



10 CFR 50.54(f)

RS-16-124

August 31, 2016

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dresden Nuclear Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

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 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 (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 (ML15194A015)
3. NEI Letter, Request for Endorsement of Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation (EPRI 3002007148), dated February 23, 2016 (ML16055A017)
4. EPRI 3002007148, Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation, February 2016
5. NRC Letter, Endorsement of Electric Power Research Institute Report 3002007148, "Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation", dated March 17, 2016 (ML15350A158)
6. Exelon Generation Company, LLC Letter to USNRC, Seismic Hazard and Screening Report (Central and Eastern United States (CEUS) Sites), 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, dated March 31, 2014 (RS-14-067) (ML14091A012)

7. Exelon Generation Company, LLC Letter to USNRC, Supplemental Information Regarding Seismic Hazard Risk Evaluation and Seismic Hazard Prioritization Results – 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, dated July 22, 2015 (RS-15-185) (ML15204A088)
8. NRC Letter to Exelon Generation Company, LLC, Dresden Nuclear Power Station, Units 2 and 3, 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 27, 2015 (ML15097A519)
9. 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 spent fuel pool (SFP) integrity evaluations with any actions identified to address any discovered vulnerabilities. By letter dated October 27, 2015 (Reference 2), the NRC transmitted final seismic information request tables which identified that Dresden Nuclear Power Station, Units 2 and 3, is to conduct limited scope SFP evaluations. 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. The reevaluated GMRS, used for the SFP seismic demand, is documented in Reference 6 and endorsed by the NRC by Reference 8. This report supplements the guidance in the Seismic Evaluation Guidance, Screening, Prioritization and Implementation Details (SPID) (Reference 9), 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 Dresden Nuclear Power Station, Units 2 and 3, and that the Dresden Nuclear Power Station, Units 2 and 3, SFPs are seismically adequate in accordance with Near Term Task Force (NTTF) 2.1 Seismic evaluation criteria.

The attachment to this letter provides the data for Dresden Nuclear Power Station, Units 2 and 3, that confirms applicability of the EPRI 3002007148 criteria, confirms that the SFPs are 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.

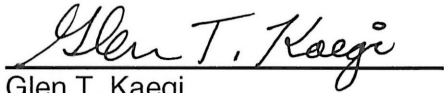
This letter closes Commitment No. 2 of Reference 6.

This letter contains no new regulatory commitments or revisions to existing regulatory commitments.

If you have any questions regarding this report, please contact Ronald Gaston at 630-657-3359.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 31st day of August 2016.

Respectfully submitted,



Glen T. Kaegi
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Site-Specific Spent Fuel Pool Criteria for Dresden Nuclear Power Station,
Units 2 and 3

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station
NRC Project Manager, NRR – Dresden Nuclear Power Station
Mr. Nicholas DiFrancesco, NRR/JLD/JHMB, NRC
Illinois Emergency Management Agency - Division of Nuclear Safety

ATTACHMENT

Site-Specific Spent Fuel Pool Criteria for
Dresden Nuclear Power Station, Units 2 and 3

The 10 CFR 50.54(f) letter requested that, in conjunction with the response to Near Term Task Force (NTTF) Recommendation 2.1, a seismic evaluation be made of the Dresden Station, Units 2 & 3 spent fuel pool (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 P and T that the GMRS exceeds the SSE and concluded that a SFP evaluation is merited for the Dresden Nuclear Power Station, Units 2 and 3. By letter dated March 17, 2016, (Reference R) the NRC 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 (Reference Q) along with data for Dresden Nuclear Power Station, Units 2 and 3, that confirms applicability of the EPRI 3002007148 (Reference Q) 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 for Dresden Station, Units 2 & 3, in Reference S (Table 2.4-1) as accepted by the NRC in Reference T is 0.59g, 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 Dresden Station, Units 2 & 3 SFP is housed in the Reactor Building, which is seismically designed to the site SSE with a PGA of 0.20g per Reference S, Section 3.1. The Dresden Nuclear Power Station, Units 2 and 3 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 Dresden Station, Units 2 & 3 structural load path from the foundation to the SFP consists of reinforced concrete shear walls, slabs, and framing members (References B-J); therefore, this criterion is met.

SFP Criteria from EPRI 3002007148	Site-Specific Data
<p>4. The SFP structure should be included in the Structural Monitoring Program performed in accordance with Maintenance Rule.</p>	<p>The SFP structure is included in the Dresden Station, Units 2 and 3, Structures Monitoring Program (References M & N) in accordance with 10 CFR 50.65, which monitors the performance or condition of structures, systems, and components (SSCs) in a manner sufficient to provide reasonable assurance that these SSCs are capable of fulfilling their intended functions. Therefore, this criterion is met.</p>

SFP Criteria from EPRI 3002007148	Site-Specific Data
Non-Structural Parameters	
<p>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.</p>	<p>Piping attached to the Dresden Station, Units 2 & 3 SFP are the fuel pool cooling system and the fuel pool gates drain line, as shown in References K & L. The fuel pool gates drain line are safety related up to the first isolation valves (References K & L) and have been evaluated for the SSE (References V & W and Dresden equipment database). The fuel pool cooling system is non-safety related (Note 2 on References K & L) but is seismically supported for 2 over 1 concern for the SSE (References V & W and Dresden equipment database). The attached SFP piping meet the requirements of Regulatory Guide 1.29 (Reference X), as documented in References V and W, which requires seismic Category I requirements extend to the first seismic restraint beyond the defined boundaries (i.e. SFP). Interface between seismic Category I and non-seismic Category I features are designed to seismic Category I requirements to prevent potential damage to safety related components from breakage of the non-seismic piping or leakage of piping contents onto safety related components or impact damage to safety related components adjacent to it. This was evaluated under SEP Topic III-6 (References V & W) which evaluated these piping systems as a whole including the piping attached to the SFP up to the first valve. Therefore, this criterion is met for Dresden Nuclear Power Station, Units 2 and 3.</p>

