



June 21, 2023

ULNRC-06821

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555-0001

10 CFR 50.90

Ladies and Gentlemen:

**DOCKET NUMBER 50-483  
CALLAWAY PLANT UNIT 1  
UNION ELECTRIC CO.  
RENEWED FACILITY OPERATING LICENSE NPF-30  
POST-AUDIT FOLLOW-UP INFORMATION IN SUPPORT OF CALLAWAY'S  
LICENSE AMENDMENT REQUEST AND PROPOSED EXEMPTION  
TO ALLOW USE OF FRAMATOME GAIA FUEL (LDCN 22-0002)  
[EPID L-2022-LLA-0150 AND EPID L-2022-LLE-0030]**

References: Provided on Page 3.

In the letter identified in Reference 1, Union Electric Company (Ameren Missouri) submitted an application for amendment and exemption request to Renewed Facility Operating License Number NPF-30 for the Callaway Plant, Unit 1 (Callaway). The requested amendment and exemption request would allow use of a limited number of Framatome GAIA fuel assemblies at Callaway. In the letter identified in Reference 2, Ameren Missouri provided its first supplement to the application for amendment (and exemption request). That supplement provided information needed to support acceptance of the requested license amendment and regulatory exemption. In the letter identified in Reference 3, Ameren Missouri provided an additional supplement which provided information requested by the NRC resulting from the audit described in References 4, 5 and 6. This letter provides additional clarifying information requested by the NRC as a result of its review of the information presented in References 1 and 3.

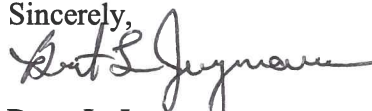
The information provided in the enclosure to this letter has no impact on the changes requested and described in the LAR (Reference 1). As such, the information does not change the “No Significant Hazards Consideration” conclusions reached in the LAR, nor does it change the conclusion regarding no need for an environmental assessment based on the categorical exclusion provisions of 10 CFR 51.22.

This letter does not contain new commitments.

If there are any questions, please contact Tom Elwood, Supervisor Regulatory Affairs and Licensing, at 314-225-1905.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,



Brent L. Jungmann  
Senior Director, Nuclear Engineering

Executed on: 6/21/23

Enclosure: Audit Follow-up Questions and Responses

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- References:
1. Ameren Missouri letter ULNRC-06768, "Application for Technical Specification Change and Exemption Request Regarding Use of Framatome GAIA Fuel (LDCN 22-002)," dated October 12, 2022 (ADAMS Accession No. ML22285A115)
  2. Ameren Missouri letter ULNRC-06783, "Supplement to License Amendment and Exemption Request Regarding Use of Framatome GAIA Fuel (LDCN 22-002) (EPID L-2022-LLA-0150 and L-2022-LLE-0030)," dated December 1, 2022 (ADAMS Accession No. ML22335A498)
  3. Ameren Missouri letter ULNRC-06808, "Post Audit Supplement to License Amendment Request and Exemption to Allow Use of Framatome GAIA Fuel (LDCN 22-0002) [EPID L-2022-LLA-0150 and EPID L-2022-LLE-0030]," dated May 9, 2023 (ADAMS Accession No. ML23129A794)
  4. NRC letter "Callaway Plant, Unit No. 1 – Regulatory Audit Plan and Setup of Online Reference Portal for License Amendment Request And Exemption For Fuel Transition To Framatome GAIA Fuel (EPID L-2022-LLA-0150 AND EPID L-2022-LLE-0030)," dated March 20, 2023 (ADAMS Accession No. ML23068A375)
  5. NRC email "Regulatory Audit Questions - Callaway LAR And Exemption For Fuel Transition To Framatome GAIA Fuel - EPIDs - L-2022-LLA-0150 and L-2022-LLE-0030," dated April 17, 2023 (ADAMS Accession No. ML23107A181)
  6. NRC email "Regulatory Audit Question - Callaway LAR And Exemption For Fuel Transition To Framatome GAIA Fuel – EPIDs - L-2022-LLA-0150 and L-2022-LLE-0030," dated April 24, 2023 (ADAMS Accession No. ML23114A230)

ULNRC-06821

June 21, 2023

Page 4 of 5

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ULNRC-06821

June 21, 2023

Page 5 of 5

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Ms. Claire Eubanks (Missouri Public Service Commission)

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**ENCLOSURE 1**

**AUDIT FOLLOW-UP QUESTIONS AND RESPONSES**

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## AUDIT FOLLOW-UP QUESTIONS AND RESPONSES

References are provided at the end of this enclosure.

