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U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Duke Energy Carolinas, LLC (Duke Energy)  
McGuire Nuclear Station (MNS), Units 1 and 2  
Docket Numbers 50-369, 50-370  
Renewed License Numbers NPF-9 and NPF-17

**Subject:** Submittal Revising Attachment S of License Amendment Request to Implement a Risk-Informed Performance-Based Fire Protection Program (TAC Nos. MF2934 and MF2935).

**References:**

1. MNS Letter, License Amendment Request (LAR) to Adopt National Fire Protection Association (NFPA) 805 Performance-Based Standard for Fire Protection for Light-Water Reactor Generating Plants, dated September 26, 2013, Agencywide Document and Management System (ADAMS) Accession Number ML13276A126.
2. NRC Letter, McGuire Nuclear Station, Units 1 and 2 - Acceptance Review Results RE: License Amendment Request to Adopt National Fire Protection Association 805 Performance-Based Standard for Fire Protection for Light-Water Reactor Generating Plants, (TAC Nos. MF2934 and MF2935), dated December 31, 2013, ADAMS Accession Number ML13354B879.
3. MNS Letter, Supplemental Information For License Amendment Request (LAR) to Adopt National Fire Protection Association (NFPA) 805 Performance-Based Standard for Fire Protection for Light-Water Reactor Generating Plants, dated January 8, 2014, ADAMS Accession Number ML14016A097.
4. NRC Letter, McGuire Nuclear Station, Units 1 and 2 - Acceptance of Requested Licensing Action RE: License Amendment Request to Adopt National Fire Protection Association (NFPA) 805 Performance-Based Standard for Fire Protection for Light-Water Reactor Generating Plants (TAC Nos. MF2934 and MF2935), dated January 15, 2014, ADAMS Accession Number ML14014A279.

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5. NRC Letter, Request for Information Regarding License Amendment Request To Implement A Risk-Informed Performance-Based Fire Protection Program (TAC Nos. MF2934 and MF2935), dated August 28, 2014, ADAMS Accession Number ML14233A366.
6. MNS Letter, Response to August 28, 2014, NRC Request for Additional Information Regarding License Amendment Request To Implement A Risk-Informed Performance-Based Fire Protection Program, dated October 13, 2014, ADAMS Accession Number ML14297A162.
7. NRC Letter, Request for Information Regarding License Amendment Request To Implement A Risk-Informed Performance-Based Fire Protection Program (TAC Nos. MF2934 and MF2935), dated October 27, 2014, ADAMS Accession Number ML14295A307.
8. MNS Letter, Response to August 28, 2014, NRC Request for Additional Information Regarding License Amendment Request To Implement A Risk-Informed Performance-Based Fire Protection Program, dated November 12, 2014, ADAMS Accession Number ML14328A628.
9. MNS Letter, Response to August 28, 2014, NRC Request for Additional Information Regarding License Amendment Request To Implement A Risk-Informed Performance-Based Fire Protection Program, dated December 12, 2014, No ADAMS Number.
10. MNS Letter, Response to August 28, 2014, NRC Request for Additional Information Regarding License Amendment Request To Implement A Risk-Informed Performance-Based Fire Protection Program, dated January 26, 2015, ADAMS Accession Number ML15036A084.
11. MNS Letter, Response to August 28, 2014, NRC Request for Additional Information Regarding License Amendment Request to Implement A Risk-Informed Performance-Based Fire Protection Program, dated February 27, 2015, No ADAMS Number.
12. MNS Letter, Response to August 28, 2014, NRC Request for Additional Information Regarding License Amendment Request to Implement A Risk-Informed Performance-Based Fire Protection Program, dated March 13, 2015, No ADAMS Number.
13. NRC Letter, Request for Additional Information Regarding License Amendment Request To Implement A Risk-Informed Performance-Based Fire Protection Program, dated May 8, 2015, ADAMS Accession Number ML15125A328.
14. NRC Letter, Request for Additional Information Regarding License Amendment Request To Implement A Risk-Informed Performance-Based Fire Protection Program, dated June 18, 2015, ADAMS Accession Number ML15147A628.
15. MNS Letter, Response to June 18, 2015, NRC Request for Additional Information Regarding License Amendment Request to Implement a Risk-Informed Performance-Based Fire Protection Program, dated July 15, 2015.
16. NRC Letter, Request for Additional Information Regarding License Amendment Request To Implement a Risk-Informed Performance-Based Fire Protection Program, dated August 18, 2015.
17. MNS Letter, Response to June 18, 2015, and May 8, 2015, NRC Requests for Additional Information Regarding License Amendment Request to Implement a Risk-Informed Performance-Based Fire Protection Program, dated August 20, 2015.

