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10 CFR 50.90

September 29, 2016

ATTN: Document Control Desk
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 Responding to Request for Additional Information Related to 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, ADAMS Accession Number ML14365A071.
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, ADAMS Accession Number ML15083A223.
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, ADAMS Accession Number ML15091A317.
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, ADAMS Accession Number ML15212A020.
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, ADAMS Accession Number ML15225A489.
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, ADAMS Accession Number ML15244B319.

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, ADAMS Accession Number ML15261A095.
19. MNS Letter, Administrative Changes to LAR Submittal Package Made at NRC Request, dated October 1, 2015, ADAMS Accession Number ML15295A311.
20. MNS Letter, Submittal Regarding License Amendment Request to Implement a Risk-Informed Performance-Based Fire Protection Program, dated January 14, 2016, ADAMS Accession Number ML16029A193.
21. MNS Letter, Submittal Revising Attachment S of License Amendment Request to Implement a Risk-Informed Performance-Based Fire Protection Program, dated April 26, 2016, ADAMS Accession Number ML16127A597.
22. NRC Letter, Request for Additional Information Regarding License Amendment Request to Implement a Risk-Informed Performance-Based Fire Protection Program, dated July 12, 2016, ADAMS Accession Number ML16175A022.

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 letters dated October 1, 2015 (Reference 19); January 14, 2016 (Reference 20); and April 26, 2016 (Reference 21), Duke Energy submitted requested administrative changes to the LAR submittal package.

By letter dated July 12, 2016 (Reference 22), the NRC submitted an RAI related to Duke Energy's compliance with NFPA 805, Section 3.3.4, "Insulation Materials." Enclosure 1 of this submittal documents the response to this RAI.

Enclosure 2 of this submittal shows changes to the LAR document made as a result of the RAI response. Changes to Attachments A and L are associated with the RAI response, and changes to Attachments M and S are associated with administrative changes to implementation scheduling. The revisions to Table S-3 included in this enclosure are considered changes to regulatory commitments.

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 September 29, 2016.

Sincerely,

A handwritten signature in black ink, appearing to read "S.D. Capps", written in a cursive style.

Steven D. Capps

Enclosures 1 and 2

xc:

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ENCLOSURE 1

Response to Request for Additional Information

By letter dated September 26, 2013 (Agencywide Documents Access and Management System Accession No. ML 13276A126), Duke Energy Carolinas, LLC (the licensee) submitted a license amendment request (LAR) to change its fire protection program to one based on the National Fire Protection Association (NFPA) Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition. The U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information is needed for the staff to complete its review.

In LAR Attachment A for NFPA 805, Section 3.3.4, "Insulation Materials," the licensee used a compliance statement of "Comply" and stated that thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials are non-combustible or limited combustible. The NRC staff would like to confirm its understanding of whether these insulation materials meet the NFPA 805 code definition of "limited combustible" and the disposition of the issue by the licensee.

Duke Response:

Insulation which does not meet the definition of noncombustible or limited combustible has been identified as being installed for industrial personnel safety and on various system piping to prevent sweating at MNS. NFPA 805 Chapter 3, Section 3.3.4, requires all insulation to be noncombustible or limited combustible per the definition given in NFPA 805. The identified insulation is potentially an intervening combustible. Walkdowns have been performed to evaluate whether the identified insulation has the potential to become an intervening combustible for any fixed or transient ignition sources. For those locations where the insulation is determined to be an intervening combustible, a PRA risk evaluation has been performed to determine the potential impact on plant fire risk.

Based on the thorough evaluation of the locations throughout the plant that contain combustible insulation, several locations were identified where an additional transient scenario could be postulated that would have impacts that are not currently addressed in the Fire PRA. There are locations where additional impact from the combustible insulation could increase the fire risk impact from existing fixed ignition source scenarios. These scenarios were analyzed for impact on CDF. In some of these locations the potential for an increase in CDF could not be shown to be negligible. These locations are as follows:

- Auxiliary Building Common area elevation 716', Column Line FF-55/EE-55
- Auxiliary Building Common area elevation 716', Column Line FF-58/EE-58
- Auxiliary Building Common area elevation 716', Column Line FF-56
- Auxiliary Building Common area elevation 716', Column Line GG-57
- Auxiliary Building Common area elevation 716', Column Line FF-55

Work Order 20104402 has been completed to remove the combustible insulation for the specific locations identified above. The impact of the combustible insulation at all remaining locations has shown to be less than 1.0E-08/yr for CDF and less than 1.0E-09/yr for LERF, at each location.

