

December 21, 2016

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

Serial No. 16-427
NRA/DEA R0
Docket Nos. 50-336/423
License Nos. DPR-65
NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNITS 2 AND 3
RESPONSE TO MARCH 12, 2012 INFORMATION REQUEST
SPENT FUEL POOL SEISMIC EVALUATION FOR RECOMMENDATION 2.1

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 Nos. ML12056A046 and 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 No. ML15194A015].
3. EPRI Report 3002007148, *Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation*, February 2016.
4. Dominion Nuclear Connecticut, Inc. Letter, "Millstone Power Station Units 2 and 3, Response to March 12, 2012 Information Request – Seismic Hazard and Screening Report (CEUS Sites) for Recommendation 2.1," dated March 31, 2014 [ADAMS Accession No. ML14092A417].
5. NRC Letter, "Millstone 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 (TAC Nos. MF3968 and MF3969)," dated December 15, 2015 [ADAMS Accession No. ML15328A268].
6. EPRI Report 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 [ADAMS Accession No. ML12333A170].

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Reference 1 to all power reactor licensees and holders of construction permits in active or deferred status. Enclosure 1, Item (9), of Reference 1 requested each addressee to provide spent fuel pool (SFP) seismic evaluations. By letter dated October 27, 2015 (Reference

ADID
NRK

Commitments made in this letter: No new regulatory commitments.

Attachments:

1. Spent Fuel Pool Data for Millstone Unit 2
2. Spent Fuel Pool Data for Millstone Unit 3

cc: U.S. Nuclear Regulatory Commission
Region I
2100 Renaissance Blvd
Suite 100
King of Prussia, PA 19406-2713

Richard V. Guzman
Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North, Mail Stop 08 C 2
11555 Rockville Pike
Rockville, MD 20852-2738

NRC Senior Resident Inspector
Millstone Power Station

50.54f_Seismic.Resource@nrc.gov

ATTACHMENT 1

SPENT FUEL POOL DATA FOR MILLSTONE UNIT 2

**MILLSTONE POWER STATION UNIT 2
DOMINION NUCLEAR CONNECTICUT, INC.**

Spent Fuel Pool Data for Millstone Unit 2

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 (Reference 1), Enclosure 1, Item (9), requested each addressee, for which the ground motion response spectrum (GMRS) exceeds the safe shutdown earthquake (SSE) in the 1 to 10 Hz frequency range, to provide a spent fuel pool (SFP) seismic evaluation in response to NTTF Recommendation 2.1: Seismic. Specifically, plants were requested to consider "all seismically induced failures that can lead to draining of the SFP."

EPRI Report 3002007148 (Reference 2) provides guidance for the limited scope SFP seismic evaluation. The Millstone Unit 2 SFP has been evaluated consistent with the guidance provided in Reference 2. The table below lists the criteria from Section 3.3 of Reference 2 along with data for Millstone Unit 2 that confirms applicability of the EPRI Report 3002007148 criteria. The table 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.

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
2. EPRI Report 3002007148, *Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation*, February 2016
3. Dominion Nuclear Connecticut, Inc. Letter, "Millstone Power Station Units 2 and 3, Response to March 12, 2012 Information Request – Seismic Hazard and Screening Report (CEUS Sites) for Recommendation 2.1," dated March 31, 2014
4. NRC Letter, "Millstone 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 (TAC Nos. MF3968 and MF3969)," dated December 15, 2015

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 the Seismic Hazard and Screening Report (Reference 3), as accepted by the NRC in the Staff Assessment (Reference 4), is 0.4217g, 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 a seismic Category I structure designed to the SSE. Reference 3, Table 3.1.1-1 gives a tabular version of the design spectra. The Millstone Power Station Unit 2 SSE PGA is 0.17g, which 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 in moment resistant frames and shear walls. The walls are nominally 72 inches thick with #11 rebar spaced at 9 inches on center. The pool is 42 feet long by 25 feet wide by 41 feet deep with a nominal level of 38 feet of water. The bottom slab is 5 feet thick and reinforcing is #14 rebar at 9 inches on center. Therefore, the structural load path to the SFP consists of reinforced concrete elements and this criterion is met for Millstone Power Station Unit 2.
4. The SFP structure should be included in the Civil Inspection Program performed in accordance with Maintenance Rule.	The Auxiliary Building, which contains the SFP, is included in the Condition Monitoring of Structures Program (Civil Inspection Program) performed in accordance with 10 CFR 50.65, Maintenance Rule. Inspections of the structure are intended to ensure long term functionality. Therefore, this criterion is met.