18. MNS Letter, Response to August 18, 2015, NRC Request for Additional Information Regarding License Amendment Request to Implement a Risk-Informed Performance-Based Fire Protection Program, dated September 9, 2015.
19. MNS Letter, Administrative Changes to LAR Submittal Package Made at NRC Request, dated October 1, 2015.
20. MNS Letter, Submittal Regarding License Amendment Request to Implement a Risk-Informed Performance-Based Fire Protection Program, dated January 14, 2016.

By letter dated September 26, 2013 (Reference 1), Duke Energy submitted a LAR to adopt a new, risk-informed, performance-based (RI-PB) fire protection licensing basis for the MNS Units 1 and 2.

On December 31, 2013 (Reference 2), the NRC requested supplemental information in order to make the September 26, 2013, LAR complete and acceptable for review by the NRC. By letter dated January 8, 2014 (Reference 3), Duke Energy provided the requested supplemental information to the NRC. By letter dated January 15, 2014 (Reference 4), the NRC accepted the September 26, 2013, LAR for review.

By letters dated August 28, 2014, and October 27, 2014 (References 5 and 7, respectively), the NRC requested additional information (RAI) in order to complete their review of the September 26, 2013, LAR. Those letters grouped the RAIs into 60-day, 90-day, 120-day, and radiation release responses. Duke Energy provided the 60-day, 90-day, and some of the 120-day RAI responses by letters dated October 13, 2014, November 12, 2014, and December 12, 2014 (References 6, 8, and 9, respectively). Responses to the radiation release RAIs and some of the remaining 120-day RAIs were provided by letter dated January 26, 2015 (Reference 10).

By letter dated February 27, 2015 (Reference 11), Duke Energy submitted responses to all remaining first-round RAIs, excluding Probabilistic Risk Assessment (PRA) RAI 03. This submittal also included revised responses to PRA RAI 12 and PRA RAI 17. By letter dated March 13, 2015 (Reference 12), Duke Energy submitted response to PRA RAI 03.

By letters dated May 8, 2015, June 18, 2015, and August 18, 2015 (References 13, 14, and 16, respectively), the NRC submitted second-round RAIs to complete their review of the September 26, 2013, LAR.

By letters dated July 15, 2015 (Reference 15), August 20, 2015 (Reference 17), and September 9, 2015 (Reference 18), Duke Energy submitted responses to the second-round RAIs.

By letter dated October 1, 2015 (Reference 19), Duke Energy submitted several administrative changes to the LAR submittal package.

By email dated October 28, 2015, the NRC requested a clean copy of Attachment S of the LAR and requested administrative changes to Attachment M of the LAR. Duke Energy submitted the requested changes by letter dated January 14, 2016 (Reference 20).

As discussed during the site's accuracy review of the draft NFPA 805 safety evaluation, the NRC requested that Tables S-1 and S-2 of Attachment S be revised to show the current status of committed plant modifications. Additionally, a revision to Table S-3 is requested to reflect a new and a revised implementation item, and they are considered regulatory commitments. These changes are shown in Enclosure 1 of this submittal.

