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ULNRC-06381

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

10 CFR 50.4
10 CFR 50.54 (f)

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
RENEWED FACILITY OPERATING LICENSE NPF-30
SPENT FUEL POOL EVALUATION SUPPLEMENTAL REPORT, RESPONSE TO NRC REQUEST FOR INFORMATION PURSUANT TO 10 CFR 50.54(F) REGARDING RECOMMENDATION 2.1 OF THE NEAR-TERM TASK FORCE REVIEW OF INSIGHTS FROM THE FUKUSHIMA DAI-ICHI ACCIDENT

References:

1. NRC Letter, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012, ADAMS Accession Number ML12053A340
2. NRC Letter, "Final Determination of Licensee Seismic Probabilistic Risk Assessments Under the Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendation 2.1 "Seismic" of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated October 27, 2015, ADAMS Accession Number ML15194A015
3. NEI Letter, transmits EPRI 3002009564 for NRC endorsement, dated 1/31/2017, ADAMS Accession Number ML17031A171
4. EPRI 3002009564, "Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation," dated January 2017
5. NRC Letter, provides endorsement of EPRI 3002009564, dated 2/8/2017, ADAMS Accession Number ML17034A408

6. ULNRC-06030, "Ameren Missouri Response to NRC Request for Information Pursuant to 10CFR50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights From the Fukushima Dai-ichi Accident- 1.5 Year Responses for CEUS Sites," dated September 12, 2013
7. ULNRC-06095, "Correction to Ameren Missouri Response to NRC Request for Information Pursuant to 10CFR50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights From the Fukushima Dai-ichi Accident- 1.5 Year Responses for CEUS Sites," dated March 04, 2014
8. ULNRC-06102, "Ameren Missouri Seismic Hazard and Screening (CEUS Sites) Response to NRC Request for Information Pursuant to 10CFR50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights From the Fukushima Dai-ichi Accident- 1.5 Year Responses for CEUS Sites," dated March 28, 2014
9. NRC Letter, "Callaway Plant, Unit 1 Staff Assessment of Information provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated April 21, 2015, ADAMS Accession Number ML15063A517

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a Request for Information per 10CFR 50.54(f) (Reference 1) to all power reactor licensees. By letter dated October 27, 2015 (Reference 2), the NRC transmitted final seismic information request tables which identified that Ameren Missouri Callaway Energy Center was to conduct a limited scope Spent Fuel Pool Evaluation. By Reference 3, Nuclear Energy Institute (NEI) submitted an Electric Power Research Institute (EPRI) report entitled, Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation (EPRI 3002009564) (Reference 4) for NRC review and endorsement. NRC endorsement was provided by Reference 5.

EPRI 3002009564 provides criteria for evaluating the seismic adequacy of a spent fuel pool (SFP) to the reevaluated ground motion response spectrum (GMRS) hazard levels. Section 4.3 of EPRI 3002009564 lists the parameters to be verified to confirm that the results of the report are applicable to Ameren Missouri, and that the Callaway SFP is seismically adequate in accordance with NTTF 2.1 Seismic evaluation criteria.

The attachment to this letter provides the data for Callaway that confirms applicability of the EPRI 3002009564 criteria and confirms that the SFP is seismically adequate in accordance with NTTF 2.1 Seismic evaluation criteria.

This letter contains no new Regulatory Commitments and no revision to existing Regulatory Commitments.

Should you have any questions regarding this submittal, please contact Bruce Huhmann, Supervising Engineer, Regulatory Projects, at 573-694-6741.

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

Sincerely,

Executed on: 10/03/2017

Timothy Herrmann
Site Vice President

Enclosure: Site-Specific Spent Fuel Pool Criteria for Callaway

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Ameren Missouri

Callaway Energy Center

Site-Specific Spent Fuel Pool Criteria for Callaway

The 50.54(f) letter (Reference 1) requested that, in conjunction with the response to NTTF Recommendation 2.1, a seismic evaluation be performed for the SFP. More specifically, plants were asked to consider "all seismically induced failures that can lead to draining of the SFP." Such an evaluation would be needed for any plant in which the ground motion response spectrum (GMRS) exceeds the safe shutdown earthquake (SSE) in the 1 to 10 Hz frequency range. The staff confirmed through References 2 and 9 that the GMRS exceeds the SSE and concluded that a SFP evaluation is merited for the Callaway Energy Center. By letter dated 02/08/2017 (Reference 5) the staff determined that EPRI 3002009564 was an acceptable approach for performing SFP evaluations considering the GMRS hazard levels.

