

Attachment 13 to
Enclosure 1 to ULNRC-06768
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ATTACHMENT 13

**RESPONSE TO INSUFFICIENCY ITEMS FROM FIRST LICENSE
AMENDMENT REQUEST**

RESPONSE TO INFORMATION INSUFFICIENCIES

Note: References are specific to this attachment and located at the end of this attachment.

During the acceptance review of the previously submitted license amendment request (Reference 1), the NRC staff identified in Reference 2 four items deemed insufficiencies in the original submittal. For unrelated reasons, the license amendment request was subsequently withdrawn which the NRC acknowledged in Reference 3. In Reference 3, the NRC staff stipulated that should Ameren Missouri decide to re-submit the license amendment request, the identified insufficiencies must be addressed. To address this stipulation, the insufficiencies are addressed in this Attachment.

Information Insufficiencies:

- 1. Enclosure 1 of the licensee's letter identifies that the results of the control rod ejection event analysis will be available for review by the NRC staff but does not identify a timeline for availability. More detailed information concerning the schedule for providing this analysis appears necessary to support a determination of the NRC staff's review timeline.**

Ameren Missouri Response:

The results of the control rod ejection event will be available for review by the NRC staff not later than the date of this LAR submittal.

- 2. In general, the limitations and conditions, established by NRC staff, for each technical report associated with GAIA fuel, and requested by the licensee to be added to its licensing basis, are not dispositioned or addressed.**

Ameren Missouri Response:

The following table provides, for each topical report, a cross-reference between the topical report and the disposition of the limitations and conditions identified in the safety evaluation report (SER) for the topical report. The second column provides the location of the limitations and conditions, if any, in the NRC SER. The third column specifies where the disposition of the limitation and condition is addressed within the license amendment request. For limitations and conditions identified as not having been addressed, their relevance is qualified in the table. Table 7-1 in Attachment 9 to Enclosure 1 of this license amendment request provides a listing of the NRC approved topical reports being added to Callaway's license basis. [Note that while the text in Section 7 in Attachment 9 to Enclosure 1 indicates that this content will be added to the COLR, that text is a hold-over from the original intent of the document to support fuel transition. This LAR will not add these methods to the COLR nor to the listing of methods in TS 5.6.5.b. This content will be placed in the FSAR description associated with the Framatome GAIA fuel.]

Cross-Reference Table for SER Limitations and Conditions

Topical Report	SER Conditions, Limitations, Restrictions¹	Reference to Location of Discussion in LAR or Additional Notes
EMF-2103(P)(A), Revision 3, "Realistic Large Break LOCA Methodology for Pressurized Water Reactors"	Refer to Section 4 of the SER for EMF-2103(P)(A), Revision 3 (NRC-IC-16-011)	Section 3.7 and Table 3-1 of ANP-3944P, Revision 1, "Callaway Realistic Large Break LOCA Analysis" (ULNRC-06768 Enclosure 1, Attachment 10)
EMF-2328(P)(A), Revision 0, "PWR Small Break LOCA Evaluation Model, S-RELAP5 Based"	A condition imposed on the use of ANF-RELAP in a previously approved methodology regarding break size is applied to the use of S-RELAP5 in EMF-2328(P)(A) Rev 0. This condition is addressed in EMF-2328 Supplement 1(P)(A), Rev 0.	Section 3.2, 3.5 and 4.1 of ANP-3943P, Revision 1, "Callaway Small Break LOCA Analysis with GAIA." ULNRC-06768 Enclosure 1, Attachment 11. There are no limitations specified other than the break size.
EMF-2328(P)(A), Revision 0, Supplement 1, Revision 0, "PWR Small Break LOCA Evaluation Model, S-RELAP5 Based"	EMF-2328 Supplement 1 contains no new limitations or conditions.	See Section 3.5 of ANP-3943P, Revision 1, "Callaway Small Break LOCA Analysis with GAIA." ULNRC-06768 Enclosure 1, Attachment 11

¹ This column identifies the existence or absence of any limitations and conditions associated with the specified method. If limitations or conditions do apply, the location of the limitations and condition (in the NRC's SER or other document) is provided. The text of the actual limitation or condition has been omitted for the sake of brevity.

