



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

June 27, 2013

Mr. Richard L. Anderson, Site Vice President
NextEra Energy
Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER – REQUEST FOR ADDITIONAL
INFORMATION FOR REVIEW REGARDING LICENSE AMENDMENT
REQUEST TO ADOPT NATIONAL FIRE PROTECTION ASSOCIATION
STANDARD 805 (TAC NO. ME6818)

Dear Mr. Anderson:

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated August 5, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11221A280), NextEra Energy Duane Arnold, LLC (the licensee) submitted a license amendment request. The licensee requested to transition their fire protection licensing basis at the Duane Arnold Energy Center (DAEC), from Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.48(b) to 10 CFR 50.48(c), National Fire Protection Association Standard 805 (NFPA 805).

The NRC staff is reviewing your submittal and has determined that additional information is required to complete the review. The specific information requested is addressed in the enclosure to this letter. During a discussion with your staff on June 11, 2013, it was agreed that you would submit an updated Attachment S, Table S-2, Implementation Items, and that you would provide a response to this request for additional information by July 3, 2013.

During a discussion with your staff on June 18, 2013, it was further agreed that you would add two implementation items to Table S-2. These items include (1) changing the heat release rate assigned to transient fires to comply with an NRC-accepted method¹, and (2) discontinuing the use of the reduction in the likelihood estimates for circuits containing a control power transformer (CPT) compared to circuits without a CPT that is described in Task 10 in NUREG/CR 6850², "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities,

¹ The two currently acceptable methods include 1) the use of 98th percentile 317KW HRR as described in Table E-1 NUREG/CR 6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities, April 2005," and 2) use of a different value supported by justification as endorsed by the NRC in its letter to NEI dated June 21, 2012 on "Recent Fire PRA Methods Review Panel Decisions and EPRI 1022993, 'Evaluation of Peak Heat Release Rates in Electrical Cabinet Fires.'"

² The values in Tables 10-1 and 10-3 of NUREG/CR 6850 include a factor of 2 reduction compared to the same parameter values in Tables 10-2 and 10-4. Recent experiments have indicated that this factor of 2 cannot be demonstrated and Tables 10-2 and 10-4 should be used until new Tables have been developed and found acceptable by the NRC.

R. Anderson

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April 2005." An example of these types of implementation items can be found in Table 2.9-1, Item 41 of the Safety Evaluation issued to Oconee Nuclear Station Units 1, 2, and 3, regarding transition to risk-informed, performance based fire protection program in accordance with 10 CFR 50.48(c) dated December 29, 2010 (ADAMS Accession No. ML103630612). This example includes direction to conduct a focused scope peer review and that all findings of this review be dispositioned if the modification made is an upgrade.

The NRC considers that timely responses to requests for additional information help ensure sufficient time is available for the NRC staff review and contribute toward the NRC's goal of efficient and effective use of staff resources.

Please contact Carolyn Faria at (301) 415-4050, if you have any questions.

Sincerely,



Karl Feintuch, Project Manager
Plant Licensing Branch 3-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosures: Request for Additional Information
and PRA RAI 84 Table 1

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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
DUANE ARNOLD ENERGY CENTER
NEXTERA ENERGY
DOCKET NO. 50-331

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated August 5, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11221A280), NextEra Energy Duane Arnold, LLC (the licensee) submitted a license amendment request (LAR). The licensee requested to transition their fire protection licensing basis at the Duane Arnold Energy Center (DAEC), from Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.48(b) to 10 CFR 50.48(c), National Fire Protection Association Standard 805 (NFPA 805). To complete its review, the NRC staff requests additional information as discussed below.

1. The table enclosed summarizes modifications made to the probabilistic risk assessment (PRA) in response to several previous requests for additional information (RAI) issued during the review of the LAR to transition to NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants", 2001 Edition. Address the individual modifications as expressed in *PRA RAI 84 Table 1* to confirm the completion of each.
2. In licensee's letter dated February 12, 2013 (ADAMS Accession No. ML13046A031), in response to RAI 58.01, DAEC states that a full update of the NFPA 805 fire PRA application will be performed prior to transition.

Propose a response that includes a regulatory process (e.g., a general license condition or implementation item) that provides assurance that all the proposed changes including those listed in *PRA RAI 84 Table 1* will be made and all associated documentation will be finalized before the PRA is used to support future self-approval.