The table below lists the criteria from Section 4.3 of EPRI 3002009564 along with data for Callaway that confirms applicability of the EPRI 3002009564 criteria and confirms that the SFP is seismically adequate in accordance with NTTF 2.1 Seismic evaluation criteria.

SFP Criteria from EPRI 3002009564	**Site-Specific Data**
Site Parameters	
1. The site-specific GMRS should be the same as that submitted to the NRC between March 2014 and July 2015, which the NRC has found acceptable for responding to the NRC 50.54(f) letter (Reference 7).	The Callaway GMRS developed by EPRI and submitted to the NRC in Reference 6 is accepted by the NRC in Reference *7*. The peak spectral acceleration of the GMRS is 1.35g.
Structural Parameters	
2. Site-specific calculations, performed in accordance with Section 4.1 of EPRI 3002009564 should demonstrate that the limiting SFP HCLPF is greater than the site-specific GMRS in the frequency range of interest (e.g., 10-20 Hz).	Site-specific calculations (AMN-12-CALC-001, Rev 0), performed in accordance with Section 4.1 of EPRI 3002009564, demonstrate that the limiting SFP HCLPF is 1.4g, which exceeds the GMRS 1.35g. Therefore, this criterion is met for Callaway.
3. The SFP structure should be included in the Civil Inspection Program performed in accordance with Maintenance Rule.	The SFP structure is included in the Callaway Civil Inspection Program in accordance with 10 CFR 50.65 [procedure ESP-ZZ-01013 and its associated Appendix A, B, and C], therefore, this criterion is met for Callaway.
Non-Structural Parameters	
4. To confirm applicability of the piping evaluation in Section 4.2 of EPRI 3002009564, piping attached to the SFP should have penetrations no more than 6 ft below water surface.	The maximum depth of piping below the water surface is less than 6 ft as documented on drawings M-23EC04, M-23EC06, and M-23EF12, therefore, this criterion is met for Callaway.

SFP Criteria from EPRI 3002009564	**Site-Specific Data**
5. To confirm ductile behavior under increased seismic demands, SFP gates should be constructed from either aluminum or stainless steel alloys.	The SFP gate is constructed from an ASTM A240, Type 304L alloy as documented on drawing C-174-00001, therefore, this criterion is met for Callaway.
6. Anti-siphoning devices should be installed on any piping that could lead to siphoning water from the SFP. In addition, for any cases where active anti-siphoning devices are attached to 2-inch or smaller piping and have extremely large extended operators, the valves should be walked down to confirm adequate lateral support.	For pool skimmers FEC04A, FEC04B, and FEC04C, ¼" diameter vent holes are located on top of the pipes for anti-siphoning. Fuel Pool Cooling A and B to the Sparging Header have 3" diameter vent holes are located at EL. 2043'-2" to provide anti-siphoning. As described, no anti-siphoning devices can lead to siphoning, therefore, this criterion is met for Callaway. As described, no anti-siphoning devices are attached to 2-inch or smaller piping with extremely large extended operators, therefore, this criterion is met for Callaway. Further, to ensure that there are no potential adverse seismic conditions or interactions, all piping that penetrates the walls of the SFP were walked down by a team consisting of two Seismic Capability Engineers. No adverse seismic interactions were identified and all piping and valves have adequate lateral support.
7. To confirm applicability of the sloshing evaluation in Section 4.2 of EPRI 3002009564, the maximum SFP horizontal dimension (length or width) should be less than 125 ft and the SFP depth should be greater than 36 ft.	The Callaway SFP has a length of 50 ft, a width of 28 ft and a depth of 40 ft based on drawings C-2C6111 and C-2C6311, therefore, this criterion is met for Callaway.
8. To confirm applicability of the evaporation loss evaluation in Section 4.2 of EPRI 3002009564, the SFP surface area should be greater than 500 ft^2 and the licensed reactor core thermal power should be less than 4,000 MWt per unit.	The Callaway SFP has a surface area of 1425 ft^2, which is greater than 500 ft^2 and the licensed reactor thermal power for Callaway is 3565 MWt per unit which is less than 4,000 MWt per unit, therefore, this criterion is met for Callaway.