



10 CFR 50.4
10 CFR 50.54(f)

LIC-16-0039
May 25, 2016

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

Fort Calhoun Station (FCS), Unit 1
Renewed Facility Operating License No. DPR-40
Docket No. 50-285

Subject: 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 (NTTF) 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 3002007148 for NRC endorsement, dated February 23, 2016, ADAMS Accession Number ML16055A017
4. EPRI 3002007148, Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation, February 2016
5. NRC Letter, provides endorsement of EPRI 3002007148, dated March 18, 2016, ADAMS Accession Number ML15350A158
6. OPPD Letter LIC-14-0047, "Omaha Public Power District (OPPD) Seismic Hazard and Screening Report (CEUS Sites), Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident", dated March 31, 2014
7. NRC Letter, Docket No. 50-285, "Fort Calhoun Station, 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 December 8, 2015, ADAMS Accession Number ML15329A181 (TAC NOS. MF3735) (NRC-15-100)

8. EPRI 1025287, Seismic Evaluation Guidance, Screening, Prioritization and Implementation Details [SPID] for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic, February 2013

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a Request for Information per 10 CFR 50.54(f) (Reference 1) to all power reactor licensees. Enclosure 1, Item (9) of the 50.54(f) letter requested addressees to provide limited scope spent fuel pool (SFP) evaluations. By letter dated October 27, 2015 (Reference 2), the NRC transmitted final seismic information request tables which identified that OPPD/FCS is to conduct a limited scope SFP 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 3002007148) (Reference 4) for NRC review and endorsement. NRC endorsement was provided by Reference 5.

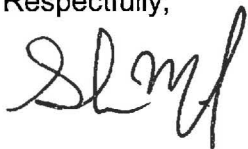
EPRI 3002007148 provides criteria for evaluating the seismic adequacy of a SFP to the reevaluated ground motion response spectrum (GMRS) hazard levels. This report supplements the guidance in the Seismic Evaluation Guidance, Screening, Prioritization and Implementation Details (SPID) (Reference 8), for plants where the GMRS peak spectral acceleration is less than or equal to 0.8g. Section 3.3 of EPRI 3002007148 lists the parameters to be verified to confirm that the results of the report are applicable to OPPD/FCS, and that the FCS SFP is seismically adequate in accordance with NTTF 2.1 Seismic evaluation criteria.

The attachment to this letter provides the data for FCS that confirms applicability of the EPRI 3002007148 criteria, confirms that the SFP is seismically adequate, and provides the requested information in response to Item (9) of the 50.54 (f) letter associated with NTTF Recommendation 2.1 Seismic evaluation criteria.

If you should have any questions regarding this submittal or require additional information, please contact Mr. Bradley H. Blome at 402-533-7270.

No commitments to the NRC are made in this letter.

Respectfully,



Shane M. Marik
Site Vice President and CNO

SMM/epm
Enclosure 1

c: M. L. Dapas, NRC Regional Administrator, Region IV
C. F. Lyon, NRC Project Manager
S. M. Schneider, NRC Senior Resident Inspector

Omaha Public Power District (OPPD)

Fort Calhoun Station (FCS)

Renewed License Number DPR-40

Site-Specific Spent Fuel Pool Criteria for Fort Calhoun Station
(FCS)

The 50.54(f) letter requested that, in conjunction with the response to NTTF Recommendation 2.1, a seismic evaluation be made of 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 7 that the GMRS exceeds the SSE and concluded that a SFP evaluation is merited for the OPPD/FCS. By letter dated March 18, 2016 (Reference 5) the staff determined that EPRI 3002007148 was an acceptable approach for performing SFP evaluations for plants where the peak spectral acceleration is less than or equal to 0.8g.

The table below lists the criteria from Section 3.3 of EPRI 3002007148 along with data for FCS that confirms applicability of the EPRI 3002007148 criteria and confirms that the SFP is seismically adequate and can retain adequate water inventory for 72 hours in accordance with NTTF 2.1 Seismic evaluation criteria.

