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10 CFR 50.4

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ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Duke Energy Carolinas, LLC (Duke Energy)
McGuire Nuclear Station, Units 1 and 2
Docket No. 50-369, 50-370
Renewed License No. NPF-9 and NPF-17

Subject: McGuire Nuclear Station (MNS) Seismic Mitigating Strategies Assessment (MSA) Report for the Reevaluated Seismic Hazard Information – NEI 12-06, Appendix H, Revision 2, H.4.4 Path 4: GMRS < 2xSSE

References:

1. NEI 12-06, Revision 2, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, December 2015, ADAMS Accession Number ML16005A625
2. JLD-ISG-2012-01, Revision 1, Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, January 2016, ADAMS Accession Number ML15357A163
3. Duke Energy Letter MNS-15-096 from McGuire Nuclear Station, Final Notification of Full Compliance with Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events" and with Order EA-12- 051, "Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" for McGuire Nuclear Station, dated December 07, 2015, ADAMS Accession Number ML15343A010
4. NRC Letter, McGuire Nuclear Station, Units 1 and 2 - Safety Evaluation Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051 (CAC Nos. MF1160, MF1161, MF1062, and MF1063), dated June 20, 2016, ADAMS Accession Number ML16104A078

The purpose of this letter is to provide the results of the assessment for MNS to demonstrate that the FLEX strategies developed, implemented and maintained in accordance with NRC Order EA-12-049 and EA -12-051 can be implemented considering the impacts of the reevaluated seismic hazard. The assessment was performed in accordance with the guidance provided in Appendix H Section H.4.4 of NEI 12-06 Revision 2 [Reference 1], which was endorsed by the NRC [Reference 2].

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NRR

Based upon the mitigating strategies assessment in the Attachment, the mitigating strategies for MNS, considering the impacts of the reevaluated seismic hazard, is acceptable as described in the MNS FLEX Final Integrated Plan [Reference 3] and NRC Endorsement of the plan [Reference 4].

There are no regulatory commitments associated with this letter.

Please address any comments or questions regarding this matter to Joseph Hussey at 980-875-5045.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 10, 2017.

Sincerely,

Steven D Capps

Attachment: Duke Energy Carolinas, LLC (Duke Energy) McGuire Nuclear Station (MNS), Units 1 and 2, Docket Nos. 50-369 and 50-370, Renewed License Nos. NPF-9 and NPF-17 Mitigating Strategies Assessment for MNS NEI 12-06, Appendix H – Seismic "Path 4"

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ATTACHMENT

Duke Energy Carolinas, LLC (Duke Energy)

McGuire Nuclear Station (MNS), Units 1 and 2

Docket Nos. 50-369 and 50-370

Renewed License Nos. NPF-9 and NPF-17

Mitigating Strategies Assessment for MNS

NEI 12-06 Appendix H – Seismic "Path 4"

1. BACKGROUND

McGuire Nuclear Station (MNS) has completed a mitigating strategies assessment (MSA) for the impacts of the reevaluated seismic hazard to determine if the mitigating (FLEX) strategies developed, implemented, and maintained in accordance with NRC Order EA-12-049 remain acceptable at the reevaluated seismic hazard levels. The MSA was performed in accordance with the guidance provided in Appendix H of NEI 12-06 Revision 2 [Reference 1], which was endorsed by the NRC [Reference 2].

The Mitigating Strategies Seismic Hazard Information (MSSHI) is the reevaluated seismic hazard information at MNS, developed using the Probabilistic Seismic Hazard Analysis (PSHA). The MSSHI includes a performance-based Ground Motion Response Spectrum (GMRS), Uniform Hazard Response Spectra (UHRS) at various annual probabilities of exceedance and a family of seismic hazard curves at various frequencies and fractiles developed at the MNS control point elevation. MNS submitted the reevaluated seismic hazard information including the UHRS, GMRS and the hazard curves to the NRC on March 20, 2014 [Reference 3]. The NRC staff concluded that the GMRS that was submitted adequately characterizes the reevaluated seismic hazard for the MNS site [Reference 4]. Section 6.1.1 of Reference 2 identifies the method described in Section H.4.4 of Reference 1 as applicable to MNS.

