 is allowed as there are no rules preventing a Region 1 assembly from being flanked on opposite sides by two Region 2 assemblies.

Please explain how these configurations are bounded by the proposed SFP criticality analysis of record or discuss how these configurations would be precluded by the proposed TS requirements.

R2	R2	R2	R2	R2	R2
R2	R2	R2	R2	R2	R2
	R1		R1		R2
R2	R2	R2	R2	R2	R2
R2	R2	R2	R2	R2	R2

Figure 1 – Example of an Unanalyzed Storage Configuration Allowed by Rules for Permissible Loading

RAI #3

The licensee's incorrect loading curve analysis does not include an analysis of a multiple misload of underburned Region 1 assemblies. Region 1 assemblies are not necessarily fresh assemblies; therefore, making it more difficult to distinguish between Region 1 and Region 2 assemblies if there is an error in the SFP loading documentation. Typically, a fresh fuel assembly and a burned fuel assembly can be identified by differences in their appearance, thus allowing plant staff to identify any errors in the loading documentation. Because Region 1 assemblies may not be fresh, the appearance of assemblies cannot be used to identify errors in loading documentation, thus a multiple misload of Region 1 assemblies that are more reactive than an assembly requiring 20 years of cooling time to be acceptable for storage in Region 2 is possible. The LAR does not analyze this condition.

Please provide either a bounding analysis of a multiple misload accident involving Region 1 assemblies or provide justification that such a configuration is precluded by means other than visual inspection.