



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

July 15, 2015

Mr. George H. Gellrich, Vice President
Exelon Generation Company, LLC
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 -
REQUEST FOR ADDITIONAL INFORMATION REGARDING THE NATIONAL
FIRE PROTECTION ASSOCIATION STANDARD 805 LICENSE AMENDMENT
REQUEST (TAC NOS. MF2993 AND MF2994)

Dear Mr. Gellrich:

By letter dated September 24, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML13301A673 and ML13301A674), as supplemented by letters dated February 9, 2015 (ADAMS Accession No. ML15043A249), March 11, 2015 (ADAMS Accession No. ML15075A110), and April 13, 2015 (ADAMS Accession No. ML15107A029), Exelon Generation, LLC, submitted a license amendment request that proposed to transition its fire protection licensing basis 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, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, for Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2.

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing the submittal and has determined that additional information is needed to complete its review. The specific questions are found in the enclosed request for additional information (RAI). The NRC staff is requesting a response to the RAIs within 30 days of the date of this letter.

If you have any questions regarding this issue, please contact me at (301) 415-2549.

Sincerely,

A handwritten signature in black ink, appearing to read "Alex Chereskin", is positioned above the typed name.

Alexander N. Chereskin, Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION
REGARDING THE NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805
LICENSE AMENDMENT REQUEST
CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2
CALVERT CLIFFS NUCLEAR POWER PLANT, LLC
EXELON GENERATION COMPANY, LLC
DOCKET NOS. 50-317 AND 50-318

By letter dated September 24, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML13301A673 and ML13301A674), Calvert Cliffs Nuclear Power Plant, LLC (the licensee), submitted a license amendment request (LAR) for Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (CCNPP), to transition its fire protection licensing basis 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 (NFPA) 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition. The licensee submitted request for additional information (RAI) responses by letters dated February 9, 2015 (ADAMS Accession No. ML15043A249), March 11, 2015 (ADAMS Accession No. ML15075A110), and April 13, 2015 (ADAMS Accession No. ML15107A029). Based on its review of the RAI responses, the U.S. Nuclear Regulatory Commission (NRC) staff requests the following additional information to complete its safety evaluation of the LAR:

Probabilistic Risk Assessment (PRA) RAI 06.01

The response to Probabilistic Risk Assessment (PRA) RAI 06 (by letter dated April 13, 2015) appears to indicate that transient combustibles with heat release rates (HRRs) greater than that assumed by the Fire PRA (FPRA) may be present and left unattended in Plant Area Units (PAUs) 311, 317, 407, and 430. The administrative controls currently discussed in the response establish expectations that appear to reduce the frequency that transient combustibles may be present but not necessarily the HRR of the combustibles. For example, if large amounts of transient combustibles are brought into a switchgear room, then it would be subjected to the associated administrative controls that seem to only reduce the frequency of large fires by reducing the time the combustibles will be present (e.g., "remove from the work area at the end of the shift"). Similarly, if "minor amounts" of transient combustibles ("minor amounts" is not defined in the RAI response and is interpreted to be "only the amount needed to support the work," which could still be greater than the 142 kW HRR assumed in the PRA) are brought into a switchgear room, then it would be subjected to a less stringent set of administrative controls that also seem to only reduce the frequency of large fires by reducing the time the combustibles will be present (e.g., "the materials are to be removed from the work location at the completion of the work activity").

Enclosure

Based on the above discussion, clarify how the administrative controls currently in place for PAUs 311, 317, 407, and 430 can be used, in conjunction with specific attributes and considerations applicable to these locations, to support a justification for selection of a screening HRR that is lower than the 317 kW.

PRA RAI 13.01

The response to PRA RAI 13 (by letter dated April 13, 2015) indicates that the main control board (MCB) analysis will be updated as part of the response to PRA RAI 03 to address the NRC staff's observation regarding the presence of both qualified and unqualified wiring in the MCB. However, the response does not state how the MCB analysis will be updated. Describe (or reference a description of) the MCB analysis and clarify how the revised treatment of qualification is consistent with, or bounds, the MCB wiring configuration.

PRA RAI 15

In the response to PRA RAI 15 (by letter dated April 13, 2015), the licensee clarified that Main Control Room (MCR) abandonment for loss of function was included in the PRA following fires in the cable spreading room. The licensee stated that loss of function is defined as the "...immediate or impending loss of vital auxiliaries, degraded steam generator level indication and/or degraded flow control instruments [that] will lead to MCR abandonment." The licensee clarified that loss of the whole Cable Spreading Room (CSR) meets these conditions and, for lesser fires, the appropriate fault tree logic is applied. The response further stated that the "...abandonment cases assume a complete relocation of the primary control station (PCS) to the Auxiliary Safe Shutdown Panel (ASSDP)..." In the response to PRA RAI 18.a (by letter dated February 9, 2015), the licensee stated that Variance from Deterministic Requirements (VFDRs) were removed from the CCNPP FPRA compliant plant model by setting the VFDR related basic events to false "in all areas." However, in the latter response to PRA RAI 18.b (by letter dated April 13, 2015), the licensee clarified that instead of setting the VFDR related basic events to false for scenarios that lead to MCR abandonment, Human Error Probability (HEPs) associated with actions occurring away from the primary control station (PCS) actions were either adjusted to reflect an equivalent action at the PCS or assumed to be successful in the compliant plant model. Therefore, the effects of individual fires in the CSR are evaluated and, if loss of control occurs, the PRA models the shutdown of the plant from the ASSDP. Furthermore, VFDRs are included as in all areas in the plant.