Enclosure 2 of this submittal documents Meggitt Control System's authorization for Duke Energy to use the summary page of a qualification testing report on silicon dioxide insulated fire

cable. This report was submitted to the NRC in a letter dated October 3, 2002 (Accession number ML022910265), and the entire report was previously considered proprietary information.

Please direct any questions on this matter to Brian Richards at (980) 875-5171.

I declare under penalty of perjury that the foregoing is true and correct. Executed on April 26, 2016.

Sincerely,

A handwritten signature in black ink, appearing to read "S.D. Capps". The signature is written in a cursive, somewhat stylized font.

Steven D. Capps

Enclosures 1 and 2

xc:

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## **ENCLOSURE 1**

### **Duke Energy MNS NFPA 805 LAR Attachment S Revisions**

Note: The revised LAR pages in this enclosure replace the previous version of Attachment S of the LAR, as transmitted on January 14, 2016, in its entirety. The revised content of the LAR pages is denoted by a revision bar in the margin of the page.

**S. MODIFICATIONS AND IMPLEMENTATION ITEMS**

8 Pages Attached

Tables S-1, Plant Modifications Completed, and S-2, Plant Modifications Committed, provided below, include a description of the modifications along with the following information:

- A problem statement,
- Risk ranking of the modification,
- An indication if the modification is currently included in the Fire PRA,
- Compensatory Measure in place, and
- A risk-informed characterization of the modification and compensatory measure.

**Table S-1 Plant Modifications Completed**

Item	Rank	Unit	Problem Statement	Proposed Modification	In Fire PRA	Comp Measure	Risk Informed Characterization
1	N/A	1, 2	Current Transformers associated with a non-safety power monitoring system in the Turbine Buildings created a situation in which a fire could potentially disable both safety related trains of the respective unit.	The Current Transformers were permanently bypassed by shorting them out.	N	N	N/A
2	N/A	1, 2	Fire area conflict analysis determined that a control device in the circuit supplying assured electrical power to each of the two (2) Technical Specification required groups of pressurizer heaters received control power from a non-diesel generator backed power source.	The control power is now derived from the same source as the pressurizer heaters.	N	N	N/A



Table S-1 Plant Modifications Completed

Item	Rank	Unit	Problem Statement	Proposed Modification	In Fire PRA	Comp Measure	Risk Informed Characterization
3	Med	1, 2	<p>Turbine Driven Auxiliary Feedwater Pump Suction Isolation Valve, which is normally open, required open for HSB, is affected by spurious operation due to cable failures. FAs 4 (U2), 14 (U2), and 21 (U2) have possible IN 92-18 concerns, also. The credited TDCAP, which starts on loss of offsite power, will be damaged if the suction valve goes closed.</p> <p>Component: 1CA VA0007AC</p> <p>VFDRs: 04-040, 14-014 19-10, 21-012, and 24-008</p> <p>Component: 2CA VA0007A</p> <p>VFDRs: 04-024, 14-078, 14-079, 20-7, 21-071, 21-072, and 24-082</p>	Engineering Change (EC) resolved spurious operation.	N	N	The modification eliminated potential spurious operation and was required as a result of the DID evaluation.
4	High	1, 2	The Unit 2 overall LERF value is above the acceptable threshold.	Reduced WL inlet or vent to have a pipe restriction of 4 inches or less.	Y	N	This modification improved overall LERF values.
5	High	1, 2	The following cabinets have unsealed penetrations: 1MLC, 1SCTC1, 1SCTC2, 1UCTC1, 1UCTC2, 1UCTC3, and 2MLC.	<p>Sealed the top surface of the Unit 1 Fire Area 19, cabinets 1MLC, 1SCTC1, 1SCTC2, 1UCTC1, 1UCTC2, and 1UCTC3.</p> <p>Sealed the top surface of the Unit 2 Fire Area 20, cabinet 2MLC.</p>	Y	N	This activity was considered a maintenance activity and were performed by work requests. This activity was required to be done due to credit taken in the Fire PRA for sealed cabinets. This activity reduced risk.