By application dated October 12, 2022 (Reference 1), as supplemented by letter dated December 1, 2022 (Reference 2), Union Electric Company, doing business as Ameren Missouri, submitted a license amendment request (LAR) and exemption request for Callaway Plant, Unit No. 1 (Callaway). The proposed amendment would revise the Technical Specifications (TSs) to allow use of Framatome GAIA fuel with M5 as a fuel cladding material. Since the Framatome GAIA fuel will use M5 fuel rod cladding, a Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," and 10 CFR Part 50 Appendix K, "ECCS [Emergency Core Cooling System] Evaluation Models," exemption request is included as part of this LAR. Callaway is proposing to load a limited number of Framatome GAIA fuel assemblies starting in operating cycle 27 to obtain in-core performance data and acquire operational experience associated with the GAIA fuel design.

Subsequent to NRC acceptance of the LAR, the NRC performed an audit which was conducted April 3 through 20, 2023. The NRC questions/requests to be addressed during the audit were provided in a letter dated March 20, 2023 (Reference 3). In addition, the NRC requested via Emails dated April 17, 2023, (Reference 4) and April 24, 2023, (Reference 5) that responses be provided to additional questions discussed during a call held on April 20, 2023. At the conclusion of the audit activities, the NRC requested that Ameren Missouri's responses to selected questions from the audit be transmitted via a letter which was subsequently provided by Reference 6. Following review of the responses provided in Reference 6, a call was held on June 8, 2023 during which the NRC requested that additional information be provided regarding four items. The additional information is provided below.

**Item 1** - In the letter identified as Reference 6, Union Electric Company (Ameren Missouri) submitted a supplement to its license amendment request (Reference 1) seeking approval to use Framatome GAIA fuel. The supplement provided information requested by the NRC resulting from an audit conducted April 3 through 20, 2023. During the staff's review of the information provided in Reference 6, it was identified that reference to a section in the Final Safety Analysis Report (FSAR) was incorrect.

### **Ameren Missouri Response:**

On page 23 of 47 in Enclosure 1 to Reference 6, reference was made to FSAR section 6.3.1.1. The response should have provided reference to FSAR section 6.3A.1.1 as provided in Enclosure 2 of Reference 8. As described in Attachment 2-5 of Enclosure 2 of Reference 8, text is being added to the FSAR as new Appendix 6.3A to describe the evaluations performed to address GSI-191, which are described in the Reference 8 license amendment request and its subsequent correspondence. The NRC approved Callaway's GSI-191 resolution license amendment request, as documented in Reference 9.

**Item 2** – Regarding Table 5-18, "Uncontrolled RCCA Bank Withdrawal at Power: Results," contained in Reference 7, provide the following:

- additional explanation of how the 10% RTP BOC MDNBR value is the bounding condition given that it is numerically larger than other MDNBR values presented in the table.
- the deterministically derived MDNBR value and the basis for its replacement with the statistically derived value shown in the table.

**Ameren Missouri Response:**

Page 40 of Reference 10 lists the deterministic MDNBR of the BOC 10% RTP case as 1.088. This deterministic value constitutes the limiting case when compared to the other cases presented in Table 5-18 of Reference 7. Because this deterministic value was below the MDNBR limit, a statistical analysis was performed, resulting in the acceptable value listed in Table 5-18 of Reference 7 of 1.228.

**Item 3** - Regarding Table 5-18, "Uncontrolled RCCA Bank Withdrawal at Power: Results," contained in Reference 7, provide the following:

- elaborate on the meaning of "overall power" used in Note 2 of the table.
- a brief explanation for how the limiting PLHGR [peak linear heat generation rate] was selected.

