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10 CFR 50.90

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: Response to August 28, 2014, NRC Request for Additional Information Regarding License Amendment Request to Implement a Risk-Informed Performance-Based Fire Protection Program (TAC Nos. MF2934 and MF2935).

Response to October 27, 2014, NRC Request for Additional Information Regarding 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, No ADAMS Number.
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, No ADAMS Number.
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.

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 Unit Nos. 1 and 2.

On December 18, 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 letter dated August 28, 2014 (Reference 5), the NRC requested additional information (RAI) in order to complete their review of the September 26, 2013, LAR. That letter grouped the RAIs into 60-day, 90-day, and 120-day response times. Duke Energy provided the 60-day and 90-day RAI responses by letters dated October 13, 2014, and November 12, 2014, respectively (References 6 and 8 respectively). Some of the 120-day RAI responses were submitted by letter dated December 12, 2014 (Reference 9). As indicated in that letter, some of the remaining 120-day RAI responses would be provided by January 26, 2015, and the balance of the 120-day RAI responses would be provided by February 27, 2015. With the exception of Fire Modeling (FM) RAI 02.a, FM RAI 02.b, FM RAI 06.a, and FM RAI 06.b, the 120-day RAI responses due January 26, 2015, are provided in Enclosure 1.

The requested information in FM RAI 02.a and FM RAI 02.b was discussed with the NRC during a conference call on January 15, 2015. Subsequent to that conference call, Duke Energy requested an extension on the response due dates for FM RAI 02.a, FM RAI 02.b, Since the responses to FM RAI 06.a and FM RAI 06.b are dependent on the response to FM RAI 02.b, Duke Energy also requested and extension on the response due dates for FM RAI 06.a and FM RAI 06.b. The NRC subsequently agreed to the above response due date extensions. The revised due dates for those responses and the balance of the 120-day RAI responses are documented in Enclosure 4.

During a conference call on December 8, 2014, the NRC requested Duke Energy provide additional details related to the 90-day RAI response for FM RAI 01.k. As described in the RAI response letter dated December 12, 2014, these details would be provided in a revised

response to that RAI by January 26, 2015. The revised response to FM RAI 01.k is provided in Enclosure 1.

By letter dated October 27, 2014 (Reference 7), the NRC requested additional information related to their radiation release related review of the MNS September 26, 2013, RI-PB LAR. The NRC requested the response to these radiation release RAIs be provided by January 26, 2015. Those responses are provided in Enclosure 2.

As a result of a MNS NFPA 805 LAR RAI response in this letter, it was necessary to revise a page in the LAR. That revised LAR page is included in Enclosure 3. Any LAR revisions resulting from the RAI responses due February 27, 2015, will be provided by February 27, 2015.

The conclusions reached in the original determination that the September 26, 2013, LAR contains No Significant Hazards Considerations and the categorical exclusion from performing an Environmental/Impact Statement have not changed as a result of the August 28, 2014, RAIs and the RAI responses in Enclosures 1 and 2.

This submittal does not contain any new or revised regulatory commitments.

Please direct any questions on this matter to Jeffrey N. Robertson at 980-875-4499.

I declare under penalty of perjury that the foregoing is true and correct. Executed on January 26, 2015.

Sincerely,

Steven D. Capps

Enclosures 1, 2, 3, and 4

xc:

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ENCLOSURE 1

Duke Energy Responses To The Below MNS NFPA 805 LAR 120-Day and 90-Day RAIs:

- **Fire Modeling (FM) RAI 01.j**
- **FM RAI 01.k - Revised Response**
- **Probabilistic Risk Assessment (PRA) RAI 13**

Note: The revised response to FM RAI 01.k replaces the response to this RAI provided on November 12, 2014.

REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST TO ADOPT

NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805

PERFORMANCE BASED STANDARD FOR FIRE PROTECTION

FOR LIGHT WATER REACTOR GENERATING PLANTS

DUKE ENERGY CAROLINAS, LLC

MCGUIRE NUCLEAR STATION UNITS 1 AND 2

DOCKET NOS. 50-369, 50-370

By letter dated September 26, 2013, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13276A126), Duke Energy Carolinas (Duke) submitted a license amendment request 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, as incorporated into Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.48(c). In order for the U. S. Nuclear Regulatory Commission (NRC) staff to complete its review of the license amendment request (LAR), the following additional information is requested:

FM RAI - 120-Day Response

FM RAI 01.j

NFPA 805-Section 2.4.3.3 states that the PRA approach, methods, and data shall be acceptable to the NRC. The NRC staff noted that the fire modeling analysis comprised the following:

- The Generic Fire Modeling Treatments (GFMTs) approach was used to determine the Zone of Influence (ZOI) for ignition sources and the time to Hot Gas Layer (HGL) conditions in all fire areas throughout MNS, Unit 1 and 2.
- The Consolidated Fire Growth and Smoke Transport (CFAST) model was used to assess the main control room (MCR) abandonment time calculations.