LAR Attachment A for NFPA 805, Section 3.3.4, "Insulation Materials," has been revised to "Submit for NRC Approval" and the applicable request/basis is included in LAR Attachment L.

ENCLOSURE 2

Duke Energy MNS NFPA 805 LAR Revisions

Note: The revised LAR pages in this enclosure replace the previous version of the pages in their entirety. The revised content of the LAR pages is denoted by a revision bar in the margin of the page.

Attachment A

NEI 04-02 Table B-1 Transition of Fundamental Fire Protection Program & Design Elements

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	MCS-1465.00-00-0008 Rev. 14 [App. A.2] - Design Basis Specification for Fire Protection		
3.3.3 Interior Finishes	3.3.3 Interior Finishes. Interior wall or ceiling finish classification shall be in accordance with NFPA 101®, Life Safety Code®, requirements for Class A materials. Interior floor finishes shall be in accordance with NFPA 101 requirements for Class I interior floor finishes.	Comply	<p>The fire protection design basis specification states that interior wall and structural components, thermal insulation materials, radiation shielding materials, and sound proofing materials have a flame spread rating of 25 or less, as tested in accordance with American Society for Testing and Materials (ASTM) E-84. Interior finishes have flame spread of 25 or less and smoke and fuel contribution of 50 or less in its use configuration. NFPA 101 defines Class A finishes are non-combustible and are defined as those that have a flame spread index of less than or equal to 25 and a smoke developed index of less than or equal to 450.</p> <p>NSD-318 includes the requirement that Service Level I, II, and IV coatings used on interior floors, walls, and ceilings in "power block" buildings are required to meet the requirements of NFPA 805, Section 3.3.3.</p> <p>Implementation Item: Update station documentation to indicate requirements for interior floor finish requirements. See Implementation Item 18 in Table S-3 of Attachment S.</p>
References	<p>Document ID</p> <p>MCS-1206.10-00-0000 Rev. 9 [Section 5] - Conventional Heat Insulation</p> <p>MCS-1465.00-00-0008 Rev. 14 [App A.1; Section D.1.d] - Design Basis Specification for Fire Protection</p> <p>NSD-318 Rev. 5 [Section 318.7] - Coatings Program</p>		
3.3.4 Insulation Materials	3.3.4 Insulation Materials. Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.	Submit for NRC Approval	<p>Some thermal insulation materials may not meet the requirement. See Attachment L of the License Amendment Request for further details on the request for NRC approval for insulation materials.</p> <p>Any new insulation materials would require a screening determination in accordance with NSD-301, "Engineering Change Program", and EDM-601, "Engineering Directives Manual." Part of the screening process is an evaluation of the potential effects on the Fire Protection Program which would require the use of noncombustible or limited combustible materials.</p>
References	<p>Document ID</p> <p>EDM-601 Rev. 14 - Engineering Change Manual</p> <p>MCS-1206.10-00-0000 Rev. 9 - Conventional Heat Insulation</p> <p>MCS-1465.00-00-0008 Rev. 14 [App A.1; Section D.1.d] - Design Basis Specification for Fire Protection</p> <p>NSD-301 Rev. 41 - Engineering Change Program</p> <p>EC Eval 405552 Rev. 0 - MNS Combustible Insulation Evaluation</p> <p>EC Eval 405789 Rev. 0 - Update to MNS Combustible Insulation Evaluation for LERF</p>		

**L. NFPA 805 Chapter 3 Requirements for Approval
(10 CFR 50.48(c)(2)(vii))**

25 Pages Attached

Approval Request 7**NFPA 805 Section 3.3.4**

NFPA 805 Section 3.3.4 states:

“Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.”

Per the MNS piping and equipment thermal insulation specification, AP Armaflex and Trymer 2000 thermal insulation materials are used at MNS. These insulation materials meet the flame spread rating criteria but do not meet the NFPA 805 Section 3.3.4 definition of noncombustible or limited combustible regarding heat value content. This approval request is limited to the thermal insulation materials that are used at MNS.

NFPA 805 Section 1.6.36 has re-defined earlier definitions of noncombustible material to the now current definition of limited combustible material:

Limited Combustible. *Material that, in the form in which it is used, has a potential heat value not exceeding 3500 Btu/lb (8141 kJ/kg) and either has a structural base of noncombustible material with a surfacing not exceeding a thickness of 1/8 in. (3.2 mm) that has a flame spread rating not greater than 50, or has another material having neither a flame spread rating greater than 25 nor evidence of continued progressive combustion, even on surfaces exposed by cutting through the material on any plane.*

Therefore the AP Armaflex and Trymer 2000 thermal insulation materials utilized at MNS are considered to be in deviation from the NFPA 805 Chapter 3 element, for which approval is requested for continued use of these thermal insulation materials.

