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PNP 2016-058

November 29, 2016

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
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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

Palisades Nuclear Plant
Docket 50-255
Renewed Facility Operating License No. DPR-20

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 Package Accession Number ML12056A046)
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. Nuclear Energy Institute letter, *Request for Endorsement of "Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation (EPRI 3002007148)*," dated February 23, 2016 (ADAMS Accession Number ML16055A017)
4. Electric Power Research Institute Report Number 3002007148, *Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation*, February 2016 (ADAMS Accession Number ML16055A021)

5. NRC letter, *Endorsement of Electric Power Research Institute Report 3002007148, "Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation,"* dated March 17, 2016 (ADAMS Accession Number ML15350A158)
6. Entergy Nuclear Operations, Inc. letter, PNP 2014-033, *Palisades Nuclear Plant Seismic Hazard and Screening Report (CEUS Sites), 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,* dated March 31, 2014 (ADAMS Accession Number ML14090A069)
7. NRC letter, *Palisades Nuclear Plant - 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 (TAC No. MF3786)*, dated April 30, 2015 (ADAMS Accession Number ML15098A032)
8. Electric Power Research Institute Report Number 1025287, *Seismic Evaluation Guidance: Screening, Prioritization and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic*, dated November 2012 (ADAMS Accession Number ML12333A170)

Dear Sir or Madam:

On March 12, 2012 (Reference 1), the Nuclear Regulatory Commission (NRC) issued a 50.54(f) letter to all power reactor licensees and holders of construction permits in active or deferred status. Enclosure 1, titled "Recommendation 2.1: Seismic," Item (9) in 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 Entergy Nuclear Operations, Inc. (ENO) is to conduct a limited scope SFP evaluation for Palisades Nuclear Plant (PNP). By Reference 3, Nuclear Energy Institute (NEI) submitted an Electric Power Research Institute (EPRI) Report Number 3002007148, entitled "Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation," (Reference 4) for NRC review and endorsement. NRC endorsement of EPRI Report Number 3002007148 was provided in Reference 5.

EPRI Report Number 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,

"Site-Specific Spent Fuel Pool Criteria for Low GMRS Sites," of EPRI Report Number 3002007148 lists the parameters to be verified to confirm that the results of the report are applicable to PNP and that the PNP SFP is seismically adequate in accordance with the Near-Term Task Force (NTTF) Recommendation 2.1 seismic evaluation criteria.

The attachment to this letter provides the data for the PNP that confirms applicability of the EPRI Report Number 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.

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

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 29, 2016.

Sincerely,

CFA/jse

Attachment: Site-Specific Spent Fuel Pool Criteria for Palisades Nuclear Plant

cc: Director of Office of Nuclear Regulation, USNRC
Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

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ATTACHMENT

SITE-SPECIFIC SPENT FUEL POOL CRITERIA

FOR PALISADES NUCLEAR PLANT

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SITE-SPECIFIC SPENT FUEL POOL CRITERIA FOR PALISADES NUCLEAR PLANT

The Near-Term Task Force (NTTF) 50.54(f) letter 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, licensees 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 Palisades Nuclear Plant (PNP). By letter dated March 17, 2016 (Reference 5), the staff determined that Electric Power Research Institute (EPRI) Report Number 3002007148 was an acceptable approach for performing SFP evaluations for plants in which the peak spectral acceleration is less than or equal to 0.8g.

The table below lists the criteria from Section 3.3, "Site-Specific Spent Fuel Pool Criteria for Low GMRS Sites," of EPRI Report Number 3002007148 along with data for PNP that confirms applicability of the EPRI Report Number 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 Report Number 3002007148	**PNP SFP 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 PNP site GMRS peak spectral acceleration as reported in Reference 6 as accepted by the NRC in Reference 7 is 0.56g, which is less than or equal to 0.8g; therefore, this criterion is met for PNP.
Structural Parameters	
1. 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 0.2g. The PNP PGA is greater than 0.1g; therefore, this criterion is met for PNP.
2. 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 Auxiliary Building foundation to the SFP consists of reinforced concrete floors and shear walls from the 590 foot elevation to the base of the SFP. The SFP is wholly contained within the reinforced concrete structure of the Auxiliary Building as shown in Updated Final Safety Analysis Report (UFSAR) Figures 1-5 thru 1-8; therefore, this criterion is met for PNP.

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SITE-SPECIFIC SPENT FUEL POOL CRITERIA FOR PALISADES NUCLEAR PLANT

SFP Criteria from EPRI Report Number 3002007148	PNP SFP Site-Specific Data
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 PNP Structural Monitoring Inspection Program in accordance with 10 CFR 50.65, *Requirements for monitoring the effectiveness of maintenance at nuclear power plants*, 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 PNP.
Non-Structural Parameters	
1. 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 PNP Specification M-195(Q), *Technical Requirements for the Design and Analysis of Safety Related Piping and Instrument Tubing*; therefore, this criterion is met for PNP.
2. 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.	An anti-siphon device is installed on the SFP cooling system supply piping, which consists of a short section of 1-1/2 inch pipe connected to the 12-inch supply piping. The elevation of the open end of the 1-1/2 inch pipe is slightly below the normal SFP water level which prevents any significant backflow through the supply line piping should that pipe fail in an area below the discharge elevation in the pool. The SFP cooling suction piping, as well as all other piping entering the pool, is located near the top of the pool, which obviates the need for an anti-siphon device since a pipe break cannot contribute to draining of the pool. As described, the anti-siphoning device is installed on the one SFP pipe that could lead to siphoning; therefore, this criterion is met for PNP. There are no valves or operators on this anti-siphoning device. The pipe is inactive and benign. 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 PNP.

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SFP Criteria from EPRI Report Number 3002007148	PNP SFP Site-Specific Data
3. 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.	The PNP main SFP has a length of 38.75 ft, a width of 14.67 ft and a depth of 38 ft, and the connected North Tilt Pit portion of the pool is 21 ft long, 5 ft wide, and 39 ft deep based on PNP UFSAR Figures 1-5 thru 1-8; therefore, this criterion is met. The PNP GMRS maximum spectral acceleration in the frequency range less than 0.3 Hz is 0.04g from Reference 6, which is less than 0.1g; therefore, this criterion is met.
4. 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 PNP main SFP is 568.5 ft^2, which is greater than 500 ft^2. Including the North tilt pit and its connecting channel to the main pool, the total surface area is 685 ft^2. Licensed reactor thermal power for PNP is 2565.4 MWt which is less than 4,000 MWt; therefore, this criterion is met.

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 Package Accession Number ML12056A046).
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5. NRC letter, *Endorsement of Electric Power Research Institute Report 3002007148, "Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation*," dated March 17, 2016 (ADAMS Accession Number ML15350A158).