LAR Section 4.5.1.2, "Fire PRA," states that fire modeling was performed as part of the fire PRA (FPRA) development (NFPA 805 Section 4.2.4.2). Reference is made to Attachment J, "Fire Modeling Verification and Validation," for a discussion of the acceptability of the fire models that were used to develop the FPRA.

Specifically regarding the acceptability of the PRA approach, methods, and data:

j. Regarding the flame spread and fire propagation in cable trays:

Section V.2.3 of the LAR and the licensee's response to F&O FSS-C2-01 indicate that the licensee did not calculate fire propagation in, and the resulting HRR of, cable trays as described NUREG/CR-6850, Section R.4.2. The licensee's justification appears to be based on EIR 51-9160514-000, which as stated in the response to F&O FSS-C2-01,"... suggests that armored cables will not contribute to fire growth and spread ..." (see LAR, Attachment V, page V-8).

The NRC staff has the following observations:

1. During the audit the NRC staff reviewed the summary in EIR 51-9160514-000 of selected results of a test program conducted by the licensee, and determined on the basis of this summary that the horizontal flame spread rate over armored cable with a PVC jacket in the test was between 0.5 and 2.2 mm/s.
2. During the audit plant walkdowns the NRC staff noticed several trays in different areas of the plant that appeared to contain some unarmored cable (for example, tray 3972 in Fire Area 13). The NRC staff notes that for thermoplastic and thermoset cables NUREG/CR-6850, Section R.4.1.2 recommends a flame spread rate of 0.9 mm/s or 0.3 mm/s, respectively.

3. During the audit the NRC staff reviewed the licensee's Design Basis Specification for Fire Protection and noted that 45% of the combustible mass of armored power cable, and 60% of the combustible mass of armored control cable is outside the armor. The contribution to the HRR from the PVC jacket around the armor is therefore expected to be not negligible.
4. FAQ 08-0049 provides guidance on calculation of cable tray ignition, fire propagation between cable trays, and HRR. The FAQ indicates that the licensee will need to develop and justify plant-specific, configuration-specific models if they are to be used outside the original ZOI, and that these models will be an area of detailed staff review.

In light of these observations the analysis should account for the impact of the horizontal flame spread, vertical fire propagation and the resulting additional HRR on the ZOI and HGL temperature timing determination for fires that involve cables. Provide a summary of this re-evaluation, including the impact on the risk and delta risk.

Duke Energy Response:

j. As described in the Fire Scenario Report, Section 9.2, the MNS Fire PRA (FPRA) adequately accounts for fire propagation by applying a ZOI that identifies targets that would be damaged due to flame spread (i.e., horizontal progression of flame along a cable tray) and fire propagation (i.e., vertical progression of fire to additional cable trays). The horizontal ZOI used in the MNS FPRA exceeds the fire's "characteristic length," as described in NUREG/CR-6850, Section R.4.2, in order to account for flame spread. The vertical ZOI used in the MNS FPRA is extended to the ceiling, in order to account for fire propagation. This is reflected in Fire Scenario Report Figure 9-1, which shows how the horizontal ZOI encompasses the 35 degree angle discussed in NUREG/CR-6850, Section R.4.2, and depicted in NUREG/CR-6850 Figure R-5. Thus, the MNS FPRA methodology adequately incorporates fire propagation and flame spread in cable trays, as described in NUREG/CR-6850, Section R.4.2. This is depicted in Figure FM-01.j(1) below:

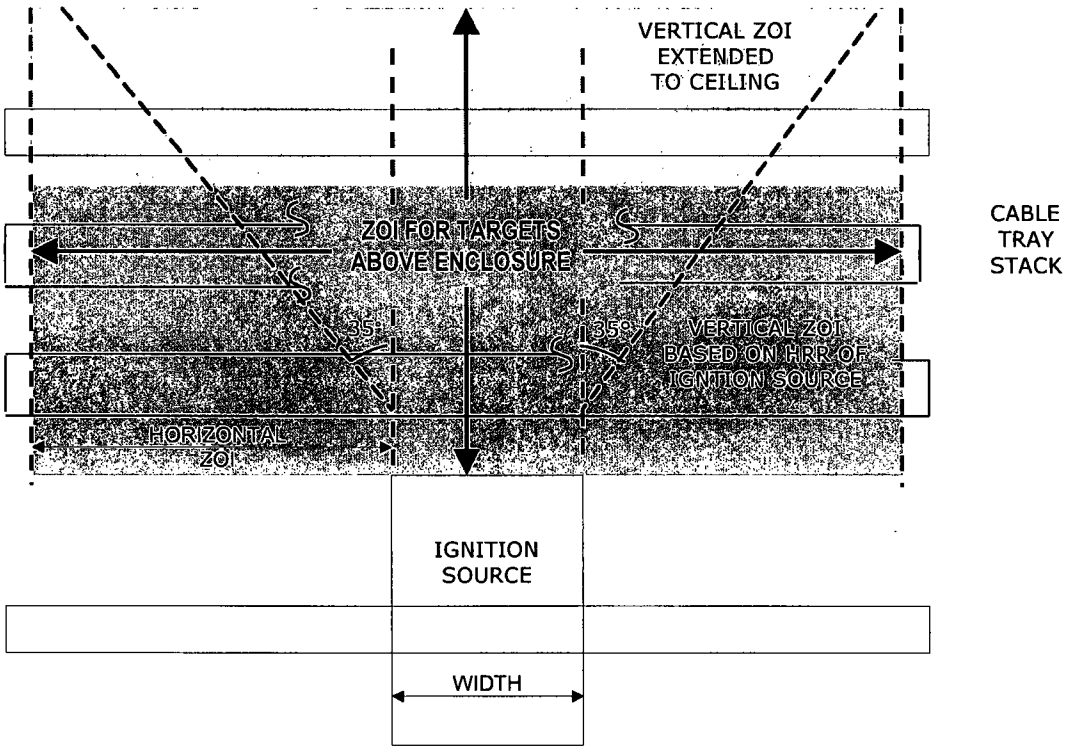

Figure FM-01.j(1)

The intention of the response to F&O FSS-C2-01 is to indicate that the approach taken in the MNS FPRA is adequate, because the armored cables predominately used at MNS are not expected to contribute to fire growth and spread. However, no actual credit is given for cable armor within the FPRA.

Appendix H of NUREG-CR/6850 states that "cables in conduit will not contribute to fire growth and spread. The conduit will be given no credit for delaying the onset of thermal damage." Engineering Information Record EIR 51-9160514-000 compares the physical construction of cable in conduit to unjacketed armored cable, and concludes that the same logic (i.e., cables in conduit not contributing to fire growth and spread) could be applied to armored cable. The response to F&O FSS-C2-01 can be clarified to state that the comparison between cable in conduit and unjacketed armored cables, combined with the guidance provided in Appendix H of NUREG-CR/6850, "suggests that [unjacketed] armored cables will not contribute to fire growth and spread." ["unjacketed" added for clarification]. This statement does not address the outer PVC jacket on the armored cable typically employed at MNS.

Also explained more thoroughly in EIR 51-9160514-000, separately from the comparison between cable in conduit and unjacketed armored cables, a review of Electric Power Research Institute/Nuclear Energy Institute (EPRI/NEI) report 1003326 (Test #1 and Test #13 results) indicates that the outer PVC jacket did not contribute to fire growth or propagation when located in the HGL, when tested. Taken together, these qualitative conclusions indicate that no additional penalties or measures need be taken to address flame spread and fire propagation at MNS due to the extensive use of armored cable, both jacketed and unjacketed. Therefore, applying the guidance in NUREG/CR-6850, Section R.4.2, as done in the MNS FPRA, adequately accounts for flame spread and fire propagation in cable trays.

Each of the NRC Staff's observations is addressed below:

1. Regarding the horizontal flame spread rate of armored cable with a PVC jacket observed during tests that were evaluated in EIR 51-9160514-000, Duke Energy does not dispute the Staff's observation. As explained above, and as reflected in the Fire Scenario Report, Section 9.2, horizontal flame spread is adequately captured within the target set (i.e., the ZOI) of each scenario.