Basis for Request:

In several areas at MNS, exposed thermal insulation materials are installed for industrial personnel safety and on miscellaneous system piping to prevent sweating. These materials met the Branch Technical Position (BTP) APCSB 9.5.1 requirements for limited combustibles by complying with the flame spread rating of 25 or less as measured using the test method of ASTM E-84, but do not meet the current heat value content requirement based on the definition of a limited combustible due to the heat value exceeding 3,500 Btu/lb. Typical thermal insulation materials at MNS were noted as having heat contribution values of approximately 9,000 to 11,000 Btu/lb, which, while higher than the definition, is not considered to contribute appreciably to the spread of fire, nor represent a secondary combustible beyond those currently analyzed in the Fire PRA.

The basis for the approval request of this deviation is:

- The forms in which the thermal insulation are installed and the conditions anticipated meet the intent of the revised limited combustible material definition because the materials used at MNS have a flame spread rating of 25 or less and will not support continued progressive combustion. Specifically, the thermal insulation materials used at MNS have flame spread ratings of 25 per ASTM E-84. Although the thermal insulation materials exceed the NFPA 805 heat value of 3,500 Btu/lb, AP Armaflex and Trymer 2000 will not contribute significantly to fire due to flame spread ratings per ASTM E-84

- The forms in which the thermal insulation are installed and the conditions anticipated do not impact the three echelons of defense-in-depth:
 - Echelon 1 is not impacted because the thermal insulation does not introduce new ignition sources and presents a negligible hazard in terms of secondary or intervening combustibles. The forms in which the thermal insulation are installed and the conditions anticipated meet the intent of the revised limited combustible material definition because the materials used at MNS have a flame spread rating of 25 or less and will not support continued progressive combustion.
 - Echelon 2 is not impacted because the applications of exposed thermal insulation materials installed for industrial personnel safety and on miscellaneous system piping do not result in an increased combustible loading which would challenge the design bases of the installed fire protection systems. The presence of the thermal insulation and associated procedural controls do not impact the ability of the automatic suppression and detection systems to perform credited functions, as the materials at MNS will not support continued progressive combustion.
 - Echelon 3 is not impacted because the applications of exposed thermal insulation materials installed for industrial personnel safety and on miscellaneous system piping do not adversely impact the installed fire protection systems and features, and essential safety functions are maintained and capable of being performed. The insulation material does not compromise post-fire safe shutdown capability as previously designed, reviewed and considered.
- The forms in which the thermal insulation materials are installed and the conditions anticipated do not impact nuclear safety. The applications of exposed thermal insulation materials do not compromise post-fire safe shutdown capability as previously designed, reviewed and considered. Adequate defense-in-depth measures are in place as described above to ensure that essential safety functions are maintained and capable of being performed.
- The identified insulation installations were evaluated against the fire scenarios supporting the Fire PRA. As a result of this evaluation, instances were identified where an additional transient scenario could be postulated that would have impacts, including the combustible insulation, that are not currently addressed in the Fire PRA. Additionally, instance were identified where additional impact from the combustible insulation could increase the fire risk impact from existing fixed ignition source scenarios. For these locations, either the combustible insulation was removed, or the scenarios were analyzed for the impact of the combustible insulation on both CDF and LERF. In all locations where the insulation has not been removed, the impact on CDF was shown to be less than 1.0E-08/yr and the impact on LERF was shown to be less than 1.0E-09/yr. Duke Fleet Procedures which govern the Engineering Change Process are in place to review future installation impacts to the Fire Protection Program and Fire PRA, resulting in updates to the applicable analyses and calculations as required.

During development of this approval request a number of plant locations were identified where insulation material is used for low point obstruction or head-bump protection (industrial safety) and anti-sweat applications. Industrial Safety applications include a minimal amount of material affixed to pipes, conduits, and structural components. Anti-sweat applications were identified primarily on piping associated with low temperature cooling water, heating, ventilation and air conditioning systems supporting Power Block components and structures located in the following areas:

- Service Building Basement EL. 739'
- Service Building EL. 787' (Rm 413) ventilation equipment room
- Turbine Building Unit 1 EL. 739'
- Aux. Building Common Area EL. 716'
- Aux. Building Common Area EL. 750'
- Aux. Building Common Area EL. 767'
- VC/YC Chiller Room EL. 767'
- Electrical Penetration Rooms EL. 750'
- Switchgear Ventilation Rooms EL. 750'
- Unit 1 CA Pump Rooms (TD, MD, and RN Strainers)
- Unit 2 CA Pump Rooms (TD, MD, and RN Strainers)

Containment was not walked down, since the fire scenarios in containment fail all targets within a given area, and the targets are not based on a specific zone of influence (ZOI) for the ignition source. That is, the frequency of all ignition sources in an area were combined and assumed to impact all cables in that area. As such, the addition of an intervening combustible has no impact on the Fire PRA. It was explicitly recognized that there is combustible insulation in the ice condenser rooms, however this insulation is contained within the chiller units and would likely not impact targets outside the chiller itself. In any event, the Fire PRA treatment of containment described above adequately accounts for this insulation.

