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

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261 / RENEWED LICENSE NO. DPR-23

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE
AMENDMENT REQUEST TO ADOPT NATIONAL FIRE PROTECTION ASSOCIATION
STANDARD 805, "PERFORMANCE-BASED STANDARD FOR LIGHT WATER REACTOR
ELECTRIC GENERATING PLANTS"**

Dear Sir/Madam:

By letter dated September 16, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13267A211) Duke Energy Progress, Inc. (DEP) submitted a license amendment request (LAR) for H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP2). This LAR would adopt a new fire protection licensing basis that complies with the requirements of Title 10 of the Code of Federal Regulations, Sections 50.48(a) and (c); the guidance in Regulatory Guide 1.205, Revision 1, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants"; and National Fire Protection Association (NFPA) 805, "Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Plants" (2001 Edition).

By letter dated July 31, 2015 (ADAMS Accession No. ML15212A136), DEP submitted a response to a NRC request for additional information (RAI). The NRC staff determined that additional information is needed to complete its review related to probabilistic risk assessment (PRA). A draft of that information request was received by DEP via email message on November 20, 2015 (ADAMS Accession No. 15324A328), officially via letter dated March 2, 2016 (ADAMS Accession No. ML16048A349). An RAI clarification call was held on December 7, 2015. The NRC staff also held an onsite audit February 9-10, 2016, to establish a proposed resolution of outstanding issues associated with the HBRSEP2 NFPA 805 review.

By letter dated May 25, 2016 (ADAMS Accession No. ML16158A006 and ML16158A267), DEP revised the LAR Attachment L, "NFPA 805, Chapter 3 Requirements for Approval," by adding an additional approval request not submitted with the original LAR. DEP requested NRC staff review and approval of a performance-based method to demonstrate an equivalent level of fire protection for the requirements of NFPA 805 Section 3.3.4, Insulation Materials because the insulation materials do not meet the definition of limited combustible due to the heat value exceeding 3500 Btu/lb. Based on the information provided by DEP in its request, the NRC staff requested additional information to complete its review. The response to this request is provided herein. The submittal conveys DEP's response, which includes a revision to LAR Attachment L, Approval Request 5.

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Please address any comments or questions regarding this matter to Mr. Tony Pilo, Acting Manager
– Nuclear Regulatory Affairs at (843) 857-1409.

There are no new regulatory commitments made in this letter.

I declare under penalty of perjury that the foregoing is true and correct. Executed on
July 25, 2016.

Sincerely,



R. Michael Glover
Site Vice President

RMG/jmw

Enclosure

cc: Region Administrator, NRC, Region II
Mr. Dennis Galvin, NRC Project Manager, NRR
NRC Resident Inspector, HBRSEP2
Ms. S. E. Jenkins, Manager, Infectious and Radioactive Waste Management Section (SC)
(w/o Attachment)

U. S. Nuclear Regulatory Commission
Enclosure to Serial: RNP-RA/16-0059
6 Pages (including this cover sheet)

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REQUEST FOR ADDITIONAL INFORMATION

VOLUNTARY FIRE PROTECTION RISK INITIATIVE

DUKE ENERGY PROGRESS

H. B ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261

Fire Protection Engineering (FPE) RAI 16

In accordance with 10 CFR 50.48(c)(2)(vii), a licensee may request NRC approval for use of a performance-based (PB) method as a means of demonstrating compliance with the prescriptive NFPA 805, Chapter 3, fundamental fire protection program (FPP) elements and minimum design requirements. Paragraph 50.48(c)(2)(vii) of 10 CFR requires that an acceptable PB approach accomplish the following:

- (A) Satisfy the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;
- (B) Maintain safety margins; and
- (C) Maintain fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

In a letter dated May 25, 2016 (ADAMS Accession Nos. ML16158A006 and ML16158A267), the licensee revised the license amendment request (LAR) Attachment L, "NFPA 805, Chapter 3 Requirements for Approval," by adding an additional approval request not submitted with its original LAR. The licensee requested NRC staff review and approval of a PB method to demonstrate an equivalent level of fire protection for the requirements of NFPA 805 Section 3.3.4, Insulation Materials because the insulation materials do not meet the definition of limited combustible due to the heat value exceeding 3500 Btu/Lb. Based on the information provided by the licensee in its request, the NRC staff was unable to complete its review.

The licensee did not fully address the requirements of 10 CFR 50.48(c)(2)(vii) in the following sections of the approval request: "Basis for Request", "Nuclear Safety and Radiological Release Performance Criteria", and "Safety Margin and Defense-In-Depth." In particular, the licensee did not fully address the requirements for using insulation materials with a heat value exceeding 3500 Btu/Lb.

The NRC staff requests that the licensee revise the approval request to fully address 10 CFR 50.48 (c)(2)(vii). The revised approval request should address how the PB method (1) satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release; (2) maintains safety margins; and (3) maintains fire protection defense-in-depth per 10 CFR 50.48 (c)(2)(vii).