Topical Report	SER Conditions, Limitations, Restrictions¹	Reference to Location of Discussion in LAR or Additional Notes
EMF-2310(P)(A), Revision 1, "SRP Chapter 15 Non-LOCA Methodology for Pressurized Water Reactors"	Refer to section 5.0 of the SER for EMF-2310(P)(A), Revision 0 dated 5/19/2004. Note that Rev 1 imposed no new limitations. Conditions in section 4.0 for dilution event analyses are captured in the internal Boron Dilution Guideline (FS1-0010448) which was used for the Callaway analysis, FS1-0057494.	Section 3.9, ANP-3969P, Revision 2, "Callaway Non-LOCA Summary Report." ULNRC-06768 Enclosure 1, Attachment 12 Section 3.9 (specifically the requirements for justification of nodalization, input parameters options selected, and consideration of chosen parameters.)
XN-NF-82-21(P)(A), Revision 1, "Application of Exxon Nuclear Company PWR Thermal Margin Methodology to Mixed Core Configurations"	No limitations stated, but section 4.0 Staff Position imposes a 2% MDNBR penalty for mixed cores.	Section 3.9, ANP-3969P, Revision 2, "Callaway Non-LOCA Summary Report." ULNRC-06768 Enclosure 1, Attachment 12 Section 3.9
EMF-92-081(P)(A), Revision 1, "Statistical Setpoint/Transient Methodology for Westinghouse Type Reactors"	Refer to the 2 conditions listed in section 4.0 of the SER	Section 5.4 of ANP-3947P, Revision 3, and Section 3.9 ANP-3969P, Revision 2, "Callaway Non-LOCA Summary Report." ULNRC-06768 Enclosure 1, Attachment 9 section 5.4 and Attachment 12 Section 3.9
ANP-10341(P)(A), Revision 0, "The ORFEO-GAIA and ORFEO-NMGRID Critical Heat Flux Correlations"	Refer to section 4.0 of the SER for ANP-10341(P)(A), Revision 0 dated 9/24/2018.	Section 3.9 and Table 3-10 (for correlation limits) of ANP-3969P, Revision 2, "Callaway Non-LOCA Summary Report." ULNRC-06768 Enclosure 1, Attachment 12 Section 3.9

Topical Report	SER Conditions, Limitations, Restrictions¹	Reference to Location of Discussion in LAR or Additional Notes
XN-75-21(P)(A), Revision 2, “XCOBRA-IIIC: A Computer Code to Determine the Distribution of Coolant During Steady State and Transient Core Operation”	Refer to Conclusion 2 of section 5.0 of the SER for XN-75-21(P)(A), Revision 2, “XCOBRAIIIC which limits use of the code to the snapshot mode and excludes LOCA/ECCS with reverse flow and recirculation.	Section 3.9 and 3.10 of ANP-3969P, Revision 2, “Callaway Non-LOCA Summary Report.” ULNRC-06768 Enclosure 1, Attachment 12 Section 3.9 and 3.10
ANP-10311P-A, Revision 1, “COBRA-FLX: A Core Thermal- Hydraulic Analysis Code”	Refer to section 4.0 of the SER for ANP-10311P-A, Revision 1, “COBRAFLX” (dated 10/18/2017) for the 2 limitations related to empirical correlations and restrictions on the COBRAFLX fuel rod model.	Section 5.4 of ANP-3947P, Revision 3, and Sections 3.9 and 3.10 of ANP-3969P, Revision 2, “Callaway Non-LOCA Summary Report.” ULNRC-06768 Enclosure 1, Attachment 9 section 5.4 and Attachment 12 Section 3.9 and 3.10

Topical Report	SER Conditions, Limitations, Restrictions¹	Reference to Location of Discussion in LAR or Additional Notes
<p>XN-NF-82-06(P)(A), Revision 1, Supplement 2, 4, and 5, “Qualification of Exxon Nuclear Fuel for Extended Burnup”</p>	<p>Refer to Section 7.0 CONCLUSIONS section of SER. Per Attachment 12: "No restrictions, limitations, and/or conditions are identified in the SER for XN-NF-82-06(P)(A), Revision 1 Supplement 5 relative to DNB propagation."</p>	<p>Section 3.9 of ANP-3969P, Revision 2, “Callaway Non-LOCA Summary Report.” ULNRC-06768 Enclosure 1, Attachment 12, Section 3.9.</p> <p>For the Callaway VQP scope, XN-NF-82-06 is only applied for DNB propagation. The Non-LOCA Summary report contains the following statement to address this (section 3.9.1, page 10): "The quantity of fuel failures includes the effects of DNB propagation as defined in Reference 13, Supplement 5. This method is typically applied conservatively by assuming a single rod failure propagates to the entire assembly. No restrictions, limitations, and/or conditions are identified in the SER for Reference 13, Supplement 5 relative to DNB propagation."</p>
<p>XN-75-32(P)(A) Supplements 1, 2, 3, and 4, “Computational Procedure for Evaluating Fuel Rod Bowing”</p>	<p>No specific limitations are stated in the SER – just a recommendation for continued vendor fuel surveillance program.</p>	<p>Section 5.4 of ANP-3947P, Revision 3, which is provided as Attachment 9 of ULNRC-06768 Enclosure 1.</p>