All of the identified locations were evaluated against the fire scenarios supporting the Fire PRA. As a result of this evaluation, instances were identified where an additional transient scenario could be postulated that would have impacts, including the combustible insulation, that are not currently addressed in the Fire PRA. Additionally, instances were identified where additional impact from the combustible insulation could increase the fire risk impact from existing fixed ignition source scenarios. For these locations, either the combustible insulation was removed, or the scenarios were analyzed for the impact of the combustible insulation on both CDF and LERF. In all locations where the insulation has not been removed, the impact on CDF was shown to be less than $1.0\text{E-}08/\text{yr}$ and the impact on LERF was shown to be less than $1.0\text{E-}09/\text{yr}$. The applications of exposed thermal insulation material were not of a quantity that would impact the fire scenarios or zones of influences and target failures developed in support of the fire and PRA analysis, and do not compromise automatic fire suppression functions, manual fire suppression functions, or post-fire safe shutdown capability as previously designed, reviewed and considered. Duke Fleet Procedures which govern the Engineering Change Process are in place to review future installation impacts to the Fire Protection Program and Fire PRA, resulting in updates to the applicable analyses and calculations as required.

Acceptance Criteria Evaluation:**Nuclear Safety and Radiological Release Performance Criteria:**

The use of thermal insulation material other than noncombustible and more than limited combustible in the plant does not affect nuclear safety. The applications of exposed thermal insulation materials do not compromise post-fire safe shutdown capability as previously designed, reviewed and considered. Essential safety functions are maintained and capable of being performed.

The forms in which the thermal insulation materials are installed and the conditions anticipated meet the intent of the revised limited combustible material definition because the materials used at MNS have a flame spread rating of 25 or less and will not support continued progressive combustion. The selection and application of thermal insulation material is controlled per the MNS piping and equipment thermal insulation specification. The Fire PRA development requires the inclusion of the effect of intervening or secondary combustibles to be documented and included in the analysis where determined to have fire effects as part of the performance-based approach. Duke Fleet Procedures which govern the Engineering Change Process are in place to review future installation impacts to the Fire Protection Program and Fire PRA, resulting in updates to the applicable analyses and calculations as required.

Plant walkdowns and personnel interviews concluded that there were no large concentration installations of thermal insulation in the plant. The areas of the plant that were walked down were the Service Building 739' and 786' (ventilation equipment room) elevations, the Turbine Building 739' elevation, the Auxiliary Building 716', 750', and 767' elevations (including the electrical penetration rooms), and the motor driven and turbine driven CA pump rooms. During the walkdowns, locations were documented where combustible insulation is within the 98th percentile fire ZOI for class A combustible materials. As discussed above, the 75th percentile fire was an option for scenarios located in Class A combustible control areas. If the insulation was identified as being within the ZOI of a fire, it was assumed to become an intervening combustible capable of impacting targets above it, provided that the target was within 10' of the insulation vertically. In the horizontal direction, targets were evaluated for impacts if they were within approximately 3' of the combustible insulation. Targets within 3' horizontally were not automatically assumed to fail. Further, it was assumed that if the combustible insulation is configured such that it is a vertical run with a height that is greater than the extent of the ZOI of the initial fire, the insulation will ignite and the fire travel vertically indefinitely. In all locations where the insulation has not been removed, the impact on CDF was shown to be less than $1.0\text{E-}08/\text{yr}$ and the impact on LERF was shown to be less than $1.0\text{E-}09/\text{yr}$. Therefore there is no impact on the nuclear safety performance criteria.

The use of insulation material other than noncombustible and more than limited combustible has no impact on the radiological release performance criteria. The radiological release review was performed based on the manual fire suppression activities in areas containing or potentially containing radioactive materials and is not dependent on the type of thermal insulation material. The insulation material, regardless of heat contribution value, does not change the radiological release evaluation performed that concluded that potentially contaminated water is contained and smoke is monitored. The insulation materials do not add additional radiological materials to the area or challenge systems boundaries.