2. ASSESSMENT TO MSSHI

Consistent with Section H.4.4 (Path 4) of Reference 1, the MNS GMRS has spectral accelerations greater than the safe shutdown earthquake (SSE) but no more than 2 times the Safe Shutdown Earthquake (SSE) anywhere in the 1 to 10 Hz frequency range. As described in the Final Integrated Plan (FIP) [References 14, 15], the plant equipment relied on for FLEX strategies have previously been evaluated as seismically robust to the SSE levels. The basic elements within the MSA of Path 4 SSCs are described in Reference 1. Implementation of each of these basic Path 4 elements for the MNS site is summarized below.

2.1 Scope of MSA Plant Equipment

The scope of SSCs considered for the Path 4 MSA was determined following the guidance used for the expedited seismic evaluation process (ESEP) defined in EPRI 3002000704 [Reference 9]. FLEX SSCs excluded from consideration in the ESEP were added to the MSA equipment scope. In addition, SSC failure modes not addressed in the ESEP that could potentially affect the FLEX strategies were added and evaluated. The selection of the scope of SSCs for the Path 4 MSA is presented in Stevenson & Associates Report 16C4418-RPT-001 [Reference 23].

SSCs associated with the FLEX strategy that are inherently rugged or sufficiently rugged are discussed in Section 2.3 below and identified in Section H.4.4 (Path 4) of Reference 1. These SSCs were not explicitly added to the scope of MSA plant equipment.

2.2 Step 1 – ESEP Review

Equipment used in support of the FLEX strategies has been evaluated to demonstrate seismic adequacy following the guidance in Section 5 of NEI 12-06. As stated in Appendix H of NEI 12-06, previous seismic evaluations should be credited to the extent that they apply for the

assessment of the MSSHI. This includes the expedited seismic evaluation process (ESEP) evaluations [Reference 10] for the FLEX strategies which were performed in accordance with EPRI 3002000704 [Reference 9]. The ESEP evaluations remain applicable for this MSA since these evaluations directly addressed the most critical 1 Hz to 10 Hz part of the new seismic hazard using seismic responses from the scaling of the design basis analyses. In addition, separate evaluations are performed to address high frequency exceedances under the high frequency (HF) sensitive equipment assessment process, as required, and are documented in Section 4 of this attachment.

2.3 Step 2 – Inherently/Sufficiently Rugged Equipment

The qualitative assessment of certain SSCs not included in the ESEP was accomplished using (1) a qualitative screening of "inherently rugged" SSCs and (2) evaluation of SSCs to determine if they are "sufficiently rugged." Reference 1 documents the process and the justification for this ruggedness assessment. SSCs that are either inherently rugged or sufficiently rugged are described in Reference 1 and no further evaluations for these rugged SSCs are required under the MSA. The qualitative assessment of selected SSCs is presented in Stevenson & Associates Report 16C4418-RPT-002 [Reference 17].

2.4 Step 3 – Evaluations Using Section H.5 of Reference 1

Step three for Path 4 plants includes the evaluations of:

1. FLEX equipment storage buildings and Non-Seismic Category 1 Structures that could impact FLEX implementation
2. Operator Pathways
3. Tie down of FLEX portable equipment
4. Seismic Interactions not included in ESEP that could affect FLEX strategies
5. Haul Paths

The results of the reviews of each of these five areas are described in the sections below.

2.4.1 FLEX Equipment Storage Buildings

The FLEX storage buildings are part of the MNS FLEX response strategy and are utilized for the storage of associated FLEX equipment and its protection from the elements. Per the FIP [Reference 14] MNS has three FLEX buildings, each having a 60' by 120' footprint and multiple access doors. Furthermore, each building is designed as a moment-resisting frame system comprising steel moment frames, concrete walls on the perimeter and a concrete slab on the roof [Reference 18].