2. Tray 3972 in Fire Area 13 was confirmed to contain only armored cables. Most of the armored cables at MNS employ an interlocking steel armor that is often visible beneath the contouring PVC jacket. However, some of the armor is either smooth metallic tape or braided flat wires and are not readily distinguishable from non-armored cables. However, no actual credit is given for cable armor within the FPRA. The flame spread rate found in NUREG/CR-6850, Section R.4.1.2 is adequately captured within the target set (i.e., the ZOI) of each scenario.

3. Regarding the referenced figure in the Design Basis Specification for Fire Protection, combustible mass values were not used in the MNS FPRA, and the values provided in this single figure are not intended to be used as accurate values for all cable types and configurations. For example, the quantity of cable filler material varies between cable types and configurations, and would impact the percent of combustible material outside the cable armor. The MNS FPRA adequately accounts for cable flame spread and fire propagation within the target set (i.e., the ZOI) of each scenario.

4. The MNS FPRA does not model cable flame spread and fire propagation outside of the original ZOI, because the MNS FPRA adequately accounts for cable flame spread and fire propagation within the target set (i.e., the ZOI) of each scenario. Therefore, no plant-specific, configuration-specific models were developed.

FM RAI - Revised 90-Day RAI Response

FM RAI 01.k

NFPA 805-Section 2.4.3.3 states that the PRA approach, methods, and data shall be acceptable to the NRC. The NRC staff noted that the fire modeling analysis comprised the following:

- The Generic Fire Modeling Treatments (GFMTs) approach was used to determine the Zone of Influence (ZOI) for ignition sources and the time to Hot Gas Layer (HGL) conditions in all fire areas throughout MNS, Unit 1 and 2.
- The Consolidated Fire Growth and Smoke Transport (CFAST) model was used to assess the main control room (MCR) abandonment time calculations.

LAR Section 4.5.1.2, "Fire PRA," states that fire modeling was performed as part of the fire PRA (FPRA) development (NFPA :805 Section 4.2.4.2). Reference is made to Attachment J, "Fire Modeling Verification and Validation," for a discussion of the acceptability of the fire models that were used to develop the FPRA.

Specifically regarding the acceptability of the PRA approach, methods, and data:

k. Regarding the fires in the proximity of a wall or a corner, explain how the GFMTs approach was applied for a fire against a wall or in a corner. Explain how wall and corner effects in the ZOI and HGL timing calculations were accounted for, or provide a technical justification if these effects were not considered.

Duke Energy Response:

k. The following general guidance/methodology was followed for wall and corner effects in the ZOI evaluation.

   Regarding separation distances, Calculation DPC-1535.00-00-0024, Rev. 0, Generic Fire Modeling Treatments (GFMT), Section 3.3.7 [Guidance for Fuel Packages Positioned in a Corner and Wall] states:

   1. If the fuel package is within 0.6 m (2 ft.) of a wall, then double the heat release rate and assume that the fire is centered at the fuel package edge adjacent to the wall.

   2. If the fuel package is within 0.6 m (2 ft.) of a corner, then quadruple the heat release rate and assume that the fire is centered at the fuel package corner nearest the wall corner.

   This GFMT is reflected in the McGuire Nuclear Station Fire Scenario Report, MCC-1535.00-00-0104, Rev. 3, Section 9.3 [Location Factor]. This section states:

   > The location of an ignition source relative to a wall or a corner may impact the zone of influence [*ZOI*]. While an ignition source walk down did not identify any fixed ignition sources as being located in a corner, ... Inverters ... in the Battery Room were confirmed to be located against a wall. The inverters, which stand nearly 8' tall, were located against individual battery room walls that are approximately 8' high with significant free space between the top of the cabinet and the adjacent room and the overall battery room ceiling; therefore, the location of these cabinets against the wall has minimal

> impact on the heat release rate. The impact of the location on the zone of influence for these fixed ignition sources (all of which were equipped with a top mounted deflector shield) has been addressed in the scope of assumed target damage. Similarly for transients, if the postulated transient location ... was along a wall or in a corner, the zone of influence was adjusted accordingly.

A review of the transient scenarios indicates that, while several were assumed to result in room burnout, it was not necessary to apply wall or corner effects to the Heat Release Rate (HRR). The hypothetical transient fuel packages were placed where targets such as cable trays or risers would be impacted. Since the target damage could be achieved by placement of the ignition source away from the wall or corner (i.e., an open location transient fuel package), no further adjustments were applied.