Safety Margin and Defense-in-Depth:

The forms in which the thermal insulation are installed and the conditions anticipated meet the intent of the revised limited combustible material definition because the materials used at MNS have a flame spread rating of 25 or less and will not support continued progressive combustion. The insulation material, and specifically the increase in heat contribution, does not compromise automatic fire suppression functions, manual fire suppression functions, or post-fire safe shutdown capability as previously designed, reviewed and considered.

The insulation materials in the current configurations are considered as intervening combustibles and are evaluated by the Fire PRA, which showed that safety margin is not affected. The selection and application of thermal insulation material is controlled per the MNS piping and equipment thermal insulation specification. Duke Fleet Procedures which govern the Engineering Change Process are in place to review future installation impacts to the Fire Protection Program and Fire PRA, resulting in updates to the applicable analyses and calculations as required. The precautions and limitations on the use of these materials do not impact the fire safety analysis of the fire event. Therefore, the inherent safety margin and conservatism in these analysis methods remain unchanged.

The three echelons of defense-in-depth are,

- 1) to prevent fires from starting (combustible/hot work controls),
- 2) rapidly detect, control and extinguish fires that do occur thereby limiting damage (fire detection systems, automatic fire suppression, manual fire suppression, pre-fire plans), and,
- 3) provide adequate level of fire protection for systems and structures so that a fire will not prevent essential safety functions from being performed (fire barriers, fire rated cable, success path remains free of fire damage, recovery actions).

The use of insulation material which is noncombustible or more than limited combustible does not affect Echelons 1, 2, and 3. The insulation material, and specifically the increase in heat contribution, does not introduce new ignition sources, does not exceed the design bases of installed fire protection systems, does not compromise manual fire suppression functions, and does not adversely impact fire protection systems and features or post-fire safe shutdown capability as previously designed, reviewed and considered.

1) Prevent Fires from Starting:

The thermal insulation does not introduce new ignition sources and presents a negligible hazard in terms of secondary or intervening combustibles. The forms in which the thermal insulation are installed and the conditions anticipated meet the intent of the revised limited combustible material definition because the materials used at MNS have a flame spread rating of 25 or less and will not support continued progressive combustion. Specifically, the thermal insulation materials used at MNS have fuel contribution and flame spread ratings of 25 per ASTM E-84, respectively. Although the thermal insulation materials exceed the NFPA 805 heat value of 3,500 Btu/lb, AP Armaflex and Trymer 2000 will not contribute significantly to fire due to limited flame spread per ASTM E-84.

The selection and application of thermal insulation material is controlled per the MNS piping and equipment thermal insulation specification. Duke Fleet Procedures which govern the Engineering Change Process are in place to review future installation impacts to the Fire Protection Program and Fire PRA, resulting in updates to the applicable analyses and calculations as required.

2) Rapidly Detect, Control and Extinguish Fires that do Occur thereby Limiting Damage:

The applications of exposed thermal insulation materials installed for industrial personnel safety and on miscellaneous system piping do not result in increased combustible loading which would challenge the design bases of the installed fire protection systems. The presence of the thermal insulation and associated procedural controls do not impact the ability of the automatic suppression and detection systems to perform credited functions. Portable fire extinguishers and hose stations are available for manual firefighting activities by the site fire brigade. Therefore, if a fire was to occur damage would be limited.

3) Provide Adequate Level of Fire Protection for Systems and Structures so that a Fire will not Prevent Essential Safety Functions from being Performed :

The applications of exposed thermal insulation materials installed for industrial personnel safety and on miscellaneous system piping do not adversely impact the installed fire protection systems and features, and essential safety functions are maintained and capable of being performed. The insulation material does not compromise post-fire safe shutdown capability as previously designed, reviewed and considered.

The forms in which the thermal insulation are installed and the conditions anticipated meet the intent of the revised limited combustible material definition because the materials used at MNS have a flame spread rating of 25 or less and will not support continued progressive combustion. The identified installations were evaluated against the fire scenarios supporting the Fire PRA. As a result of this evaluation, instances were identified where an additional transient scenario could be postulated that would have impacts, including the combustible insulation, that are not currently addressed in the Fire PRA. Additionally, instance were identified where additional impact from the combustible insulation could increase the fire risk impact from existing fixed ignition source scenarios. For these locations, either the combustible insulation was removed, or the scenarios were analyzed for the impact of the combustible insulation on both CDF and LERF. In all locations where the insulation has not been removed, the impact on CDF was shown to be less than $1.0E-08/\text{yr}$, and the impact on LERF was shown to be less than $1.0E-09/\text{yr}$. Duke Fleet Procedures which govern the Engineering Change Process are in place to review future installation impacts to the Fire Protection Program and Fire PRA, resulting in updates to the applicable analyses and calculations as required. The presence of the thermal insulation does not compromise automatic/manual fire protection functions, or post-fire safe shutdown capability and will not prevent essential safety functions from being performed.