**Ameren Missouri Response:**

Section 7.3, "PLHGR," on page 42 of Reference 10 shows the calculation for the PLHGR. The only input that varies between the cases analyzed is the peak transient power. The paragraph following Table 7-3, "PLHGR Inputs for UCBW," elaborates that the power identified is the kinetic power (not the heat flux). All cases analyzed were examined, and those where the reactivity insertion rate was less than or equal to 50 pcm/s (consistent with the cycle-to-cycle check in Appendix B of Reference 11, table note c) were sorted. One of the BOC 10% RTP cases resulted in a peak transient kinetic power of 146.2% RTP, which is what is used in the calculation shown on page 42 of Reference 10. The wording of the power described in Note 2 to Table 5-18 in Reference 7 can be clarified from "overall power" to "overall peak transient kinetic power."

**Question 4** - Regarding Section 5.21, "Uncontrolled RCCA Bank Withdrawal at Power (FSAR SP 15.4.2)," in Reference 7, it is observed that the text appears to use critical heat flux (CHF) and departure from nucleate boiling (DNB) interchangeably. Is there a reason for the different usage?

**Ameren Missouri Response:**

The terms "CHF" and "DNB" and their associated limits are used interchangeably in this section of Reference 7.

## REFERENCES

1. Ameren Missouri letter ULNRC-06768, "Application for Technical Specification Change and Exemption Request Regarding Use of Framatome GAIA Fuel (LDCN 22-0002)," ADAMS Accession No. ML22285A115, October 12, 2022.
2. Ameren Missouri letter ULNRC-06783, "Supplement to License Amendment Request and Exemption Request Regarding Use of Framatome GAIA Fuel (LDCN 22-0002) (EPID L-2022-LLA-0150 and L-2022-LLF-0030)," ADAMS Accession No. ML22335A498, December 1, 2022.
3. NRC Letter from Mahesh Chawla (NRC) to Fadi Diya (Ameren), "Callaway Plant, Unit No. 1 – Regulatory Audit Plan and Setup of Online Reference Portal for License Amendment Request and Exemption for Fuel Transition to Framatome GAIA Fuel (EPID L-2022-LLA-0150 and EPID L-2022-LLE-0030)," ADAMS Accession No. ML23068A375, March 20, 2023.
4. NRC Letter from Mahesh Chawla (NRC) to Thomas Elwood (Ameren), "Regulatory Audit Questions - Callaway LAR and Exemption for Fuel Transition to Framatome GAIA Fuel - EPIDs - L-2022-LLA-0150 and L-2022-LLE-0030," ADAMS Accession No. ML23107A181, April 17, 2023.
5. NRC Letter from Mahesh Chawla (NRC) to Thomas Elwood (Ameren), "Regulatory Audit Question - Callaway LAR and Exemption for Fuel Transition to Framatome GAIA Fuel - EPIDs - L-2022-LLA-0150 and L-2022-LLE-0030," ADAMS Accession No. ML23114A230, April 24, 2023.
6. Ameren Missouri letter ULNRC-06808, "Post Audit Supplement to License Amendment Request and Exemption to Allow Use of Framatome GAIA Fuel (LDCN 22-0002) [EPID L-2022-LLA-0150 and EPID L-2022-LLE-0030]," ADAMS Accession No. ML23129A794, May 9, 2023.
7. Framatome Inc. Licensing Report ANP-3969(P), Revision 2, "Callaway Non-LOCA Summary Report," October 2022 (included as Attachment 12 to Enclosure 1 in Reference 1).
8. Ameren Missouri letter ULNRC-06526, "Request for License Amendment and Regulatory Exemptions for a Risk-Informed Approach to Address GSI-191 and Respond to GL 2004-02 (LDCN 19-0014)," ADAMS Accession No. ML21090A185, March 31, 2021.
9. NRC letter "Callaway Plant, Unit No. 1 – Issuance of Amendment No. 228 Re: Revise Technical Specifications to Address Generic Safety Issue-191 and Respond to Generic Letter 2004-02 Using a Risk-Informed Approach (EPID L-2021-LLA-0059)," ADAMS Accession No. ML22220A132, October 21, 2022.

10. FS1-0058737, "Callaway 15.4.2 (Uncontrolled Bank Withdrawal at Power) DNB/PLHGR Analysis," Revision 2, September 2022.
11. FS1-0052700, "Callaway VQP – Uncontrolled Bank Withdrawal at Power Analysis," Revision 1.0, September 2021.