Wall and corner effects were not applied to the HGL screening analysis. HGL effects were calculated for situations with and without the presence of localized fire exposures. In cases with localized fire exposures, where HGL formation was sufficient to impact the ZOI of the localized fire, a reduced critical heat flux value was used to determine whether or not a target would be damaged. The method used is described in the Generic Fire Modeling Treatments calculation, Section 6.1.2 [Combined Hot Gas Layer – Localized Fire Exposure Effects].

Because the overall heat input to the room is not increased by placement near a wall or corner, in order to address the initial change in rate, the room volumes (and ventilation parameters) would also be doubled and quadrupled, accordingly. The net impact on the room burnout calculation is, therefore, considered negligible.

PRA RAI - 120-Day Response

PRA RAI 13

Section 2.4.3.3 of NFPA-805 states that the PRA approach, methods, and data shall be acceptable to the NRC. Section 2.4.4.1 of NFPA-805 further states that the change in public health risk arising from transition from the current fire protection program to an NFPA-805 based program, and all future plant changes to the program, shall be acceptable to the NRC. RG 1.174 provides quantitative guidelines on CDF, LERF, and identifies acceptable changes to these frequencies that result from proposed changes to the plant's licensing basis and describes a general framework to determine the acceptability of risk-informed changes. The NRC staffs review of the information in the LAR has identified additional information that is required to fully characterize the risk estimates.

LAR Section V.2.7 states "Control room abandonment is only considered for cases where the Control Room environment (temperature and smoke) reaches the criteria specified in NUREG/CR 6850. For non-abandonment cases credit may be taken at the Primary Control Station (PCS) as needed to control functions impacted for a given Control Room panel fire." LAR Table G-1 identifies PCS actions for the following 11 fire areas: 01 (U1 and U2), 02, 03, 04 (U1 and U2), 13 (U1 and U2), 14 (U1 and U2), 19, 20, 21 (U1 and U2), 24 (U1 and U2), and 25 (U1 and U2). If primary command and control is retained in the MCR (i.e., the MCR is not abandoned), then RG 1.205 states, "operation of dedicated or alternative shutdown controls while the main control room remains the command and control location would normally be considered a recovery action." In light of this, provide the following:

a) Clarify if primary command and control is retained in the MCR for fire scenarios in each of these 11 fire areas and explain how this decision is reached. If primary command and control is retained in the MCR, actions taken at the PCSs should be recovery actions. If these actions are not considered recovery actions in your analysis, please justify. Provide the additional risk of all recovery actions for each fire area if not already provided in the LAR. Also, discuss the results of the feasibility and reliability evaluation in accordance with FAQ 07-0030.

b) If command and control is not retained in the MCR and is transferred to the PCS, the actions taken at the primary control station are not recovery actions and the MCR is assumed to be abandoned on loss-of-control. Describe how PCS actions are modeled in the FPRA and the modeled abandonment scenarios. Describe the HRA performed for these actions. In the response, describe the cues that result in the decision to abandon and the timing of these cues, identify the instruments being relied upon to make the abandonment decision and discuss whether these instruments are protected, and discuss how failure to transfer control to the primary control stations is taken into account.

Duke Energy Response:

a) The compliance assessment for the aforementioned fire areas relies upon transfer of primary command and control to the Standby Shutdown Facility (SSF) as the success strategy. However, many of the fire scenarios in the FPRA for these fire areas do not rely on the SSF as the primary success path. Additionally, MNS Abnormal Procedures will direct the operators to implement SSF functions such as Reactor Coolant Pump (RCP) seal cooling while still maintaining command and control in the MCR. Only a loss of control room habitability will cause a transfer of primary command and control to the SSF.

The MCR (FA 24) and the Cable Rooms (U1 FA 19 and U2 FA 20) at MNS, which are "typical" alternative shutdown fire areas per Section III.G.3 of Appendix R, have been addressed consistent with the guidance in RG 1.205. A sensitivity study will be included in the PRA RAI 03 response to review the scenarios in fire areas 1, 2, 3, 4, 13, 14, 21 and 25 for modeled actions taken outside of the MCR that might be deemed a recovery action (actions credited to mitigate fire-specific failures) following the guidance in FAQ 07-0030 and RG 1.205.

b) When command and control is not retained in the MCR, the actions taken at the primary control station are not recovery actions. PRA RAI 12 describes how PCS actions are modeled in the FPRA including considerations of the cues that result in the decision to activate the SSF, timing of these cues and discussion of how a failure to transfer control to the PCS is taken into account. However, the PRA RAI 12 response does not address the instruments relied on to make the abandonment decision. Per MNS plant procedures, only control room habitability due to the fire will cause a complete abandonment of the MCR (as opposed to implementing SSF functions while maintaining command and control in the MCR as discussed in the response to PRA RAI 13.a). This decision does not rely on instrumentation.

