Exelon Generation

10 CFR 50.54(f)

RS-16-123

August 31, 2016

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

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Renewed Facility Operating License Nos. DPR-53 and DPR-69
NRC Docket Nos. 50-317 and 50-318

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. Constellation Energy Nuclear Group, 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 (ML14099A196)

7. NRC Letter to Exelon Generation Company, LLC, Calvert Cliffs Nuclear Power Plant, 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, dated July 8, 2015 (ML15153A073)
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. Seismic Walkdown Report in response to the 50.54(f) information request regarding Fukushima near-term task force recommendation 2.3: Seismic for Calvert Cliffs Nuclear Power Plant Unit 1, dated November 27, 2012 (ML12339A349)
10. Constellation Energy Nuclear Group, LLC Letter to USNRC, Supplement to Response to Request for Information: Near-Term Task Force Recommendation 2.1, Seismic Reevaluation dated June 28, 2013 (ML13190A471)

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 Calvert Cliffs Nuclear Power Plant, Units 1 and 2, 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. The reevaluated GMRS, used for the SFP seismic demand, are documented in Reference 6 and endorsed by the NRC by Reference 7. 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 Calvert Cliffs Nuclear Power Plant, Units 1 and 2, and that the Calvert Cliffs Nuclear Power Plant, Units 1 and 2, SFP is seismically adequate in accordance with Near Term Task Force (NTTF) 2.1 Seismic evaluation criteria.

The attachment to this letter provides the data for Calvert Cliffs Nuclear Power Plant, Units 1 and 2, 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.

This letter closes the commitment related to CCNPP completing a SFP evaluation given in Attachment 1 of Constellation Energy Nuclear Group, LLC Letter to USNRC, Supplement to Response to Request for Information: Near-Term Task Force Recommendation 2.1, Seismic Reevaluation dated June 28, 2013 (Reference 10).

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,

James Barstow
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Site-Specific Spent Fuel Pool Criteria for Calvert Cliffs Nuclear Power Plant, Units 1 and 2

cc: Regional Administrator - NRC Region I
NRC Senior Resident Inspector – Calvert Cliffs Nuclear Power Plant
NRC Project Manager, NRR – Calvert Cliffs Nuclear Power Plant
Mr. Nicholas DiFrancesco, NRR/JLD/JHMB, NRC
S. Gray, MD-DNR

ATTACHMENT

Site-Specific Spent Fuel Pool Criteria for Calvert Cliffs Nuclear Power Plant, Units 1 and 2

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 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 A and B that the GMRS exceeds the SSE and concluded that a SFP evaluation is merited for the Calvert Cliffs Nuclear Power Plant, Units 1 and 2. By letter dated March 17, 2016 (Reference C) 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 along with data for Calvert Cliffs Nuclear Power Plant, 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 spectral acceleration at any frequency should be less than or equal to 0.8g.	The GMRS peak spectral acceleration in Reference D (Table 2.4-1), as accepted by the NRC in Reference B, is 0.204g, which is ≤ 0.8g; therefore, this criterion is met for Calvert Cliffs Nuclear Power Plant, 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 Auxiliary Building, which is seismically designed to the site SSE with a PGA of 0.15g per Reference D, Section 3.1. The Calvert Cliffs Nuclear Power Plant, Units 1 and 2 PGA is greater than 0.1g; therefore, this criterion is met for Calvert Cliffs Nuclear Power Plant, Units 1 and 2.
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 SFP is located within the Auxiliary Building which is a reinforced concrete structure and the mat foundation supports a structural steel and reinforced concrete frame. The structural load path from the foundation to the SFP consists of reinforced concrete walls and floors (References M-O); therefore, this criterion is met for Calvert Cliffs Nuclear Power Plant, Units 1 and 2.

SFP Criteria from EPRI 3002007148	Site-Specific Data
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 Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Structures Monitoring Program (Reference F) 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 Calvert Cliffs Nuclear Power Plant, Units 1 and 2.
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 classified as Category I piping and is evaluated to the SSE in accordance with B31.1 '1967, Power Piping', or B31.7 '1969, Nuclear Power Piping' and/or ASME Code Case N-411, 'Alternative Damping Values for Seismic Analysis of Analyses for reconciliation work on new or existing systems (Reference E, Section 5A.3.2.2); therefore, this criterion is met for Calvert Cliffs Nuclear Power Plant, Units 1 and 2.