Conclusion:

NRC approval is requested for use of thermal insulation materials that meet the flame spread criteria, but do not meet the heat value content criteria of NFPA 805 based on these materials meeting BTP APCSB 9.5.1 requirements. MNS has determined that the approach satisfies the following criteria:

- Satisfies the performance goals performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;
- maintains safety margin; and,
- maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

M. LICENSE CONDITION CHANGES

8 Pages Attached

Replace the current MNS fire protection license condition 2.C.(4) for both Unit 1 and Unit 2 with the standard license condition in Regulatory Position 3.1 of RG 1.205, modified as shown below.

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Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment request dated September 26, 2013, as supplemented by letters dated January 8, 2014; October 13, 2014; November 12, 2014; December 12, 2014; January 26, 2015; February 27, 2015; March 13, 2015; July 15, 2015; August 20, 2015; September 9, 2015; October 1, 2015; January 14, 2016; April 26, 2016; and September 29, 2016, and as approved in the safety evaluation dated _____. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

Risk-Informed Changes that May Be Made Without Prior NRC Approval

A risk assessment of the change must demonstrate that the acceptance criteria below are met. The risk assessment approach, methods, and data shall be acceptable to the NRC and shall be appropriate for the nature and scope of the change being evaluated be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at MNS. Acceptable methods to assess the risk of the change may include methods that have been used in the peer-reviewed fire PRA model, methods that have been approved by NRC through a plant-specific license amendment or NRC approval of generic methods specifically for use in NFPA 805 risk assessments, or methods that have been demonstrated to bound the risk impact.

- a) Prior NRC review and approval is not required for changes that clearly result in a decrease in risk. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.
- b) Prior NRC review and approval is not required for individual changes that result in a risk increase less than 1×10^{-7} /year (yr) for CDF and less than 1×10^{-8} /yr for LERF. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

Other Changes that May Be Made Without Prior NRC Approval

1) Changes to NFPA 805, Chapter 3, Fundamental Fire Protection Program

Prior NRC review and approval are not required for changes to the NFPA 805, Chapter 3, fundamental fire protection program elements and design requirements for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is

functionally equivalent or adequate for the hazard. The licensee may use an engineering evaluation to demonstrate that a change to an NFPA 805, Chapter 3, element is functionally equivalent to the corresponding technical requirement. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the change has not affected the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard.

The licensee may use an engineering evaluation to demonstrate that changes to certain NFPA 805, Chapter 3, elements are acceptable because the alternative is “adequate for the hazard.” Prior NRC review and approval would not be required for alternatives to four specific sections of NFPA 805, Chapter 3, for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is adequate for the hazard. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the change has not affected the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard. The four specific sections of NFPA 805, Chapter 3, are as follows:

- Fire Alarm and Detection Systems (Section 3.8);
- Automatic and Manual Water-Based Fire Suppression Systems (Section 3.9);
- Gaseous Fire Suppression Systems (Section 3.10); and,
- Passive Fire Protection Features (Section 3.11).

This License Condition does not apply to any demonstration of equivalency under Section 1.7 of NFPA 805.

2) Fire Protection Program Changes that Have No More than Minimal Risk Impact

Prior NRC review and approval are not required for changes to the licensee's fire protection program that have been demonstrated to have no more than a minimal risk impact. The licensee may use its screening process as approved in the NRC safety evaluation report dated _____ to determine that certain fire protection program changes meet the minimal criterion. The licensee shall ensure that fire protection defense-in-depth and safety margins are maintained when changes are made to the fire protection program.

Transition License Conditions

- 1) Before achieving full compliance with 10 CFR 50.48(c), as specified by (2) below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in (2) above.
- 2) The licensee shall implement the items as listed in Attachment S, Table S-3, “Implementation Items,” of Duke Energy letter dated September 29, 2016, within 365 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. 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 will be completed by June 30, 2017. Implementation Item 20, associated with the pressure boundary breach analysis, will be completed by December 31, 2017.

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License condition 2.C.(4) for both Unit 1 and Unit 2 shall be superseded:

2.C.(4) Fire Protection Program

Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report for the facility and as approved in the SER dated March 1978 and Supplements 2, 5, and 6 dated March 1979, April 1981, and February 1983, respectively, and the safety evaluation dated May 15, 1989, subject to the following provisions:

The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

It is Duke Energy's understanding that implicit in the revocation of this license condition, all prior Fire Protection Program Safety Evaluations and commitments have been superseded in their entirety by the revised license condition.