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 SFP, which is part of the SFP cooling system, is seismic Category I up to the first valve and is evaluated to the SSE. Therefore, this criterion is met.</p>
<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>Passive anti-siphoning devices are installed on SFP piping that could lead to siphoning of the pool inventory.</p> <p>Additionally, there are no anti-siphoning devices with extremely large extended operators attached to 2-inch or smaller piping.</p> <p>Therefore, this criterion is met.</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 125ft, the SFP depth should be greater than 36ft, and the GMRS peak Sa should be < 0.1g at frequencies equal to or less than 0.3Hz.</p>	<p>The SFP has a length of 42 feet, a width of 25 feet and a depth of 41 feet with a nominal water level of 38 feet. Therefore, this criterion is met.</p> <p>The Millstone Power Station GMRS maximum spectral acceleration in the frequency range equal to or less than 0.3Hz is 0.02g (Reference 3, 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 500ft² and the licensed reactor core thermal power should be less than 4000MWt per unit.</p>	<p>The surface area of the SFP is 1050 ft², which is greater than 500 ft². The licensed reactor core thermal power for Millstone Power Station Unit 2 is 2700MWt, which is less than 4000MWt per unit. Therefore, these criteria are met.</p>

ATTACHMENT 2

SPENT FUEL POOL DATA FOR MILLSTONE UNIT 3

**MILLSTONE POWER STATION UNIT 3
DOMINION NUCLEAR CONNECTICUT, INC.**

Spent Fuel Pool Data for Millstone Unit 3

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 (Reference 1), Enclosure 1, Item (9), requested each addressee, for which the ground motion response spectrum (GMRS) exceeds the safe shutdown earthquake (SSE) in the 1 to 10 Hz frequency range, to provide a spent fuel pool (SFP) seismic evaluation in response to NTTF Recommendation 2.1: Seismic. Specifically, plants were requested to consider "all seismically induced failures that can lead to draining of the SFP."

EPRI Report 3002007148 (Reference 2) provides guidance for the limited scope SFP seismic evaluation. The Millstone Unit 3 SFP has been evaluated consistent with the guidance provided in Reference 2. The table below lists the criteria from Section 3.3 of Reference 2 along with data for Millstone Unit 3 that confirms applicability of the EPRI Report 3002007148 criteria. The table 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.

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
2. EPRI Report 3002007148, *Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation*, February 2016
3. Dominion Nuclear Connecticut, Inc. Letter, "Millstone Power Station Units 2 and 3, Response to March 12, 2012 Information Request – Seismic Hazard and Screening Report (CEUS Sites) for Recommendation 2.1," dated March 31, 2014
4. NRC Letter, "Millstone 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 (TAC Nos. MF3968 and MF3969)," dated December 15, 2015

SFP Criteria from EPRI 3002007148	Site-Specific Data
Site Parameters	
<p>1. The site-specific GMRS peak spectral acceleration at any frequency should be less than or equal to 0.8g.</p>	<p>The GMRS peak spectral acceleration in the Seismic Hazard and Screening Report (Reference 3), as accepted by the NRC in the Staff Assessment (Reference 4), is 0.4217g, which is $\leq 0.8g$. Therefore, this criterion is met.</p>
Structural Parameters	
<p>2. The structure housing the SFP should be designed using an SSE with a peak ground acceleration (PGA) of at least 0.1g.</p>	<p>The SFP is housed in the Fuel Building, which is a Seismic Category I structure designed to the SSE. Reference 3, Table 3.1.1-2 gives a tabular version of the design spectra. The Millstone Power Station Unit 3 SSE PGA is 0.17g, which is greater than 0.1g. Therefore, this criterion is met.</p>
<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 reinforced concrete in moment resistant frames and shear walls. The pool walls are nominally 72 inches thick with #11 rebar spaced at 12 inches on center. The pool is 'L' shaped with a maximum length of 52 feet 6 inches and a maximum width of 38 feet, and 41 feet 1 inch deep with a nominal water level of 38 feet. The bottom slab is 8 feet thick and reinforcing is #11 rebar at 12 inches on center. Therefore, the structural load path to the SFP consists of reinforced concrete elements and this criterion is met.</p>
<p>4. The SFP structure should be included in the Civil Inspection Program performed in accordance with Maintenance Rule.</p>	<p>The Fuel Building, which contains the SFP, is included in the Condition Monitoring of Structures Program (Civil Inspection Program) performed in accordance with 10 CFR 50.65, Maintenance Rule. Inspections of the structure are intended to ensure long term functionality. 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 SFP, which is part of the SFP cooling and service water makeup systems, is seismic Category I up to the first valve and is evaluated to the SSE. Therefore, this criterion is met.</p>
<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>Passive anti-siphoning devices are installed on SFP piping that could lead to siphoning of the pool inventory.</p> <p>Additionally, there are no anti-siphoning devices with extremely large extended operators attached to 2-inch or smaller piping.</p> <p>Therefore, this criterion is met.</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 125ft, the SFP depth should be greater than 36ft, and the GMRS peak Sa should be < 0.1g at frequencies equal to or less than 0.3Hz.</p>	<p>The SFP is 'L' shaped with a maximum length of 52 feet 6 inches, a maximum width of 38 feet, and a depth of 41 feet, with a nominal water level of 38 feet. Therefore, this criterion is met.</p> <p>The Millstone Power Station GMRS maximum spectral acceleration in the frequency range less than or equal to 0.3Hz is 0.02g (Reference 3, Table 2.4-1), which is less than 0.1g. Therefore, this criterion is met.</p>

SFP Criteria from EPRI 3002007148	Site-Specific Data
<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 500ft² and the licensed reactor core thermal power should be less than 4000MWt per unit.</p>	<p>The surface area of the SFP is approximately 1600 ft², which is greater than 500 ft². The licensed reactor thermal power is 3650MWt, which is less than 4000MWt per unit. Therefore, these criteria are met.</p>