SFP Criteria from EPRI 3002007148	Site-Specific Data
<p>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>	<p>All penetrations into the pool are located above a fixed height from the bottom such that there must always be a safe level of water above the fuel (Section 9.1.3.3 of Reference A).</p> <p>Two 6-inch diameter spent fuel pool cooling system return lines to the spent fuel pool each have openings in the pipe about 6 inches below the pool surface to act as anti-syphon devices (Section 9.1.3.3 of Reference A and References K & L).</p> <p>As described, anti-siphoning devices are installed on all SFP piping that could lead to siphoning; therefore, this criterion is met for Dresden Nuclear Power Station, Units 2 and 3.</p> <p>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 Dresden Nuclear Power Station, Units 2 and 3 (References K & L).</p>
<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 Sa should be <0.1g at frequencies equal to or less than 0.3 Hz.</p>	<p>The Dresden Nuclear Power Station, Units 2 and 3, SFP has a length of approximately 41 ft, a width of approximately 33 ft and a depth of approximately 39 ft based on Section 9.1.2.2.3 of Reference A and References D & J; therefore, this criterion is met.</p> <p>The Dresden Nuclear Power Station, Units 2 and 3, GMRS maximum spectral acceleration in the frequency range equal to or less than 0.3 Hz is 0.0412 g from Reference S (Table 2.4-1), which is less than 0.1g; therefore, this criterion is met.</p>
<p>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 ft² and the licensed reactor core thermal power should be less than 4,000 MWt per unit.</p>	<p>The surface area of the Dresden Nuclear Power Station, Units 2 and 3, SFP is approximately 1,353 ft² (41 ft length x 33 ft width) per unit (References D & J), which is greater than 500 ft²; and licensed reactor thermal power for Dresden Nuclear Power Station, Units 2 and 3 is 2957 MWt per unit (Reference U) which is less than 4,000 MWt per unit; therefore, these criteria are met.</p>

Attachment References:

- A. Dresden Nuclear Power Station Updated Final Safety Analysis Report (UFSAR), Revision 11.
- B. Dresden Unit 2 Drawing B-208, Revision S, Reactor Building Framing Plan EL 613'-0" South Area.
- C. Dresden Unit 2 Drawing B-209, Revision N, Reactor Building Framing Plan EL 613'-0" North Area.
- D. Dresden Unit 2 Drawing B-218, Revision P, Reactor Building Framing Section D-D Upper Area.
- E. Dresden Unit 2 Drawing B-224, Revision M, Reactor Building Framing Section G-G Upper Area.
- F. Dresden Unit 3 Drawing B-638, Revision H, Reactor Building Framing Plan EL 613'-0" South Area.
- G. Dresden Unit 3 Drawing B-639, Revision D, Reactor Building Framing Plan EL 613'-0" North Area.
- H. Dresden Unit 3 Drawing B-648, Revision 0, Reactor Building Framing Section D-D Upper Area.
- J. Dresden Unit 3 Drawing B-654, Revision E, Reactor Building Framing Section G-G Upper Area.
- K. Dresden Unit 2 Drawing M-31, Revision BQ, Diagram of Fuel Pool Cooling Piping.
- L. Dresden Unit 3 Drawing M-362, Revision BF, Diagram of Fuel Pool Cooling Piping.
- M. Exelon Procedure ER-AA-450, Revision 5, Structures Monitoring.
- N. Exelon Procedure ER-DR-450-1001, Revision 0, Dresden Structures Monitoring Instructions.
- P. 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 (ML15194A015)
- Q. EPRI 3002007148, Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation, February 2016
- R. NRC Letter, Endorsement of Electric Power Research Institute Report 3002007148, "Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation", dated March 17, 2016 (ML15350A158)
- S. Exelon Generation Company, LLC Letter to USNRC, Seismic Hazard and Screening Report (Central and Eastern United States (CEUS) Sites), 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, dated March 31, 2014 (RS-14-067) (ML14091A012)

- T. NRC Letter to Exelon Generation Company, LLC, Dresden Nuclear Power Station, Units 2 and 3, 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 27, 2015 (ML15097A519)
- U. Dresden Nuclear Power Station, Units 2 and 3, Renewed Facility Operating License Nos. DPR-19 and DPR-25
- V. SEP Safety Topic III-6, Seismic Design Consideration and III-11, Component Integrity – Dresden Nuclear Power Station Unit No. 2, Letter to Mr. L. DelGeorge, dated June 30, 1982
- W. Systematic Evaluation Program, Topic III-6, Structural Integrity of Reactor Pressure Vessel – Dresden Nuclear Power Station, Unit 2 (TAC No. M72906), Letter to Mr. D. L. Farrar, dated September 10, 1993
- X. Regulatory Guide 1.29, Revision 3, Seismic Design Classification (ML003739983)