No other license conditions need to be revised or superseded.

MNS implemented the following process for determining that these are the only license conditions required to be either revised or superseded to implement the new fire protection program which meets the requirements in 10 CFR 50.48(a) and 50.48(c):

- A review was conducted of the MNS Renewed Facility Operating License NPF-9 and NPF-17, by MNS licensing staff and the NFPA 805 Transition Team. The review was performed by reading the Operating License and performing electronic searches. Outstanding LARs that have been submitted to the NRC were also reviewed for potential impact on the license conditions.

Proposed Changes to Facility Operating License – Markup

The current version of Renewed Facility Operating Licenses NPF-9 and NPF-17 have been marked up to reflect the proposed change.

(4) ~~Fire Protection Program~~ **INSERT ATTACHMENT**

~~Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report for the facility and as approved in the SER dated March 1978 and Supplements 2, 5 and 6 dated March 1979, April 1981, and February 1983, respectively, and the safety evaluation dated May 15, 1989, subject to the following provision:~~

~~Duke may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.~~

(5) Additional Conditions

The Additional Conditions contained in Appendix B, as revised through Amendment No. 200, are hereby incorporated into this renewed operating license. Duke Energy Carolinas, LLC shall operate the facility in accordance with the Additional Conditions.

(6) Antitrust Conditions

The licensee shall comply with the antitrust conditions delineated in Appendix C of this renewed operating license.

(7) Mitigation Strategy License Condition

Develop and maintain strategies for addressing large fires and explosions and that include the following key areas:

- A) Fire fighting response strategy with the following elements:
 - 1. Pre-defined coordinated fire response strategy and guidance
 - 2. Assessment of mutual aid fire fighting assets
 - 3. Designated staging areas for equipment and materials
 - 4. Command and control
 - 5. Training of response personnel
- B) Operations to mitigate fuel damage considering the following:
 - 1. Protection and use of personnel assets
 - 2. Communications
 - 3. Minimizing fire spread
 - 4. Procedures for implementing integrated fire response strategy
 - 5. Identification of readily-available pre-staged equipment
 - 6. Training on integrated fire response strategy
 - 7. Spent fuel pool mitigation measures
- C) Actions to minimize release to include consideration of:
 - 1. Water spray scrubbing
 - 2. Dose to onsite responders

(4) ~~Fire Protection Program~~ **INSERT ATTACHMENT**

~~Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report for the facility and as approved in the SER dated March 1978 and Supplements 2, 5, and 6 dated March 1979, April 1981, and February 1983, respectively, and the safety evaluation dated May 15, 1989, subject to the following provisions:~~

~~The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.~~

(5) Protection of the Environment

Before engaging in additional construction or operational activities which may result in a significant adverse environmental impact that was not evaluated or that is significantly greater than that evaluated in the Final Environmental Statement dated April 1976, the licensee shall provide written notification to the Office of Nuclear Reactor Regulation.

(6) Additional Conditions

The Additional Conditions contained in Appendix B, as revised through Amendment No. 484, are hereby incorporated into this renewed operating license. Duke Energy Carolinas, LLC shall operate the facility in accordance with the Additional Conditions.

(7) Antitrust Conditions

The licensee shall comply with the antitrust conditions delineated in Appendix C of this renewed operating license.

(8) Mitigation Strategy License Condition

Develop and maintain strategies for addressing large fires and explosions and that include the following key areas:

- A) Fire fighting response strategy with the following elements:
 - 1. Pre-defined coordinated fire response strategy and guidance
 - 2. Assessment of mutual aid fire fighting assets
 - 3. Designated staging areas for equipment and materials
 - 4. Command and control
 - 5. Training of response personnel
- B) Operations to mitigate fuel damage considering the following:
 - 1. Protection and use of personnel assets
 - 2. Communications
 - 3. Minimizing fire spread

Attachment – Replacement Fire Protection License Condition

Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment request dated September 26, 2013, as supplemented by letters dated January 8, 2014; October 13, 2014; November 12, 2014; December 12, 2014; January 26, 2015; February 27, 2015; March 13, 2015; July 15, 2015; August 20, 2015; September 9, 2015; October 1, 2015; January 14, 2016; April 26, 2016; and September 29, 2016, and as approved in the safety evaluation dated _____. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

Risk-Informed Changes that May Be Made Without Prior NRC Approval

A risk assessment of the change must demonstrate that the acceptance criteria below are met. The risk assessment approach, methods, and data shall be acceptable to the NRC and shall be appropriate for the nature and scope of the change being evaluated be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at MNS. Acceptable methods to assess the risk of the change may include methods that have been used in the peer-reviewed fire PRA model, methods that have been approved by NRC through a plant-specific license amendment or NRC approval of generic methods specifically for use in NFPA 805 risk assessments, or methods that have been demonstrated to bound the risk impact.