SFP Criteria from EPRI 3002007148	Site-Specific Data
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.	CCNPP uses siphon break gooseneck vent lines to prevent siphoning of the Spent Fuel Pool Cooling (SFPC) system due to system piping failing outside of the pool structure. The siphon break lines are fabricated from 1-1/2 inch stainless steel pipe. The siphon break vent lines on the SFPC low suction piping are equipped with hand valves for isolation. These valves are normally locked open, and verified locked open semi-annually via an Operations Performance Evaluation. Per procedure Operations Performance Evaluation (PE) 1-187-3-O-SA, Locked Valve Checks ABO - 27', 45' & 69', (Reference G) the suction pipe gooseneck vent isolation valves are checked semiannually. This PE verifies that the isolation valves for 21 and 11 SFP Low Suction Siphon Breakers 0-SFP-162 and 0-SFP-168 are locked open in accordance with Operating Instruction (OI) OI-24A, Spent Fuel Pool Cooling Pump and Cooler Operation on Spent Fuel Pool (Reference H). As described, anti-siphoning devices are installed on all SFP piping that could lead to siphoning; therefore, this criterion is met for Calvert Cliffs Nuclear Power Plant, Units 1 and 2. CCNPP anti-siphoning devices are passive therefore, no active anti-siphoning devices are attached to 2-inch or smaller piping with extremely large extended operators; therefore, this criterion is met for Calvert Cliffs Nuclear Power Plant, Units 1 and 2.
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.	The Calvert Cliffs Nuclear Power Plant, Units 1 and 2, SFP has an approximate length of 113 ft, a width of 25 ft and a depth of 40 ft based on Reference J and K; therefore, this criterion is met for Calvert Cliffs Nuclear Power Plant, Units 1 and 2. The Calvert Cliffs Nuclear Power Plant, Units 1 and 2 GMRS maximum spectral acceleration in the frequency range less than 0.3 Hz is 0.0341g from Reference D, Section 2.4 which is less than 0.1g; therefore, this criterion is met for Calvert Cliffs Nuclear Power Plant, Units 1 and 2.

SFP Criteria from EPRI 3002007148	Site-Specific Data
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 Calvert Cliffs Nuclear Power Plant, Units 1 and 2 Spent Fuel Pool is 2825 ft^2 (Reference J and K), which is greater than 500 ft^2; and licensed reactor thermal power for Calvert Cliffs Nuclear Power Plant, Units 1 and 2 is 2737 MWt (Reference L) per unit which is less than 4,000 MWt per unit; therefore, these criteria are met for Calvert Cliffs Nuclear Power Plant, Units 1 and 2.

References:

A. 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)

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C. NRC Letter, Endorsement of Electric Power Research Institute Report 3002007148, "Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation", dated March 17, 2016 (ML15350A158)

D. Constellation Energy Nuclear Group, 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 (ML14099A196)

E. Calvert Cliffs Updated Final Safety Analysis Report (UFSAR), Revision 48

F. MN-1-319, Revision 012, System & Structures Walkdowns

G. PE 1-187-03-O-SA, Revision 0602, Locked Valve Checks ABO - 27', 45' & 69'

H. OI-24A, Revision 011, Spent Fuel Pool Cooling Pump and Cooler Operation on Spent Fuel Pool

J. "Aux Bldg SFP Liner Plan and Sections", Drawing 61706SH0001, Revision 18

K. "Aux Bldg SFP Liner Sections and Details", Drawing 61707SH0002, Revision 19

L. Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Renewed Facility Operating License Nos. DPR-53 and DPR-69

M. Foundations & Floor Plan at Elevations -10'-0" & -15'-0", Drawing 61-666-E, Revision 8

N. Auxiliary Building Foundation Sections and Details, Drawing 61-668, Revision 5

O. Auxiliary Building Foundation Sections and Details", Drawing 66-669, Revision 4