3. An integrated analysis is provided in Table 5 of the response to RAI 82 dated May 1, 2013, (ADAMS Accession No. ML13122A045). The results include fire scenarios for the main control room (MCR).

Please provide the MCR abandonment fire scenarios total core damage frequency and large early release probability (CDF/LERF) and delta CDF/LERF from this analysis. If there is a difference between the total and delta risk for these fire scenarios, explain the

reason for the difference and provide justification for not including the entire MCR abandonment risk in the calculation of delta risk.

Discuss how the delta risk is calculated for the MCR abandonment scenarios for the different conditional core damage probabilities (CCDPs), which are discussed in the response to RAI 64 (ADAMS Accession No. ML13015A350), and how the MCR abandonment recovery actions are included in the delta risk calculation for each CCDP. For example, it is not clear from the response to RAI 64 how the failure to recover probability and the 0.1 probability of failure of success path equipment are used in the compliant case versus the variant case. Please include additional description of how the compliant versus variant CDF/LERF are estimated for the same scenario.

PRA RAI 84
Table 1

RAI	Description of Modification and Request for Additional Information
FM 01	<p>In the licensee's letter dated October 15, 2013 (ADAMS Accession No. ML122910950), DAEC states that: The DAEC Fire PRA - NFPA 805 RAI Model Update Quantification Report has been updated to include the new self-ignited fire scenarios and the change in input for fire scenarios with thermoplastic cable targets. This change will be incorporated in the updated FPR model in response to RAI-01.</p> <p>Please confirm that the PRA includes the new self-ignited fire scenarios and the change in input for fire scenarios with thermoplastic cable targets, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 05	<p>Licensee's letter dated May 23, 2012 (ADAMS Accession No. ML12146A094), included a revised multi-compartment analysis (MCA) in which barrier elements were summed. The revised MCA is included in the composite analysis. DAEC also stated that they would revise Appendix C of the Fire Scenario Report to include barrier elements as discussed in RAI PRA-5.</p> <p>Confirm that the PRA includes a revised MCA in which barrier elements were summed, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 07	<p>Licensee's letter dated May 23, 2012 (ADAMS Accession No. ML12146A094), included a revised analysis without using a severity factor of 0.01 for the diesel generator rooms. The revised analysis is included in the composite analysis. DAEC also stated that they would update Appendix C of the Fire Scenario Report to reflect changes in MCA scenarios as discussed in RAI PRA-7.</p> <p>Confirm that the PRA no longer uses a severity factor of 0.01 for the diesel generator rooms, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>

RAI	Description of Modification and Request for Additional Information
PRA 08.01	<p>By letter dated March 6, 2013, (ADAMS Accession No. ML13070A065), DAEC included a revised MCA to include NUREG/CR-6850 Step 5.c (Section 11.5.4.5) while determining whether combinations of MCA should be screened out. The letter also stated that the revised analysis is included in the composite analysis (ADAMS Accession No. ML13122A045), Table 4-3 of the License Amendment Request (ADAMS Accession No. ML11221A280) and will be updated to include the automatic suppression system required for risk.</p> <p>Confirm that the PRA screens combinations of MCAs based on NUREG/CR-6850, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 10	<p>By letter dated April 23, 2012, (ADAMS Accession No. ML12117A052), DAEC responded that during transition to NFPA 805, the monitoring program will be enhanced to satisfy new requirements.</p> <p>Please confirm that the monitoring program will be enhanced to satisfy new requirements and, to the extent applicable, these new requirements will be reflected in the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 11.01	<p>By letter dated March 6, 2013, (ADAMS Accession No. ML13070A065), DAEC included a revised analysis without manual suppression credit. The letter also stated that the revised analysis is included in the composite analysis. (See letter dated April 23, 2012, ADAMS Accession No. ML12117A052 and ML13122A045).</p> <p>Confirm that the PRA does not include manual suppression credit and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 13	<p>By letter dated April 23, 2012 (ADAMS Accession No. ML12117A052), DAEC stated that they would revise Section 2 and Table 2.2-2 of the Plant Partitioning and Fire Ignition Frequency report to reflect the expanded justification provided in response to RAI PRA-13.</p> <p>Please confirm that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>