Topical Report	SER Conditions, Limitations, Restrictions¹	Reference to Location of Discussion in LAR or Additional Notes
ANP-10297P-A, Revision 0, "The ARCADIA Reactor Analysis System for PWRs Methodology Description and Benchmarking Results"	Refer to the section 3.0 of the SER for ANP-10297P-A, Revision 0. (Note that the SER for ANP-10297P-A, Revision 0 included 3 limitations. The SER for Supp 1-PA rev 1 eliminated the third and included the first 2 and added 4, 5 and 6.)	Section 3.3 of ANP-3947P, Revision 3, and Section 3.9 and 3.10 ANP-3969P, Revision 2, "Callaway Non-LOCA Summary Report." ULNRC-06768 Enclosure 1 Attachment 9 section 3.3 and Attachment 12 sections 3.9 and 3.10
ANP-10297P-A, Revision 0, Supplement 1PA, Revision 1, "The ARCADIA Reactor Analysis System for PWRs Methodology Description and Benchmarking Results"	See above.	Section 3.3 of ANP-3947P, Revision 3, and Section 3.9 and 3.10 ANP-3969P, Revision 2, "Callaway Non-LOCA Summary Report." ULNRC-06768 Enclosure 1 Attachment 9 section 3.3 and Attachment 12 sections 3.9 and 3.10
ANP-10338P-A, Revision 0, "AREA – ARCADIA Rod Ejection Accident"	Refer to section 5.0 of the SER for ANP-10338P-A, Revision 0 dated 12/20/2-17 (NRC-IC-17-051).	Section 6.1.1.3 of ANP-3947P, Revision 3, (ULNRC-06768 Enclosure 1, Attachment 9) <u>Limitation 1</u> is addressed since this analysis is only used for the rod ejection as discussed in section 6.1.1.3 of ULNRC-06768 Enclosure 1, Attachment 9 <u>Limitation 2</u> refers to the conditions and limitations of the coupled codes that comprise the ARCADIA Rod Ejection Accident. <u>Limitation 3</u> is addressed in section 6.1.1.3 of ULNRC-06768 Enclosure 1, Attachment 9.

Topical Report	SER Conditions, Limitations, Restrictions¹	Reference to Location of Discussion in LAR or Additional Notes
<p>ANP-10323P-A, Revision 1, "GALILEO Fuel Rod Thermal-Mechanical Methodology for Pressurized Water Reactors"</p>	<p>Refer to section 5.0 of the SER for ANP-10323P-A, Revision 1 Dated 12/20/2017</p> <ul style="list-style-type: none"> • The application of GALILEO should assume fuel failure when the predicted fuel temperatures exceed the fuel melting temperature as calculated by GALILEO due to the lack of properties for molten fuel in GALILEO and other properties such as thermal conductivity and fission gas release. • The ability to make changes to both the mean and standard deviation of model parameter uncertainty values without NRC review and approval is not approved. Because of the complex interaction between parameters in fuel performance codes, the NRC staff does not approve the ability to make changes to the model parameters without NRC approval. • The peak axial node burnup for the fuel rod is limited to [proprietary] GWd/MTU. • No methodology has been approved for providing initial data or conditions for ECCS analysis. 	<p>Section 6.1.1.3 of ANP-3947P, Revision 3, (ULNRC-06768 Enclosure 1, Attachment 9)</p> <p><u>Bullet 1</u>: This is addressed in Section 6.1.1.2 of ANP-3947P, Revision 3.</p> <p><u>Bullet 2</u>: General requirement. For the Callaway AREA analysis, GALILEO is used for two aspects of the analysis. These are:</p> <ol style="list-style-type: none"> 1. Generation of fuel limits that are the basis for comparisons of ARTEMIS results. 2. Generation of hgap and porosity tables. <p><u>Bullet 3</u>: The peak node burnup is shown to be less than the GALILEO limit in the computer output files in the AREA limits analysis (FS1-0056223-2.0).</p> <p><u>Bullet 4</u>: This does not apply to the AREA inputs.</p>
<p>BAW-10231P-A, Revision 1, "COPERNIC Fuel Rod Design Computer Code"</p>	<p>None other than a 62 GWD/MTU limit for rod average burn-up.</p>	<p>Section 2.4.4 of ANP-3947P, Revision 3, (ULNRC-06768 Enclosure 1, Attachment 9) and Section 3.9 and 3.10 of ANP-3969P, Revision 2, "Callaway Non-LOCA Summary Report," (ULNRC-06768 Enclosure 1, Attachment 12).</p>