Per the MNS FIP, the FLEX buildings have been designed to conform to the ASCE 7-10 wind and seismic ruggedness requirements, and are located appropriately to provide protection from flooding and to minimize the potential for multiple buildings to be damaged by tornados. The MNS FIP also specifies that redundant equipment is stored in the three FLEX buildings such that if any single building was destroyed, sufficient FLEX equipment would remain intact and available for deployment from the remaining two buildings.

The FLEX buildings were reviewed and evaluated in Stevenson & Associates Calculation 16C4418-CAL-001 [Reference 18] to the Foundation Input Response Spectra (FIRS), estimated from the GMRS, and applicable in the proximity of the FLEX buildings. The review of the FLEX building design analysis revealed that the mid-span steel columns on the long side of FLEX-2 building are the most critical structural components. Namely, it was found that the design of the mid-span columns accounted for static lateral soil pressure from the soil backfill, vertical loads and wind loads, and yielded the lowest capacity margin. Considering the complexity of the load combination, the existence of soil backfill and the low capacity margin, the mid-span steel columns on the long side of the FLEX-2 building were selected as the critical components for a seismic evaluation to establish the capacity of all FLEX buildings on the MNS site. A $HCLPF_{1\%}$ ($C_{1\%}$) capacity was calculated for the columns based on the Conservative Deterministic Failure Margin (CDFM) method of EPRI NP-6041-SL [Reference 12], and using the FLEX-2 building FIRS estimated from the GMRS as input to the FLEX-2 building. Subsequently, a $HCLPF_{10\%}$ ($C_{10\%}$) capacity was developed to comply with NEI 12-06 Appendix H requirements of Section H.5 [Reference 1]. It was concluded that the columns have adequate $C_{10\%}$ capacities exceeding the GMRS level. With the controlling structural components qualified, the FLEX buildings were determined to have adequate capacity to withstand the GMRS.

Non-Seismic Category 1 Structures

The operator paths were walked down to identify non-seismic Category 1 structures that could potentially impact the operator paths at the GMRS level as well as debris removal capabilities in case of smaller seismic interactions. During the walkdowns, the Turbine Building was identified as the only non-seismic Category 1 structure that would be expected to impact the operator paths at the GMRS level. Per the Stevenson & Associates Report 16C4418-RPT-002 [Reference 17], the Turbine Building has been evaluated and found to be seismically rugged for seismic levels up to 2xSSE. Hence, the Turbine building was screened out for MSA Path 4 and does not adversely affect the implementation of the FLEX strategy. Furthermore, per the Stevenson & Associates Report 16C4418-RPT-003 [Reference 19] the operator pathways in non-seismic Category 1 structures were concluded to be adequate at the GMRS level on the basis that sufficient debris removal capabilities are available and that only hoses are to be maneuvered over the debris in the potentially impacted areas.

The haul path walkdowns concentrated on assuring that sufficient space is available to maneuver around any potential debris from non-seismic Category 1 structures. The staging areas were also walked down for potential seismic interactions with non-seismic Category 1 nearby buildings. Per the walkdown report [Reference 19] it was concluded that excess space is available, that the haul paths are maintained even if debris exists and that no seismic interactions are considered credible.

2.4.2 Operator Pathways

Pre-determined operator pathways have been previously identified and documented in the FLEX Support Guidelines (FSGs) documented per Reference 21 Table 4-1. The primary operator pathways were reviewed and walked-down. MNS has reviewed the operator pathways and verified that the operator pathways are not impacted by the MSSHI. Considerations for this review included:

- Multiple available pathways or multiple FLEX components

- Pathways in seismic Category 1 structures with previous reviews for seismic ruggedness
- Debris removal capabilities for moderate to smaller seismic interactions
- Available time for operator actions
- Assessment of seismic interactions associated with a GMRS level seismic event

Components and structures with the potential for seismic interaction with the operator pathways were identified during the walk-down. The identified components and structures were evaluated in Reference 17 and were concluded to have adequate capacities corresponding to the GMRS level.