ENCLOSURE 2

Duke Energy Responses To The MNS NFPA 805 LAR Radiation Release RAIs

REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST TO ADOPT

NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805

PERFORMANCE BASED STANDARD FOR FIRE PROTECTION

FOR LIGHT WATER REACTOR GENERATING PLANTS

DUKE ENERGY CAROLINAS, LLC

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

DOCKET NO. 50-369, 50-370

Radiation Release RAI 01

Describe the role and contributions of the McGuire Radiation Protection personnel in the screening process discussed in LAR Section 4.4.1, page 32.

Duke Energy Response:

The MNS Radiation Protection group played an important role in the development of calculation MCC-1435.00-00-0019, NFPA 805 Transition – Radiological Release Input to LAR Attachment E. The screening process requires input from plant personnel with knowledge of the plant's radiological controlled areas. The preparer of the Radiological Release report contacted Radiation Protection prior to performing the requisite research to obtain feedback during the screening and calculation development process. Radiation Protection personnel's involvement, including review and feedback on the calculation, continued through the final development of the NFPA 805 LAR.

Radiation Release RAI 02

LAR Attachment E, page E-11, states that Auxiliary Building "Sump C will transfer to the plant yard drains which discharge to the SNSWP and to the Waste Water Collection Basin." Is the capacity of this basin sufficient to contain liquid firefighting effluent such that there is no release from the site? If not, describe how the NFPA 805 release requirements will be met.

Duke Energy Response:

At its design water surface elevation of 690.00, the Waste Water Collection Basin (WWCB) has a capacity of 112,639 cubic yards or 69.8176 acre-feet. The calculated area of the WWCB at its design water surface elevation is 10.58 acres. In a conservative firefighting scenario, a single 1½" attack line, at a flow rate of 125 gallons per minute, is put into service for one hour to suppress a fire. Assuming all suppression flow reaches Sump C and, ultimately, the WWCB, the water surface elevation of the WWCB would increase by approximately 0.025 inches, or less than 1 millimeter. Given that the WWCB has a top of bank elevation of 697.00 (7 feet above the design water surface elevation) and is designed to accommodate storm events that produce multiple inches of runoff, the firefighting scenario described has a negligible impact on the capacity of the WWCB.

Radiation Release RAI 03

LAR Attachment E, page E-19, states that "The Turbine buildings are non-RCA areas of the plant," but they appear to be screened-in to the evaluation. If they are screened-in, describe what, and how, administrative controls will prevent a radiological release through their unmonitored ventilation.

Duke Energy Response:

LAR Attachment E, page E-19, "Smoke and By Products of Combustion-Airborne Effluent Evaluation" section will be revised to state "The Turbine Buildings are generally non-RCA areas of the plant." This statement is consistent with the Compartment Selection and Justification Basis section which states that there are "...localized areas of the Turbine Building that are identified as having an RCA..."

There are areas of the Turbine Building that may be used for storage or movement of radioactive material. As stated in Attachment E of the LAR, the ventilation systems in these areas are not equipped with radiation monitors and administrative controls will be required to ensure compliance. The intent of the administrative controls is to require site procedures to provide options for compliance in these areas. For example, materials may be stored in metal containers with tight fitting closures and/or covers. This will contain the radioactive material during fire suppression activities. Where it is not practical to store radioactive materials in tight fitting metal containers, a quantitative evaluation to determine an administrative storage limit has been completed. MNS has developed a new calculation, "Radioactive Release From Dry Active Waste Fire Suppression Calculation," which establishes the maximum level of curies that can be stored in a single fuel package (i.e., area, container or building) which, if completely consumed by fire, would not result in a radioactive release that would exceed 10 CFR 20 limits. LAR Attachment S, Table S-3 documents the implementation of administrative storage limits.

A revision to LAR Attachment E for this item is attached with this RAI response that includes this change.