Table S-1 Plant Modifications Completed

Item	Rank	Unit	Problem Statement	Proposed Modification	In Fire PRA	Comp Measure	Risk Informed Characterization
6	Low	1, 2	Valves 1(2) CA161C and 1(2) CA162C are a rising stem concern in Fire Area 03, 04, and 14.  Component: 1CA161C VFDR: 04-092, 14-030  Component: 2CA161C VFDR: 03-01  Component: 1CA162C VFDR: 04-093, 14-031  Component: 2CA162C VFDR: 03-02	Engineering Change (EC) installed a bypass around both valves. Manual butterfly valves installed around these valves.	N	N	This modification eliminated impact of a hot gas layer impairing operation of the rising stem valve.

Table S-2 Plant Modifications Committed

Item	Rank	Unit	Problem Statement	Proposed Modification	In Fire PRA	Comp Measure	Risk Informed Characterization
				All items originally in Table S-2 have been completed and are shown on Table S-1.			

Table S-3, Items provided below are those items (procedure changes, process updates, and training to affected plant personnel) that will be completed prior to the implementation of new NFPA 805 fire protection program. This will occur within 180 days after issuance of the license amendment unless that date falls within a scheduled refueling outage. Then, implementation will occur within 60 days after startup from that scheduled refueling outage. Note that Implementation Item 12 is associated with modifications in Table S-2 and will be completed 180 days after completion of the last risk related modification. Implementation Item 19 is associated with thermoplastic cable analysis and this item will be completed by June 30, 2017. Implementation Item 20 is associated with completion of IN 92-18 pressure boundary breach analysis, and this item will also be completed by June 30, 2017.

Table S-3 Implementation Items			
Item	Unit	Description	LAR Section / Source
1	1, 2	Perform the following recommendations from the Radiological Release Evaluation: <ol style="list-style-type: none"> <li>1. Within each yard area fire strategy, identify RCA boundaries within the strategy and any potential escape paths. This includes building sumps and storm drains, where applicable. For consistency, it is recommended that even hardened barriers are identified. Examples of these would include: the containment hatch, fuel handling access hatch, water tight doors to the outside, as well as passage doors and roll-up doors.</li> <li>2. Enhance Fire Brigade Guidelines (Procedure RP/0/A/5700/025, Fire Brigade Response) to include more detail on the control measures used to maintain radioactive release limits where monitoring cannot be accomplished. Examples include:                             <ul style="list-style-type: none"> <li>▪ Water fog streams used for smoke scrubbing.</li> <li>▪ Controlling water runoff during fire suppression activities.</li> <li>▪ Covering drains and other similar containment measures.</li> </ul> </li> <li>3. Enhance Fire Brigade Guidelines (Procedure RP/0/A/5700/025, Fire Brigade Response) to instruct Radiation Protection personnel to respond to all fires within RCAs inside and outside the Protected Area.</li> <li>4. Enhance Fire Brigade Guidelines (Procedure RP/0/A/5700/025, Fire Brigade Response) to include guidance for crossing RCA/RCZ boundaries including escape routes.</li> <li>5. Develop a Standard Operating Guideline (SOG) for fires involving contaminated material outside of the power block.</li> <li>6. Create new fire strategies for yard areas that contain RCAs. This includes Radwaste Facility, Warehouse 7, and the open yard areas where tanks and land-sea containers are stored.</li> </ol>	4.4.2 and Attachment E