Response:

A revision to LAR Attachment L, Approval Request 5 is submitted with this RAI response. The revision includes text revisions to the Approval Request and the additional details regarding how the PB method (1) satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release; (2) maintains safety margins; and (3) maintains fire protection defense-in-depth per 10 CFR 50.48 (c)(2)(vii).

Approval Request 5**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.”

Thermal insulation materials such as Armaflex, Neoprene, Styrofoam and other foam based insulating materials are used at HBRSEP. These insulation materials meet flame spread and smoke developed criteria, but do not meet the NFPA 805 definition of non or limited combustible regarding heat value content.

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

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 above described thermal insulation materials utilized at Duke Energy, HBRSEP are considered to be in deviation from the NFPA 805 Chapter 3 element, for which approval is requested to continue use thermal insulation materials.

During development of this approval request a number of plant locations were identified where insulation material was used for low point obstruction or head-bump protection (industrial safety). Additional limited applications were identified on piping associated with air cooling systems. All of the identified applications were evaluated against the fire scenarios supporting the FPR. In all instances, the supporting analyses were found to be bounding. The limited uses of exposed insulation material were not of an amount that would impact the fire scenarios developed in support of the fire and PRA analysis. These installations were therefore screened out from further consideration.

Basis for Request:

The basis for the approval request of this deviation is:

- It is not practical to replace these insulating materials throughout the plant. As discussed in the Acceptance Criteria Evaluation below, this deviation presents no adverse impact to the NSPC and radiological release performance criteria, or to safety margin and defense-in-depth.

Armaflex and similar thermal insulation met the Branch Technical Position BTP APCSB 9.5.1/ Appendix R requirements for limited combustibles by meeting the flame spread rating of 25 or less as measured using the test method of ASTM E-84, but does not meet the current decreased heat value content requirement based on the definition of a limited combustible due to the heat value exceeding 3500 Btu/Lb.

NFPA 805 Section 3.3.4 requires: "Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible." The definition of a limited combustible for NFPA 805 uses the definition from NFPA 220 which states:

1.6.36 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. (See NFPA 220, Standard on Types of Building Construction).

The insulation materials used in the plant have flame spread and smoke developed ratings of 50 or less. Interior walls and structural components, radiation shielding, soundproofing, and interior finishes are non-combustible or are listed by a nationally recognized testing laboratory, such as Factor Mutual (FM) or UL, or have flame-spread, smoke and fuel contribution of 25 or less and are considered acceptable per the original BTP/Appendix R requirements. Typical insulation materials were noted as having heat contribution values of approximately 9,000-11,000 Btu/Lb, which, while higher than the definition, was not considered to contribute appreciably to the spread of fire, nor represent a secondary combustible beyond those currently analyzed in the FPRA due to the limited applications.

Acceptance Criteria Evaluation:

Nuclear Safety and Radiological Release Performance Criteria:

The use of insulation material other than non-combustible and more than limited combustible in the plant does not affect nuclear safety. 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. General area walkdowns and personnel interviews found that there were no large concentration installations of this insulation in the plant. Therefore the additional heat contribution (Btu/Lb.) noted for the insulation provided no additional impact beyond that previously considered. The impact of the negligible quantities of exposed materials was noted to be bounded by the currently applied ignition source ZOIs, and did not create a new or expanded ZOI that impacted existing targets. No existing fire scenarios as considered in the FPRA were adversely impacted.

Some fire areas transitioned using deterministic based approaches. The Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) were evaluated for each ignition source in these fire areas. Threshold values of CDF and LERF were used to characterize the risk significance of the ignition sources. The results of the quantification determined that all ignition sources in the fire area fell below 1.00E-08/year CDF and below 1.00E-09/year LERF and are characterized as "Not Potentially Risk Significant", and no Variances from the Deterministic Requirements (VFDRs) were present in the area. Therefore, the presence of limited quantities of exposed combustible insulation would likewise have a negligible impact on the FPRA results and walkdowns of these fire areas were not performed.

The use of insulation material other than non-combustible 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 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 insulation materials in the current configurations are considered as non-cable intervening combustibles. 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 conservatisms in these analysis methods remain unchanged based on the impact of the insulation and the deviation noted in the heat contribution of the insulation.

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 non-combustible or more than limited combustible does not impact fire protection defense-in-depth. The insulation material does not affect echelons 1, 2, and 3. The insulation material, and specifically the small deviation increase in heat contribution in conjunction with the limited applications, does not directly result in compromising automatic fire suppression functions, manual fire suppression functions, or post-fire safe shutdown capability as previously designed, reviewed and considered.

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/Appendix R requirements. HBRSEP 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, along with
- Defense in Depth, and
- Safety Margin