Radiation Release RAI 04

LAR Attachment E, pages E-21 thru E-27, list several Compartments where administrative controls will be used to meet the NFPA 805 release requirements from fire in areas that are described as "open to atmosphere," with "no special drainage" provided. Describe what, and how, administrative controls will prevent a radiological release from the facility. If these controls meet the NFPA 805 release requirements by limiting the amount of radioactivity available for release, provide a quantitative assessment demonstrating that the bounding case does not exceed the dose limit to a member of the public.

Duke Energy Response:

The Compartments listed on pages E-21 through E-27 of LAR Attachment E do lack engineering controls to prevent radioactive release and, therefore, do rely on administrative controls to ensure compliance with 10 CFR 20 limits. The intent of the administrative controls is to require site procedures to provide options for compliance in these areas. For example, materials may be stored in metal containers with tight fitting closures and/or covers. This will contain the radioactive material during fire suppression activities. Where it is not practical to store radioactive materials in tight fitting metal containers, a quantitative evaluation to determine an administrative storage limit has been completed. MNS has developed a new calculation, "Radioactive Release From Dry Active Waste Fire Suppression Calculation," which establishes the maximum level of curies that can be stored in a single fuel package (i.e., area, container or

building) which, if completely consumed by fire, would not result in a radioactive release that would exceed 10 CFR 20 limits. LAR Attachment S, Table S-3 documents the implementation of administrative storage limits.

ENCLOSURE 3

Duke Energy MNS NFPA 805 LAR Revision Resulting From A RAI Response In This Submittal

Note: The revised LAR Attachment E Page E-19 in this Enclosure replaces the September 26, 2013 LAR Attachment E Page E-19 page in its entirety. The revised content of the LAR page is denoted by a revision bar in the margin of the page.

Compartment: Turbine Buildings-RCA

Compartment Selection and Justification Basis

Unit 1 and Unit 2 Turbine Buildings are completely independent structures with independent equipment. This evaluation applies to the localized areas of the Turbine Building that are identified as having an RCA during normal operation and temporary RCAs during periods of non-power operation.

Turbine Buildings RCA Fire Area, Fire Strategy(s) and Drawing Numbers

Fire Area:	Fire Area Description	Related Fire Strategy	Rev.	Related Drawing
FA TB1	Unit 1 Turbine Building	39	0	N/A
FA TB2	Unit 2 Turbine Building	45	0	N/A

Smoke and By Products of Combustion-Airborne Effluent Evaluation

The Turbine Buildings are generally non-RCA areas of the plant. The area ventilation is not equipped with radiation monitors. All ventilation discharges directly to atmosphere.

Fire Suppressant Runoff-Liquid Effluent Evaluation

Turbine building floor drains drain to the Turbine Building Sump. This sump is pumped to the Conventional Waste Water Treatment System. This system monitors for radioactivity and upon high radiation alarm, flow can be rerouted to the Condenser Circulating Water System, which is part of the Liquid Waste System. The Liquid Waste System is used to process liquid effluent.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies include guidance for monitoring by Radiation Protection. Additional modifications to the Fire Strategies will show potential release points. Examples of release points include: passage doors, overhead doors and hatches.

Guidance is provided in the Fire Brigade Response procedure (RP/0/A/5700/025) for the need to monitor, prevent or control radioactive release in the event of a fire. In addition, RP/0/A/5700/025 Enclosure 4.3, Fire Brigade Guidelines includes a section for Radiation Protection containing a bulleted list that states: Monitor smoke and water runoff, provide guidance to Fire Brigade Leader for all radiological concerns, and ensure Radioactive Releases are less than 10 CFR 20 limits.

Additional revisions to the fire strategy drawings will be done to highlight potential radioactive material release points such as: doors, hatches, roll-up doors, and other similar openings.

ENCLOSURE 4

Revised Due Dates For The Responses To FM RAI 02.a, FM RAI 02.b, FM RAI 06.a, FM RAI 06.b, And The Balance Of The 120-Day RAI Responses.

Revised Due Dates for the Responses to MNS NFPA 805 LAR FM RAI 02.a, FM RAI 02.b, FM RAI 06.a, FM RAI 06.b, and the Balance of the 120-Day RAI Responses

RAI	Revised Due Date
FM RAI 02.a	February 27, 2015
FM RAI 02.b	February 27, 2015
FM RAI 06.a	February 27, 2015
FM RAI 06.b	February 27, 2015
PRA RAI 03	February 27, 2015
PRA RAI 23	February 27, 2015