Table S-3 Implementation Items

Item	Unit	Description	LAR Section / Source
		<ol style="list-style-type: none"> <li>7. Within each fire strategy, identify the RCA or Radioactive Control Zone in the written text.</li> <li>8. Fire Brigade training will be revised to ensure the new guidance included in Procedure RP/0/A/5700/025, Fire Brigade Response for radioactive release is covered during the established training interval.</li> <li>9. Add a standard statement for water runoff to all RCA fire strategies similar to the caution contained for smoke removal.</li> <li>10. Incorporate all fire fighting strategies into the electronic records management retrieval system (internally referred to as NEDL). This will provide consistency for current users and the ability to conduct effective reviews to ensure all radioactive release recommendations have been incorporated.</li> <li>11. Add an appendix to the fire strategies for building sump drainage and site storm drains. This is NOT intended to be a detailed plan, but a site overview that identifies areas where runoff has the potential to route to a storm drain or an automatic sump that will pump without radiation monitoring.</li> <li>12. Develop a SOG to address owner controlled area RCAs. This would include, for example, Warehouse 7 and outage equipment stored there.</li> <li>13. Develop administrative guidance, in collaboration with radiation protection, to support ensuring that radioactive release(s) do not exceed limits in the event of a fire in areas where engineering controls will not contain the potential release.</li> </ol>	
2	1, 2	After the approval of the LAR, in accordance with 10 CFR 50.71(e), the MNS UFSAR will be revised. The format and content will be consistent with NEI 04-02 FAQ 12-0062.	5.4
3	1, 2	Revise station documentation (Design Basis Specification for Fire Protection) to state the NRC is the AHJ for fire protection changes requiring approval.	4.1.2 and Attachment A, 3.2.2.4

<b>Table S-3 Implementation Items</b>			
<b>Item</b>	<b>Unit</b>	<b>Description</b>	<b>LAR Section / Source</b>
4	1, 2	Revise appropriate fire protection program document(s) to provide a requirement that if a plant elects to implement the methodologies in EPRI Report TR-1006756, that the methodologies will be implemented in their entirety as they pertain to the fire protection systems or features being evaluated.	4.1.2 and Attachment A, 3.2.3(1)
5	1, 2	The monitoring program required by NFPA 805 Section 2.6 will be implemented after the LAR approval as part of the fire protection program transition to NFPA 805, in accordance with NFPA 805 FAQ 10-0059, and will include a process that reviews the fire protection performance and trends in performance.	4.1.2 and Attachment A, 3.2.3(3) 4.6.2
6	1, 2	Revise station procedures/directives to comply with NFPA 805 Section 3.3.1.2(1).	4.1.2 and Attachment A, 3.3.1.2(1)
7	1, 2	Revise appropriate station documentation to include the requirements for installation of cable above suspended ceilings.	4.1.2, Attachment A, 3.3.5.1, and Attachment L, Approval Request #2
8	1, 2	Review MNS fire strategies for compliance with NFPA 805 requirements and update as applicable.	4.1.2 and Attachment A, 3.4.2.1
9	1, 2	The Fire Protection Design Basis Document described in Section 2.7.1.2 of NFPA 805 and necessary supporting documentation described in Section 2.7.1.3 of NFPA 805 will be created as part of transition to 10 CFR 50.48(c) to ensure program implementation following receipt of the safety evaluation. Appropriate cross references will be established to supporting documents as required by MNS processes.	4.7.1
10	1, 2	Ensure the MNS configuration control process follows the requirements in NFPA 805 and the guidance outlined in RG 1.174 which requires the use of qualified individuals, procedures that require calculations be subject to independent review and verification, record retention, peer review, and a corrective action program that ensures appropriate actions are taken when errors are discovered. The configuration control requirements should be implemented in accordance with FAQ 12-0061.	4.7.2
11	1, 2	Develop Engineering training guidelines to identify and document required training and mentoring to ensure individuals are appropriately qualified per the requirements of NFPA 805 Section 2.7.3.4 to perform assigned work.	4.7.3