2.4.3 Tie Down of FLEX Portable Equipment

The FLEX portable equipment is stored inside the three FLEX buildings located on the MNS site. The FLEX equipment includes a variety of components including high, medium and low pressure pumps, diesel generators, air compressors and trailers containing hoses and other light weight equipment [Reference 21].

Stored equipment was evaluated (for stability and restraint as required/necessary) and protected from seismic interactions to the SSE level as part of the FLEX design process to ensure that unsecured and/or non-seismic components do not damage the FLEX equipment. In addition, large FLEX equipment such as pumps and power supplies were secured as necessary to protect them during a SSE seismic event.

Stored equipment inside the FLEX buildings was walked down to ensure stability and restraint as required/necessary and protection from seismic interactions. All the FLEX equipment was found to be secured using tie downs and, in many cases, additionally with wheel stoppers. Furthermore, the walkdown considered unsecured and/or non-seismic components stored around the FLEX equipment and concluded that no damage to the FLEX equipment is credible due to the presence of these components.

Following review of the FLEX equipment stored inside the FLEX buildings, component FLEX 600VAC D/G located in the FLEX-3 building was selected as the most critical component to evaluate a representative $C_{10\%}$ capacity for the equipment tie downs in consideration of its high aspect ratio relative to other FLEX equipment, large weight, anchorage configuration (review of the straps, anchors and hoist rings used) and substantial seismic input corresponding to the FLEX-3 building. The FLEX 600VAC D/G tie downs were evaluated per the Stevenson & Associates Calculation 16C4418-CAL-002 [Reference 20] to the FLEX-3 building FIRS estimated from the GMRS and were found to possess considerable capacity to sufficiently restrain the equipment. It was therefore concluded that the FLEX building equipment in all three FLEX storage buildings has adequate capacity to withstand the GMRS.

MNS has reviewed the storage requirements (including any tie-down or restraint devices) in effect for FLEX portable equipment and verified that the equipment has no adverse interactions or significant damage that could impair the ability of the equipment to perform its mitigating strategy function during or following the GMRS-level seismic event using the methods described in Section H.5 of NEI 12-06 [Reference 1].

2.4.4 Additional Seismic Interactions

Seismic interactions that could potentially affect the FLEX strategies and were not previously reviewed as part of the ESEP program (e.g., flooding from non-seismically robust tanks, interactions to distributed systems associated with the ESEP equipment list, etc.) were reviewed for MNS. No Piping attached to buried tanks within the FLEX strategy exists.

The block walls at MNS were walked down to assess the potential for seismic interaction with the FLEX related equipment and the operator pathways. Certain block walls were identified that could affect access to FLEX equipment or the equipment itself in case they failed. The block walls have been assessed in Reference 17 and were screened as they were found to have sufficient capacity to withstand the GMRS level.

MNS has reviewed the additional seismic interactions and verified that the Mitigation Strategy is not adversely impacted by the GMRS.

2.4.5 Haul Path

Multiple and redundant pre-determined deployment routes have been previously identified and documented in the FLEX Support Guidelines (FSGs) documented per Reference 21 Table 4-1. Typically, the haul paths attempt to avoid areas with trees, power lines, narrow passages, etc., when practical. However, high winds can cause debris from distant sources to interfere with planned haul paths. During the FLEX building walkdown, it was verified that debris removal equipment is stored inside the FLEX storage buildings, and it is found sufficient to remove potential debris.

The haul path walkdowns concentrated on assuring that sufficient space is available to maneuver around any potential debris from non-seismic Category 1 structures in order to maintain the determined haul paths. The staging areas were also walked down for potential seismic interactions with non-seismic Category 1 nearby buildings. The walkdowns concluded that excess space is available, that the haul paths are maintained even if debris exists and that no seismic interactions are considered credible.

The haul paths were evaluated in Stevenson & Associates Calculation 16C4418-CAL-002 [Reference 20] for potential soil liquefaction, considering as input the FIRS estimated from the GMRS, and were concluded to have adequate capacities corresponding to the GMRS level.

