



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

June 25, 2015

Mr. K. Henderson  
Site Vice President  
Catawba Nuclear Station  
Duke Energy Carolinas, LLC  
4800 Concord Road  
York, NC 29745

SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2: REQUEST FOR  
ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT  
REQUEST TO IMPLEMENT A RISK-INFORMED, PERFORMANCE-BASED  
FIRE PROTECTION PROGRAM (TAC NOS. MF2936 AND MF2937)

Dear Mr. Henderson:

By letter dated September 25, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13276A503), Duke Energy Carolinas, LLC (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.

On May 10, 2015, the U.S. Nuclear Regulatory Commission staff issued several requests for additional information in the fire modeling (FM) area of review. We have determined FM RAI 01.I.01 should be revised and are providing the revised version in the enclosure.

Sincerely,

A handwritten signature in cursive script that reads "Bob Martin".

Bob Martin, Senior Project Manager  
Plant Licensing Branch II-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-413 and 50-414

Enclosure: As stated

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION (RAI)  
ADOPTION OF NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)  
STANDARD 805 FOR FIRE PROTECTION  
DUKE ENERGY CAROLINAS, LLC (DUKE)  
CATAWBA NUCLEAR STATION, UNITS 1 AND 2  
DOCKET NOS. 50-413, 50-414

By letter dated September 25, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13276A503), Duke Energy Carolinas, LLC (Duke) 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 is revising one of the RAIs issued in its letter of May 10, 2015, as follows:

**Fire Modeling (FM) RAI 01.I.01 (Revised)**

In a letter dated March 30, 2015 (ADAMS Accession No. ML15091A249), the licensee responded to FM RAI 01.I and explained that the installed above-ground high-density polyethylene (HDPE) piping was the only non-cable intervening combustible identified at Catawba Nuclear Station, Units 1 and 2, with the potential to impact the Fire PRA, and provided two reasons to justify ignoring the contribution from the existing HDPE piping to any pertinent fire scenarios.

Subsequently, as part of the regulatory audit activities, the NRC staff examined a description and summary of the results of an analysis that was prepared in support of the licensee's response to FM RAI 01.I. The purpose of the analysis was to provide an assessment of the thermal response of the HDPE piping exposed to constant heat flux typical of fire conditions. The heat transfer analysis was performed using HEATING Version 7.3 computer code. One of the key assumptions of the analysis is that the HDPE pipe maintains its structural integrity, even though in most cases the surface temperature reaches the melting temperature of HDPE. The NRC staff identified the following major issues concerning the analysis, among others:

- (i) The verification and validation (V&V) basis provided for HEATING Version 7.3 only includes heat transfer calculations for non-combustible materials that maintain their structural integrity in a fire (steel, concrete, etc.) and does not include heat transfer calculations for materials that deform and melt, nor do they include calculations that account for removal of melted material from the exposed surface, as would be the case for HDPE piping. The V&V basis provided is therefore inadequate, at least when the calculated temperature exceeds the melting point of the HDPE.

- (ii) The analysis assumes a constant heat flux and does not account for changes in the exposure conditions due to the heat release rate (HRR) contribution of the melted material, nor does the analysis make an assessment of the effect of this HRR contribution on PRA target damage.

In light of these conclusions, provide a summary of the results of an analysis that:

- a) Quantifies the contribution of the melted material to the HRR of the fire for the scenarios that expose the HDPE piping;
- b) Determines whether any additional PRA targets would be damaged due to the increased HRR; and
- c) Assesses the impact of the additional target damage, if any, on CDF,  $\Delta$ CDF, LERF and  $\Delta$ LERF.

In addition, provide the V&V basis for any models and model applications used in any additional analyses performed to respond to this RAI that are not already discussed in Attachment J of the license amendment request.

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/RA/

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Plant Licensing Branch II-1  
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**ADAMS Accession No. ML15169A875**

\*via E-mail

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