Table S-3 Implementation Items			
Item	Unit	Description	LAR Section / Source
12	1, 2	Following installation of the risk related modifications and the as-built installation details, additional refinements surrounding the modifications and procedural implementation items (Table S-3 Items 13 and 14) will be incorporated into the Fire PRA model and Internal Events model, as required. If changes to the model are required, the correlated mean results will be compared to point estimate values as the FPRA is revised to monitor the alignment between the two approaches. In addition, a verification will be performed to confirm that the risk results are not appreciably changed. If the as-built change-in-risk estimates exceed the RG 1.174 acceptance guidelines, the responsible feature will be identified and evaluated. Actions taken to address such a case may be one or more of the following: 1) implementing additional modifications, 2) refining the analytical estimates, or 3) requesting that exceeding the guidelines be deemed acceptable in a new LAR.	4.8.2
13	1, 2	Revise Shutdown Risk Management procedures to reflect the appropriate recommendations noted in FAQ 07-0040, as determined in the calculation entitled, "NFWA 805 Transition – NPO".	4.3.2 Attachment D
14	1,2	Implementation items resulting from the feasibility evaluation include: <ul style="list-style-type: none"> <li>▪ Corrective action to add hard hat lights in control room and operation’s kitchen to procedure, IP/0/B/3260/031.</li> <li>▪ Add 60 minutes time to throttle Turbine Driven Auxiliary Feedwater valves to “Time Critical” program.</li> <li>▪ Add 60 minutes time to trip NC Pumps (for FA-13(Units 1 and 2)) to “Time Critical” program (this is not a loss of seal cooling event).</li> </ul>	Attachment G
15	1, 2	Revise the QA Topical, as appropriate, to update the definition of QA 3 to match post NFWA 805 criteria. QA Topical currently defines QA 3 as:  <i>“QA Condition 3 covers those systems, components, items, and services which are important to fire protection as defined in the Hazards Analysis for each station. The Hazards Analysis is in response to Appendix A of NRC Branch Technical Position APCSB 9.5-1.”</i>	4.7.3
16	1,2	Update the transient combustible control procedure to reflect the requirements in NFWA 805 analysis documentation.	Attachment C, FRE, PIP 13-6092.

Table S-3 Implementation Items			
Item	Unit	Description	LAR Section / Source
17	1, 2	The following MCCs where one or more external failures involved components with a RAW greater than 10 were flagged for increased PM frequency: 1EPEMXEMXA2, 1EPEMXEMXA3, 1EPEMXEMXD, 1EPEMXEMXH, 2EPEMXEMXA2, 2EPEMXEMXB5, and 2EPEMXEMXD. Revise the PMs associated with these MCCs to increase the PM frequency.	Attachment V
18	1, 2	Update station documentation to indicate requirements for interior floor finishes.	Attachment A, 3.3.3
19	1, 2	<p>Revise the MNS Fire PRA analysis to reflect the quantities of thermoplastic cable installed in the plant. Guidance in NUREG/CR-6850 and other NRC accepted documents will be used to perform the analysis. The impact on the Fire CDF/LERF and the delta CDF/LERF will be reviewed to verify the results are within RG 1.174 acceptance guidelines. An MSO Expert Panel will also be conducted as part of the Fire PRA update. MNS will complete this analysis by June 30, 2017.</p> <p>If the impact on risk estimates exceed the RG 1.174 acceptance guidelines, actions taken to address this case may be one or more of the following: 1) refining the analytic estimates, 2) communicating to the NRC the need and proposed schedule to implement additional modifications, or 3) requesting that exceeding the guidelines be deemed acceptable in a new LAR." Until the post Fire PRA reanalysis is complete and the results are within the RG 1.174 acceptance guidelines, the use of the Fire PRA for self-approval of plant changes affecting the fire protection program will be restricted to changes that are not greater than minimal for the fire areas with greater than 5% thermoplastic cable.</p>	RAI FM-02a, RAI FM-02b, RAI FM-01.j.01, RAI PRA-03.d
20	1, 2	Perform additional IN 92-18 analysis to determine whether hot shorts in subject MOV control circuits could result in damage to the MOV pressure boundary. MNS will complete this analysis by June 30, 2017.	Duke/NRC conference call from 4/6/2016