MNS has reviewed the haul paths and verified that the haul paths are not adversely impacted by the MSSHI.

3. SPENT FUEL POOL COOLING REVIEW

Spent Fuel Pool Cooling Evaluation

The evaluation of spent fuel pool cooling for MNS was performed based on the initial conditions established in NEI 12-06 [Reference 1] for spent fuel cooling coping in the event of an ELAP/LUHS. The evaluation also used the results of pool heatup analyses from the ELAP evaluation as input.

The FLEX strategy for spent fuel pool (SFP) cooling utilizes SFP level monitoring and make-up capability as described in MNS Final Integrated Plan (FIP) [Reference 14]. SFP make-up capability is provided by pumping water from the Standby Nuclear Service Water Pond (SNSWP) and discharging directly to the SFP deck through hoses connected to a spray header (Boggs Box) early in the ELAP process when SFP boil-off has not initiated and access to the SFP is less challenging. Suction is provided using the portable FLEX low pressure pumps.

The permanently installed plant equipment relied on for the implementation of the SFP Cooling FLEX strategy has been designed and installed, or evaluated to remain functional, in accordance with the plant design basis to the SSE loading conditions. The spent fuel pool integrity evaluations demonstrated inherent margins of the spent fuel pool structure and interfacings plant equipment above the SSE to a peak spectral acceleration of 0.8g [Reference 16]. The portable FLEX equipment availability, including its storage and deployment pathways, were evaluated to the FLEX storage facility FIRS estimated from the GMRS, including equipment associated with SFP cooling. Per the Stevenson & Associates Report 16C4418-RPT-002 [Reference 17], the permanently installed plant equipment needed to accomplish SFP level monitoring has been evaluated and found to be seismically rugged for seismic levels up to 2xSSE. It was therefore concluded that the equipment relied on for the implementation of the SFP Cooling FLEX strategy has adequate capacity to withstand the GMRS.

4. HIGH FREQUENCY REVIEW

The high frequency review is included as Enclosure 1 to this attachment.

The selection process for high frequency evaluation is described in detail in Stevenson & Associates Report 16C4435-RPT-001 [Reference 22]. The analysis described in this report functionally screened out all devices in these categories, and thus there were no devices selected for further evaluation.

5. CONCLUSION

Therefore, the FLEX strategies for MNS as described in the FIP [Reference 14] are acceptable as specified and no further seismic evaluations are necessary.

6. REFERENCES

1. NEI 12-06, Revision 2, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, December 2015, ADAMS Accession Number ML16005A625.
2. JLD-ISG-2012-01, Revision 1, Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, January 2016, ADAMS Accession Number ML15357A163.
3. Duke Energy Letter MNS-14-029 from McGuire Nuclear Station, Seismic Hazard and Screening Report (CEUS Sites), Response to NRC 10 CFR 50.54(f) 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 20, 2014, ADAMS Accession Number ML14098A421.
4. NRC Letter, McGuire Nuclear 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 (TAC Nos. MF3689 and MF3690), dated July 20, 2015, ADAMS Accession Number ML15182A067.
5. Not Used.
6. Not Used.
7. EPRI 3002004396, Final Report, July 2015, High Frequency Program Application Guidance for Functional Confirmation and Fragility Evaluation, ADAMS Accession Number ML15223A102.
8. NRC Letter, Endorsement of Electric Power Research Institute Final Draft Report 3002004396, "High Frequency Program: Application Guidance for Functional Confirmation and Fragility", dated September 17, 2015, ADAMS Accession Number ML15218A569.
9. EPRI, "Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic", Report Number 3002000704, Palo Alto, CA, April, 2013.
10. Duke Energy Letter MNS-16-008 from McGuire Nuclear Station, Expedited Seismic Evaluation Process (ESEP) Closeout, Response to NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulation 50.54(f) Regarding Recommendations 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated February 04, 2016, ADAMS Accession Number ML16041A173.
11. EPRI, "Seismic Evaluation Guidance: Screening, Prioritization and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic", Report Number 1025287, Palo Alto, CA, November, 2012.
12. EPRI, "EPRI NP-6041-SL Revision 1: A Methodology for Assessment of Nuclear Plant Seismic Margin, Revision 1", Palo Alto, CA, August, 1991.
13. NRC Letter, McGuire Nuclear Station, Units 1 and 2 - Staff Review of Interim Evaluation Associated with Reevaluated Seismic Hazard Implementing Near-Term Task Force Recommendation 2.1 (CAC Nos. MF5249 and MF5250), dated March 17, 2016, ADAMS Accession Number ML16072A038.
14. Duke Energy Letter MNS-15-096 from McGuire Nuclear Station, Final Notification of Full Compliance with Order EA-12-049, "Order Modifying Licenses with Regard to