- a) Prior NRC review and approval is not required for changes that clearly result in a decrease in risk. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.
- b) Prior NRC review and approval is not required for individual changes that result in a risk increase less than 1×10^{-7} /year (yr) for CDF and less than 1×10^{-8} /yr for LERF. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

Other Changes that May Be Made Without Prior NRC Approval

1) Changes to NFPA 805, Chapter 3, Fundamental Fire Protection Program

Prior NRC review and approval are not required for changes to the NFPA 805, Chapter 3, fundamental fire protection program elements and design requirements for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is functionally equivalent or adequate for the hazard. The licensee may use an engineering evaluation to demonstrate that a change to an NFPA 805, Chapter 3, element is functionally equivalent to the corresponding technical requirement. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the change has not affected the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard.

The licensee may use an engineering evaluation to demonstrate that changes to certain NFPA 805, Chapter 3, elements are acceptable because the alternative is "adequate for the hazard." Prior NRC review and approval would not be required for alternatives to four specific sections of NFPA 805, Chapter 3, for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is adequate for the hazard. A qualified fire protection engineer shall

Attachment – Replacement Fire Protection License Condition

perform the engineering evaluation and conclude that the change has not affected the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard. The four specific sections of NFPA 805, Chapter 3, are as follows:

- Fire Alarm and Detection Systems (Section 3.8);
- Automatic and Manual Water-Based Fire Suppression Systems (Section 3.9);
- Gaseous Fire Suppression Systems (Section 3.10); and,
- Passive Fire Protection Features (Section 3.11).

This License Condition does not apply to any demonstration of equivalency under Section 1.7 of NFPA 805.

2) Fire Protection Program Changes that Have No More than Minimal Risk Impact

Prior NRC review and approval are not required for changes to the licensee's fire protection program that have been demonstrated to have no more than a minimal risk impact. The licensee may use its screening process as approved in the NRC safety evaluation report dated _____ to determine that certain fire protection program changes meet the minimal criterion. The licensee shall ensure that fire protection defense-in-depth and safety margins are maintained when changes are made to the fire protection program.

Transition License Conditions

- 1) Before achieving full compliance with 10 CFR 50.48(c), as specified by (2) below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in (2) above.
- 2) The licensee shall implement the items as listed in Attachment S, Table S-3, "Implementation Items," of Duke Energy letter dated September 29, 2016, within 365 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. 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 will be completed by June 30, 2017. Implementation Item 20, associated with the pressure boundary breach analysis, will be completed by December 31, 2017.

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 365 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 be completed by December 31, 2017.

Table S-3 Implementation Items			
Item	Unit	Description	LAR Section / Source
1	1, 2	<p>Perform the following recommendations from the Radiological Release Evaluation:</p> <ol style="list-style-type: none"> 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. 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"> ▪ Water fog streams used for smoke scrubbing. ▪ Controlling water runoff during fire suppression activities. ▪ Covering drains and other similar containment measures. 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. 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. 5. Develop a Standard Operating Guideline (SOG) for fires involving contaminated material outside of the power block. 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. 	4.4.2 and Attachment E

Table S-3 Implementation Items

Item	Unit	Description	LAR Section / Source
		<ul style="list-style-type: none"> 7. Within each fire strategy, identify the RCA or Radioactive Control Zone in the written text. 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. 9. Add a standard statement for water runoff to all RCA fire strategies similar to the caution contained for smoke removal. 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. 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. 12. Develop a SOG to address owner controlled area RCAs. This would include, for example, Warehouse 7 and outage equipment stored there. 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. 	
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

Table S-3 Implementation Items			
Item	Unit	Description	LAR Section / Source
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, "NFPA 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"> ▪ Corrective action to add hard hat lights in control room and operation's kitchen to procedure, IP/0/B/3260/031. ▪ Add 60 minutes time to throttle Turbine Driven Auxiliary Feedwater valves to "Time Critical" program. ▪ 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). 	Attachment G
15	1, 2	Revise the QA Topical, as appropriate, to update the definition of QA 3 to match post NFPA 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 NFPA 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	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. 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.	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 December 31, 2017.	Duke/NRC conference call from 4/6/2016