SFP Criteria from EPRI 3002007148	Site-Specific Data
Site Parameters	
1. The site-specific GMRS peak spectral acceleration at any frequency should be less than or equal to 0.8g.	The GMRS peak spectral acceleration in FCS letter LIC-14-0047 (Reference 6) as accepted by the NRC in NRC Letter Docket No. 50-285 (Reference 7) is 0.424g, which is $\leq 0.8g$, therefore, this criterion is met.
Structural Parameters	
2. The structure housing the SFP should be designed using an SSE with a peak ground acceleration (PGA) of at least 0.1g.	The SFP is housed in the Auxiliary Building, which is seismically designed to the site SSE with a PGA of 0.17g (Reference 7). The FCS PGA is greater than 0.1g, therefore, this criterion is met.
3. The structural load path to the SFP should consist of some combination of reinforced concrete shear wall elements, reinforced concrete frame elements, post-tensioned concrete elements and/or structural steel frame elements.	The structural load path from the foundation to the SFP consists of reinforced concrete shear walls, since the SFP sits directly on the foundation as shown in Sections 1-1 and 2-2 of Drawing 11405-S-61 (File 16446), therefore, this criterion is met for FCS.
4. The SFP structure should be included in the Civil Inspection Program performed in accordance with Maintenance Rule.	The SFP structure is included in the FCS Civil Inspection Program in accordance with 10 CFR 50.65, which monitors the performance or condition of structures, systems, or components (SSCs) in a manner sufficient to provide reasonable assurance that these SSCs are capable of fulfilling their intended functions (PBD-42, Revision 4, Structures Monitoring item 1.1.2, procedure SE-PM-AE-1001, Revision 15). Therefore, this criterion is met for FCS.

Non-Structural Parameters	
5. To confirm applicability of the piping evaluation in Section 3.2 of EPRI 3002007148, piping attached to the SFP up to the first valve should have been evaluated for the SSE.	Piping attached to the SFP is evaluated to the SSE in accordance with Class I Seismic Criteria in USAR Appendix F, therefore, this criterion is met for FCS. (note: per 1.3 (d) in USAR Appendix F, the Spent Fuel Pool Cooling System is designated as Seismic Class I).
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.	<p>Per Section 9.6.1 of USAR, the piping of the SFP cooling system is so arranged that failure of any pipeline connected to the pool will not drain the pool below the top of the spent fuel racks. As shown by P & ID drawing 11405-M-11 (File 10441), there are 4 pipelines connected to the pool (note: the penetrations for the 4 pipelines connected to the pool are shown in Sections 1-1 of Drawing 11405-S-61). The makeup line enters and the outlet line capped with a strainer exits the pool at Elev. 1034'. The main supply line enters the pool at Elev. 1034' and terminates at Elev. 1031'-7". The secondary drain line is equipped with a normally locked closed manual isolation valve (AC-187) at Elev. 1011'-4" and its piping between the pool wall and this isolation valve is seismically adequate, since the piping of the SFP cooling system is designated as seismic class I and was designed to the SSE. Elev. 1031'-7" is the lowest potential water level if siphoning happens to occur in the SFP cooling system and pipe termination at Elev. 1031'-7" can be considered as an anti-siphoning mechanism.</p> <p>Since the piping of the SFP cooling system cannot lead to rapid drain down due to siphoning; therefore, this criterion is met for FCS.</p> <p>No active anti-siphoning devices are attached to 2-inch or smaller piping with extremely large extended operators, therefore, this criterion is met for FCS.</p>
7. To confirm applicability of the sloshing evaluation in Section 3.2 of EPRI 3002007148, the maximum SFP horizontal dimension (length or width) should be less than 125 ft, the SFP depth should be greater than 36 ft, and the GMRS peak S_a should be $<0.1g$ at frequencies equal to or less than 0.3 Hz.	<p>The FCS SFP has a length of 33'-3", a width of 20'-7" and a depth of 43.5' based on Drawing 11405-S-61; therefore, this criterion is met.</p> <p>The FCS GMRS maximum spectral acceleration in the frequency range less than 0.3 Hz is 0.034g from FCS letter, LIC-14-0047 (Reference 6), which is less than 0.1g, therefore, this criterion is met.</p>

Non-Structural Parameters	
8. To confirm applicability of the evaporation loss evaluation in Section 3.2 of EPRI 3002007148, 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 surface area of the FCS SFP is 684 ft ² , which is greater than 500 ft ² ; and licensed reactor thermal power for FCS is 1500 MWt which is less than 4,000 MWt per unit, therefore, these criteria are met.