RAI	Description of Modification and Request for Additional Information
PRA 14a	<p>Licensee's letter dated May 23, 2012 (ADAMS Accession No. ML12146A094), included a revised cable spreading room (CSR) analysis that removed a hot work pre-initiator factor of 0.01. In the response to RAI 82 dated May 1, 2013 (ADAMS Accession No. ML13122A045), it was stated that the revised analysis is included in the composite analysis.</p> <p>Confirm that the PRA no longer includes a hot work pre-initiator factor of 0.01, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 14b	<p>Licensee's letter dated May 23, 2012 (ADAMS Accession No. ML12146A094), included a revised CSR analysis with the use of a "Very Low" ranking consistent with Frequently Asked Question (FAQ) 12-0064, Hot Work/Transient Fire Frequency Influence Factors (ADAMS Accession No. ML12346A488). In the response to RAI 82 dated May 1, 2013 (ADAMS Accession No. ML13122A045), it was stated that the revised analysis is included in the composite analysis.</p> <p>Confirm that the PRA's CSR analysis uses the "Very Low" ranking consistent with FAQ 12-0064, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 14.01	<p>Licensee's letter dated May 23, 2012 (ADAMS Accession No. ML12146A094), included a revised CSR analysis that: (1) assumes at least a plant trip for CSR fires; (2) identifies the contribution from the loss of offsite power; (3) assumes alternate shutdown capability (ASC) is not available; (4) does not credit prompt suppression for general transient fires; and (5) quantifies large early release frequency (LERF). In the response to RAI 82 dated May 1, 2013 (ADAMS Accession No. ML13122A045), it was stated that the revised analysis is included in the composite analysis.</p> <p>Confirm that the PRA: (1) assumes at least a plant trip for CSR fires; (2) identifies the contribution from the loss of offsite power; (3) assumes ASC is not available; (4) does not credit prompt suppression for general transient fires; and (5) quantifies LERF, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>

RAI	Description of Modification and Request for Additional Information
PRA 16	<p>By letter dated April 23, 2012 (ADAMS Accession No. ML12117A052), DAEC stated that Table 3.3-1 of the Fire Model Development Report, the human reliability analysis (HRA) and the basic event probability will be updated to reflect the lack of a cue and that the operator action is not credited in the FPRA. In addition, DAEC stated that the basic event probability will be applied in the updated FPRA model in response to RAI PRA 01.</p> <p>Confirm that the HRA in the PRA and any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 33	<p>By letter dated April 23, 2012 (ADAMS Accession No. ML12117A052), DAEC stated that they would revise Section 6 of the Fire Model Development Report to include the details regarding the evaluation of long term operator actions on LERF provided in response to RAI PRA-33.</p> <p>Confirm that the missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 35.01	<p>Licensee's letter dated March 6, 2013 (ADAMS Accession No. ML13070A065), included justification for incipient detection credit and the results of a sensitivity study without incipient detection credit. In the response to RAI 82 dated May 1, 2013 (ADAMS Accession No. ML13122A045), it was stated that no credit for incipient detection is included in the composite analysis.</p> <p>Confirm that the PRA includes no credit for incipient detection and that conforming changes will be completed for all documentation during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 57	<p>Licensee's letter dated April 23, 2012 (ADAMS Accession No. ML12117A052), included a response to RAI 57 that included a table that listed each PRA level 2 basic event and identified the potential fire impact for each event. The letter also stated that DAEC would revise the Fire Model Development Report to include the table provided in response to RAI PRA-57.</p> <p>Confirm the documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 under cover letter dated February 12, 2013 (ADAMS Accession No. ML13046A031).</p>