Topical Report	SER Conditions, Limitations, Restrictions¹	Reference to Location of Discussion in LAR or Additional Notes
BAW-10227P-A, Revision 1, "Evaluation of Advanced Cladding and Structural Material (M5) in PWR Reactor Fuel"	None explicitly listed.	Section 2.4.4 of ANP-3947P, Revision 3, (ULNRC-06768 Enclosure 1, Attachment 9).
ANP-10342P-A, Revision 0, "GAIA Fuel Assembly Mechanical Design"	Refer to Section 4.0 of the SER for ANP-10342P-A, Revision 0 (dated 9/24/2019).	Section 2.4.3.1 of ANP-3947P, Revision 3, (ULNRC-06768 Enclosure 1, Attachment 9)

- 3. The licensee proposes a unique TS structure, which includes parallel sets of TS requirements for TSs 3.2.1, "Heat Flux Hot Channel Factor (FQ(Z))"; 3.2.2, "Nuclear Enthalpy Rise Hot Channel Factor"; and 3.2.3, "Axial Flux Difference (AFD) (Relaxed Axial Offset Control (RAOC) Methodology," with one set of requirements based on Westinghouse fuel and methods, and the other based on those of Framatome. While the licensee would allow both fuel types to be present in limiting locations for several cycles, only one set of these TS requirements would apply for each cycle. Framatome has performed confirmatory analysis for its fuel, and the two sets of parallel TS operating limits would be similar. However, differences remain, such as with respect to TS required actions and surveillances. The basis for selecting one or the other of the parallel sets of TS requirements as governing for a given cycle is not clear and does not necessarily appear to be associated with which type of fuel has the limiting operating margin. The application does not appear to include sufficient information justifying why the TS requirements for the fuel type considered to "govern Core Operating Limits Report development" adequately protect the other fuel type, which could be more limiting with respect to operating margin.**

Ameren Missouri Response:

The license amendment request presented in this letter, ULNRC-06768, does not include proposed changes to the TS Section 3.2, "Power Distribution Limits," nor does it include the unique TS structure originally proposed. As reflected in this license amendment request, the current TSs continue to reflect the Westinghouse TS LCOs supported by the current Westinghouse methodologies listed in TS 5.6.5, "Core Operating Limits Report (COLR)." A

summary description of how Westinghouse provides confirmation of core reload analysis and its ability to support the presence of the eight GAIA fuel assemblies has been added at the end of Section 3, "Technical Evaluation," in Enclosure 1.

- 4. Enclosure 1, Attachment 12 (ANP-3969P) identifies that evaluation of the inadvertent loading and operation of a fuel assembly in an improper position event will be provided by the licensee. However, the NRC staff could not locate the analysis or disposition of this event in the licensee's submittal. This information should be provided, and the licensee should clarify the expected schedule to support a determination of the staff's review timeline.**

Ameren Missouri Response:

The LAR described in Enclosure 1 of this letter, ULNRC-06768, contains a description of the disposition of this event. Refer to Section 2.2 of Enclosure 1.

References:

1. Ameren Missouri letter ULNRC-06729, "Application for Technical Specification Change and Exemption Request Regarding Transition to Framatome Fuel, LDCN 22-0002," dated June 2, 2022 (ADAMS Accession No. ML22153A174).
2. NRC Letter "Callaway Plant, Unit No. 1 – Supplemental Information Needed for Acceptance of Requested Licensing Action re: Amendment to Allow Use of Framatome GAIA Fuel (EPID L-2022-LLA-0083)," dated July 19, 2022 (ADAMS Accession No. ML22199A177).
3. NRC Letter "Callaway Plant, Unit No. 1 – Withdrawal of Requested Licensing Action re: License Amendment Request for Technical Specification Change and Exemption Request Regarding Transition to Allow Use of Framatome GAIA Fuel, Submitted to NRC for Acceptance Review (EPID L-2022-LLA-0083 and EPID L-2022-LLE-0019)," dated August 15, 2022 (ADAMS Accession No. ML22220A281).