Requirements for Mitigation Strategies for Beyond Design Basis External Events" and with Order EA-12-051, "Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" for McGuire Nuclear Station, dated December 07, 2015, ADAMS Accession Number ML15343A010.

15. NRC Letter, McGuire Nuclear Station, Units 1 and 2 - Safety Evaluation Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051 (CAC Nos. MF1160, MF1161, MF1062, and MF1063), dated June 20, 2016, ADAMS Accession Number ML16104A078.
16. Duke Energy Letter MNS-16-060 from McGuire Nuclear Station, 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, dated August 18, 2016, ADAMS Accession Number ML16236A074.
17. Stevenson & Associates 16C4418-RPT-002, Revision 0, Screening of Selected Plant Equipment for MSA – NEI 12-06 Appendix H Path 4.
18. Stevenson & Associates 16C4418-CAL-001, Revision 0, Seismic Capacity Calculations for FLEX Buildings.
19. Stevenson & Associates 16C4418-RPT-003, Revision 0, Walkdown Results for MSA - NEI 12-06 Appendix H Path 4
20. Stevenson & Associates 16C4418-CAL-002, Revision 0, NEI 12-06 Appendix H Path 4 Seismic Evaluations.
21. Duke Energy Document No. MCS-1465.00-00-0026, Revision 1, Design Specification for Flexible Response to Extended Loss of all AC Power, March 02, 2016.
22. Stevenson & Associates 16C4435-RPT-001 Rev. 1, Selection of Relays and Switches for High Frequency Seismic Evaluation at McGuire Nuclear Station.
23. Stevenson & Associates 16C4418-RPT-001, Revision 0, Selection of Scope of Plant Equipment for MSA – NEI 12-06 Appendix H Path 4.

Enclosure 1 – High Frequency Review Consistent with Path 2

For Path 4 plants, NEI 12-06 Section H.4.4 [Reference 1] requires licensees with GMRS exceedances of the SSE above 10 Hz to perform a high frequency evaluation of relays in accordance with the methodology described in NEI 12-06 Section H.4.2. This section describes the selection process for high frequency evaluation as focusing on moving-contact electrical control devices subject to intermittent states (predominantly relays and contactors) in the control systems of components in four categories:

(1) *"Relays and contactors whose chatter could cause malfunction of a reactor SCRAM.*
(2) *Relays and contactors in seal-in or lockout circuits whose chatter could cause a reactor coolant system (RCS) leakage pathway that was not considered in the FLEX strategies. Examples include the automatic depressurization system (ADS) actuation relays in boiling-water reactors (BWRs) and relays that could actuate pressurizer power-operated relief valves (PORVs).*
(3) *Relays and contactors that may lead to circuit seal-ins or lockouts that could impede the Phase 1 FLEX capabilities, including buses fed by station batteries through inverters.*
(4) *Relays and contactors that may lead to circuit seal-ins or lockouts that could impede FLEX capabilities for mitigation of seismic events in permanently installed Phase 2 SSCs that have the capability to begin operation without operator manual actions.*

The selection process for each of these categories is described in detail in Stevenson & Associates Report 16C4435-RPT-001 [Reference 22]. The analysis described in this report functionally screened out all devices in these categories, and thus there were no devices selected for further evaluation.