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10 CFR 50.54(f)

LR-N16-0094

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

Salem Generating Station Units 1 and 2
Renewed Facility Operating License Nos. DPR-70 and DPR-75
NRC Docket Nos. 50-272 and 50-311

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, 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 transmitting 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 endorsing EPRI 3002007148, dated March 17, 2016, ADAMS Accession Number ML15350A158

6. PSEG Letter LR-N13-0205, "Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident - Base Case Velocity Profiles with Supporting Subsurface Materials and Properties," dated September 10, 2013, ADAMS Accession No. ML13253A391
7. NRC Letter, "Salem Nuclear Generating Station, Units 1 and 2 - 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 (CAC Nos. MF3922 and MF3923)," dated February 18, 2016, ADAMS Accession Number ML16041A033
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
9. PSEG Letter LR-N14-0051, "PSEG Nuclear LLC's 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 the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident – Salem Generating Station," dated March 28, 2014, ADAMS Accession No. ML14090A043

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) seismic evaluations. By letter dated October 27, 2015 (Reference 2), the NRC transmitted final seismic information request tables which identified that PSEG is to conduct a limited scope SFP evaluation for Salem Generating Station (SGS), Units 1 and 2. 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 SGS Units 1 and 2, and that the SGS Units 1 and 2 SFPs are seismically adequate in accordance with NTTF 2.1 seismic evaluation criteria.

Attachment 1 to this letter provides the data for SGS Units 1 and 2 that confirms applicability of the EPRI 3002007148 criteria, confirms that the SFPs are seismically adequate, and provides the requested information in response to Enclosure 1, Item (9)

of the 50.54(f) letter associated with NTTF Recommendation 2.1 seismic evaluation criteria.

This transmittal completes Commitment No. 4 from Reference 9. There are no regulatory commitments contained in this letter. If you have any questions or require additional information, please do not hesitate to contact Mr. Lee Marabella at 856-339-1208.

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

Executed on 12/6/16
(Date)

Sincerely,

A handwritten signature in black ink, appearing to read 'C. McFeaters', written over a horizontal line.

Charles V. McFeaters
Site Vice President
Salem Generating Station

Attachment 1: Site-Specific Spent Fuel Pool Criteria for Salem Generating Station,
Units 1 and 2

cc: Mr. Daniel Dorman, Administrator, Region I, NRC
Ms. Carleen J. Parker, Project Manager, NRC/NRR/DORL
Mr. Nicholas DiFrancesco, Project Manager, NRC/NRR/JLD
Mr. Patrick Finney, NRC Senior Resident Inspector, Salem
Mr. Patrick Mulligan, Chief, NJBNE
Mr. Thomas Cachaza, Salem Commitment Tracking Coordinator
Mr. Lee Marabella, PSEG Corporate Commitment Coordinator

(The bcc list should not be submitted as part of the DCD submittal – remove this page prior to submittal and make the bcc distribution accordingly)

bcc: President and Chief Nuclear Officer
Vice President – Salem
Plant Manager – Salem
Senior Director – Regulatory Operations
Director – Regulatory Compliance
Manager – Emergency Preparedness
BDB Response Manager
Manager - Licensing
Document Control

Attachment 1

Site-Specific Spent Fuel Pool Criteria for Salem Generating Station,
Units 1 and 2

Site-Specific Spent Fuel Pool Criteria for Salem Generating Station, Units 1 and 2

The 50.54(f) letter (Reference 1)¹ requested that, in conjunction with the response to NTTF Recommendation 2.1, a seismic evaluation be made of the 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 2 and 7 that the GMRS exceeds the SSE and concluded that a SFP evaluation is merited for the Salem Generating Station (SGS), Units 1 and 2. By letter dated March 17, 2016 (Reference 5), the staff determined that EPRI 3002007148 was an acceptable approach for performing SFP evaluations for plants where the peak spectral acceleration (Sa) 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 SGS Units 1 and 2 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 Sa at any frequency should be less than or equal to 0.8g.	The GMRS peak Sa described in the site-specific GMRS submittal (Reference 9) as accepted by the NRC (Reference 7) is 0.33g, which is $\leq 0.8g$; therefore, this criterion is met for SGS Units 1 and 2.
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 Fuel Handling Building, which is seismically designed to the site SSE with a PGA of 0.2g. The SGS PGA is greater than 0.1g; therefore, this criterion is met for SGS Units 1 and 2.

¹ References in this attachment are listed in the transmittal letter.

SFP Criteria from EPRI 3002007148	Site-Specific Data
<p>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.</p>	<p>The structural load path from the foundation to the SFP consists of an 11 ft. thick reinforced concrete mat with reinforced concrete walls varying in width from 4 ft. to 9.6 ft. with a stainless steel liner. The walls go from the top of the foundation mat, 11 ft. below grade to 30 ft. above grade, as shown on drawing 201082, Revision 5, "Salem Nuclear Generating Station No. 1 Unit - Fuel Handling Area Sections F-F & G-G." Therefore, this criterion is met for SGS Units 1 and 2.</p>
<p>4. The SFP structure should be included in the Civil Inspection Program performed in accordance with Maintenance Rule.</p>	<p>The SGS SFP structures are included in PSEG procedure ER-AA-310-101, "Condition Monitoring of Structures," 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. Therefore, this criterion is met for SGS Units 1 and 2.</p>
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 SFP is evaluated to the SSE as described in UFSAR Section 9.1.3.3; therefore, this criterion is met for SGS Units 1 and 2.</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>As described in UFSAR Section 9.1.3.3, the spent fuel pool cooling suction connection enters near the normal water level so that the pool cannot be gravity-drained. The cooling water return lines contain anti-siphon holes to prevent the possibility of gravity draining the pool.</p> <p>As described, anti-siphoning devices are installed on all SFP piping that could lead to siphoning; therefore, this criterion is met for SGS Units 1 and 2. There are no anti-siphoning devices attached to 2-inch or smaller piping with extremely large extended operators; therefore, this criterion is met for SGS Units 1 and 2.</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 S_a should be $<0.1g$ at frequencies equal to or less than 0.3 Hz.</p>	<p>The Salem SFP has a length of 37 ft, a width of 28.5 ft. and a depth of 40.5 ft from the top of the stainless steel liner at base elevation 89.5 ft. to the top of the liner at elevation 130 ft. based on Drawing 204836, Revision 11.</p> <p>The Salem GMRS maximum S_a in the frequency range less than or equal to 0.3 Hz is 0.0344g from Reference 6 which is less than 0.1g.</p> <p>Therefore, these criteria are met for SGS Units 1 and 2.</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 Salem SFP is 1054.5 ft², which is greater than 500 ft²; and licensed reactor thermal power for Salem is 3459 MWt per unit which is less than 4,000 MWt per unit, therefore, these criteria are met for SGS Units 1 and 2.</p>