RAI	Description of Modification and Request for Additional Information
PRA 69	<p>In a letter dated March 6, 2013, (ADAMS Accession No. ML13070A065), it was stated by DAEC that the FPRA adequately evaluates electronics in the MCR as described in NUREG/CR-6850. In a letter dated May 1, 2013 (ADAMS Accession No. ML13122A045), in response to a follow-on question related to RAI 69 in RAI 82, a summary was provided related to an evaluation of electronics outside of the MCR that included walkdowns and use of NUREG/CR-6850 damage temperatures.</p> <p>Confirm that: (1) the PRA includes the results of evaluation inside and outside of the MCR that are consistent with the methods as described in NUREG/CR-6850, and (2) that documentation will incorporate the relevant discussion during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 under cover letter dated February 12, 2013.</p>
PRA 70	<p>Licensee's letter dated February 12, 2013 (ADAMS Accession No. ML13046A031), identified that the credit given to sealed electrical cabinets to prevent fire spread was consistent with the treatment in FAQ 08-0042, Fire Propagation From Electrical Cabinets, (ADAMS Accession No. ML092110537).</p> <p>Confirm that the PRA evaluates sealed cabinets according to FAQ 08-0042, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 71	<p>RAI 71 questioned the use of a conditional probability of 0.1 for transient combustibles located near the MCR, and the response to RAI 82 indicated that this probability had been removed. In the response to RAI 82 dated May 1, 2013 (ADAMS Accession No. ML13122A045), it was stated that the revised analysis is included in the composite analysis.</p> <p>Confirm that the PRA no longer includes the conditional probability, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
PRA 72	<p>Licensee's letter dated March 6, 2013 (ADAMS Accession No. ML13070A065), included a revised analysis that used a minimum non-suppression probability of 0.001. In the response to RAI 82 dated May 1, 2013 (ADAMS Accession No. ML13122A045), it was stated that the revised analysis is included in the composite analysis.</p> <p>Confirm that the PRA uses a minimum non-suppression probability of 0.001, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>

RAI	Description of Modification and Request for Additional Information
PRA 83b	<p>In response to the RAI 83b dated May 1, 2013 (ADAMS Accession No. ML13122A045), it was clarified by DAEC that the heat release rate (HRR) used in the updated CSR analysis was based on NUREG/CR-6850 guidance. In the response to RAI 82 dated May 1, 2013 (ADAMS Accession No. ML13122A045), it was stated that the revised analysis is included in the composite analysis.</p> <p>Confirm that the PRA uses an updated CSR analysis using a HRR based on NUREG/CR-6850 guidance and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031).</p>
LAR Table V-3 F&O 4-22, 4-23, 4-25 dispositions	<p>The disposition of these Facts and Observations (F&Os) is that fire scenario 1OE-F45 sensitivity case refined the use of the electric panel factor approach to use of the Hughes Generic Fire Modeling results for critical separation distances based on HRR.</p> <p>Confirm that the PRA uses the Hughes Generic Fire Modeling results for critical separation distances based on HRR, and that any missing documentation will be completed during the full update of the NFPA 805 fire PRA application, as stated in response to RAI 58.01 (See letter dated February 12, 2013, ADAMS Accession No. ML13046A031). Also confirm that the electric panel factor approach had not been used in the results reported for RAI 82.</p>
RAI 64	<p>A detailed HRA was performed as a basis for justifying that the MCR conditional core damage probability of 0.1 is bounding. This HRA is related to a recovery action in the LAR to start the emergency diesel generator SBDG1 to power the vital bus for ASC. The HRA evaluation was provided in response to RAI 64 in a letter dated January 11, 2013 (ADAMS Accession No. ML13015A350).</p> <p>Confirm that the inputs to the detailed HRA have been evaluated in both the LAR Attachment G, Step 4, "Evaluate the Feasibility of Recovery Actions," and Step 5, "Evaluate the Reliability of Recovery Actions".</p>

R. Anderson

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April 2005." An example of these types of implementation items can be found in Table 2.9-1, Item 41 of the Safety Evaluation issued to Oconee Nuclear Station Units 1, 2, and 3, regarding transition to risk-informed, performance based fire protection program in accordance with 10 CFR 50.48(c) dated December 29, 2010 (ADAMS Accession No. ML103630612). This example includes direction to conduct a focused scope peer review and that all findings of this review be dispositioned if the modification made is an upgrade.

The NRC considers that timely responses to requests for additional information help ensure sufficient time is available for the NRC staff review and contribute toward the NRC's goal of efficient and effective use of staff resources.

Please contact Carolyn Faría at (301) 415-4050, if you have any questions.

Sincerely,

/RA/

Karl Feintuch, Project Manager
Plant Licensing Branch 3-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosures: Request for Additional Information
and PRA RAI 84 Table 1

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*concurrence via e-mail dated 6/11/13

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