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

March 28, 2014

Vice President, Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 – REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT REQUEST PROPOSING THE ADOPTION OF NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805 (TAC NO. MF0404)

Dear Sir or Madam:

By letter dated December 17, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12353A041), as supplemented by letters dated November 7 and December 4, 2013, and January 6, 2014 (ADAMS Accession Nos. ML13312A877, ML13338A432, and ML14006A315, respectively), Entergy Operations, Inc. (the licensee) submitted a license amendment request (LAR) proposing to revise Renewed Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit 2. The proposed changes would modify the license to incorporate a transition to National Fire Protection Association Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition."

The U.S. Nuclear Regulatory Commission staff has reviewed the LAR and determined that additional information is needed to complete its review. The specific questions are found in the enclosed request for additional information (RAI). The questions were sent in draft form via electronic transmission on March 11, 2014, to Mr. David Bice, of your staff. The draft questions were discussed in a teleconference with your staff on March 19, 2014. It was agreed that a response to this RAI would be submitted within 60 days of the issuance date of this letter.

If you have any questions, please contact me at (301) 415-2833 or by e-mail at Peter.Bamford@nrc.gov.

Sincerely,

Peter Bamford

Peter J. Bamford, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST TO ADOPT

NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805

ENTERGY OEPRATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 2

DOCKET NO. 50-368

By letter dated December 17, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12353A041), Entergy Operations, Inc. (Entergy, the licensee), submitted a license amendment request (LAR) proposing to revise Renewed Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit 2. The proposed changes would modify the license to incorporate a transition to National Fire Protection Association Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition" (NFPA 805). By letters dated November 7 and December 4, 2013, and January 6, 2014 (ADAMS Accession Nos. ML13312A877, ML13338A432, and ML14006A315, respectively), Entergy responded to previous requests for additional information (RAIs) from the U.S. Nuclear Regulatory Commission (NRC) staff. The NRC staff continues to review the submittal, as supplemented, and has determined that additional information is needed to complete its review.

Fire Modeling (FM) RAI 01.03

In Entergy's letter dated January 6, 2014, the licensee responded to FM RAI 01.f and 01.g and stated that new zone of influence (ZOI) and hot gas layer (HGL) tables were developed that are applicable to ignition source-cable tray configurations. The ZOI and HGL were calculated for a number of ignition sources without any intervening combustibles, and in combination with various cable tray configurations. The ZOI dimensions and HGL temperatures are tabulated as a function of time, compartment volumes, vent sizes, and for different fire locations (open, wall, and corner) and ambient temperatures.

Please provide the following information:

a. An explanation regarding the extent that the new ZOI and HGL tables replace the generic fire modeling treatments (GFMTs) ZOI and HGL tables and whether the latter are still used for fires involving secondary combustibles.

b. A description concerning whether the new ZOI and HGL tables were used for the ignition sources without intervening combustibles and if so, how.

c. An explanation regarding how the effect of ambient temperature is accounted for in the ZOI and HGL determination.

FM RAI 07

NFPA 805, Section 2.4.3.3, on acceptability states, in part, that

> The PSA [Probabilistic Safety Assessment] approach, methods, and data shall be acceptable to the AHJ [Authority Having Jurisdiction].

The NRC staff has noted the utilization of a number of accepted tools and methods in the analyses for transition, such as the Consolidated Model of Fire Growth and Smoke Transport (CFAST) and Fire Dynamic Tools (FDTs).

a. Please identify any fire modeling tools and methods that have been used in the development of the NFPA 805 LAR that are not already documented in the LAR and where their use or application is documented. Examples might include a methodology (empirical correlations and algebraic models) used to convert damage times for targets in Appendix H of NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities," September 2005 (ADAMS Accession No. ML052580075), to percent damage as a function of heat flux and time or Supplements to the GFMTs - Empirical Correlations and Algebraic Models.

b. For any tool or method identified in "a." above, provide the Verification and Validation (V&V) basis if not already explicitly provided in the LAR (for example in LAR Attachment J).

FM RAI 08

In Entergy's letter dated January 6, 2014, the licensee responded to FM RAI 01.k and explained that during additional walkdowns, non-cable intervening combustibles were identified that were not considered in the FM analyses and that an implementation item was added to LAR Attachment S, Table S-2 to ensure that these combustibles will be appropriately controlled to support transition to NFPA 805.

Since non-cable intervening combustibles (e.g., fixed or in situ), are generally not subject to controls, the NRC staff questions this approach. Please provide a quantitative assessment of the impact on plant risk (core damage frequency (CDF), delta (Δ) CDF, large early release frequency (LERF) and Δ LERF) of the fire scenarios that involve the non-cable intervening combustibles that were identified in the walkdowns.

FM RAI 09

Please explain how high energy arcing fault (HEAF) initiated fires were addressed in the HGL calculations and multi-compartment analysis (MCA) and provide technical justification for the approach that was used to calculate HGL development timing. More specifically, please confirm whether the guidance provided in NUREG/CR-6850, page 11-19, fourth bullet regarding the fire growth, and the guidance provided on page M-13, sixth bullet regarding delay to cable tray ignition was followed. Also, considering the energetic nature of the HEAF events, provide

justification for the heat release rate used in the HGL calculations for electrical cabinet fires following a HEAF.

Fire Protection Engineering (FPE) RAI 11.01

In Entergy's letter dated November 7, 2013, the licensee responded to FPE RAI 11 and stated that the fire brigade leader and fire brigade members are required to maintain non-licensed operator (NLO) qualifications. This qualification requires completion of plant systems training as part of a qualification program designed to give the NLO an understanding of the integrated nature and design of plant systems and structures.

NFPA 805 Section 3.4.1(c) states, in part, that

> ...the brigade leader and at least two brigade members shall have sufficient training and knowledge of nuclear safety systems to understand the effects of fire and fire suppressants on nuclear safety performance criteria.

In Section 1.6.4.1, "Qualifications," of NRC Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plants," Revision 2, September 2009 (ADAMS Accession No. ML092580550), the NRC staff has acknowledged the following example for the fire brigade leader as sufficient:

> The brigade leader should be competent to assess the potential safety consequences of a fire and advise control room personnel. Such competence by the brigade leader may be evidenced by possession of an operator's license or equivalent knowledge of plant systems.

Please describe the training provided to the fire brigade leader that addresses their ability to assess the effects of fire and fire suppressants on nuclear safety performance criteria.

If you have any questions, please contact me at (301) 415-2833 or by e-mail at Peter.Bamford@nrc.gov.

Sincerely,

/RA/

Peter J. Bamford, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

DISTRIBUTION:
PUBLIC
LPL4-1 Reading
RidsAcrsAcnw_MailCTR Resource
RidsNrrDorlLpl4-1 Resource
RidsNrrDraAfpb Resource
RidsNrrLAJBurkhardt Resource
RidsNrrPMANO Resource
RidsRgn4MailCenter Resource
JRobinson, NRR

ADAMS Accession No.: ML14085A225 ***via email**

OFFICE	NRR/DORL/LPL4-1/PM	NRR/DORL/LPL4-1/LA	NRR/DRA/AFPB/BC*	NRR/DORL/LPL4-1/BC	NRR/DORL/LPL4-1/PM
NAME	PBamford	JBurkhardt	AKlein	MMarkley	PBamford
DATE	3/28/14	3/27/14	2/26/14	3/28/14	3/28/14

OFFICIAL RECORD COPY