Confirm that the effects of individual fires in the CSR are evaluated and different scenarios developed based on the population of Structures, Systems, and Components (SSCs) failed for different fires (i.e., not all fires lead to the use of the Auxiliary Safe Shutdown Panel, for both the post-transition and compliant plant models).

Fire Protection Engineering (FPE) RAI 11

In its letter dated April 13, 2015, the licensee identified a plant condition that was not in compliance with NFPA 805 Section 3.3.1.2(1). In accordance with 10 CFR 50.48(c)(2)(vii), the licensee submitted new Approval Request 7 as part of the amended pages to the LAR, Attachment L, to request NRC approval of a performance-based method to comply with NFPA 805 Section 3.3.1.2(1). This section requires that wood used within the power block be listed as pressure-impregnated or coated with a listed fire-retardant application.

The licensee requested the ability to store and use wood in designated fenced-in storage areas in Room 1101 (12' North Storage Area) and Room 1109 (Warehouse) in Fire Area TB/NSB/ACA.

Additionally, it states in 10 CFR 50.48(c)(2)(vii), in part, that performance-based methods that are used to evaluate fire protection program (FPP) elements and minimum design requirements of NFPA 805 Chapter 3, must meet certain criteria. It must be determined that the method:

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

The NRC staff requests the following information to evaluate the approval request:

- a. The approval request states that the storage areas contain various types and quantities of combustible storage, including but not limited to rack storage, and that limits on the quantities of storage are administratively established by the fire protection engineer through the use of the Combustible Loading Analysis Database.
 - i. Characterize the type, quantities, and use of wood and other combustible storage in Rooms 1101 and 1109, and include the relative contribution to combustible loading of the non-treated wood compared to other combustible materials in these rooms.
 - ii. Describe the specific limits and associated administrative controls on the amount of non-treated wood that can be stored in each of the fence-in storage areas in Rooms 1101 and 1109 (in-situ or transient).
- b. The approval request states that the likelihood of a fire in Rooms 1101 and 1109, is expected to be minimal due to the limited number of fixed ignition sources in the rooms and procedural controls on hot work and transient combustible materials. Describe the types of fixed ignition sources in, or near, the fenced-in storage areas, and the exposure fire hazards that could propagate to the fenced-in storage and potentially ignite the stored materials.
- c. The approval request states that in the event of a fire in the storage areas, wet pipe automatic suppression is provided in the areas above the storage which has been reviewed for compliance with NFPA 13. Summarize the technical basis for concluding that the sprinkler design is acceptable for the hazard associated with 12-foot rack storage of wood and other combustibles that substantiates the statement that the loading will not challenge that wet pipe sprinkler system, assuming the storage areas contain the maximum allowed quantity of non-treated wood and other combustibles.

- d. Discuss the bases for not needing the installation of an automatic smoke detection system to provide early warning of a fire in the fenced-in storage areas, assuming the storage areas contain the maximum allowed quantity of non-treated wood and other combustibles. Describe the additional fire protection available in the area of the storage rooms that supports defense-in-depth (e.g., hose stations and extinguishers).
- e. Element 1 (Echelon 1) of defense-in-depth, as described in NFPA 805, Section 1.2, is associated with fire prevention, which includes controlling the elements of fuels (i.e., combustibles) and ignition that are necessary for fire to occur. In Approval Request 7, the discussion of Element 1 of defense-in-depth only addresses ignition sources. Provide additional discussion of how the storage and use of untreated wood in Rooms 1101 and 1109 meets or has compensated for Element 1 of defense-in-depth relative to control of combustibles.

FPE RAI 12

In its letter dated April 13, 2015, the licensee identified a plant condition that was not in compliance with NFPA 805, Section 3.3.5.2. In accordance with 10 CFR 50.48(c)(2)(vii), the licensee submitted new Approval Request 8 as part of the amended pages to LAR Attachment L to request NRC approval of a performance-based method to comply with NFPA 805, Section 3.3.5.2. This section requires that only metal trays and metal conduits be used for electrical raceways, and that thin wall electrical metallic tubing (EMT) not be used for power, instrumentation, or control cables.

The licensee stated that CCNPP currently uses non-metallic raceways (conduit) in concrete-embedded and underground applications; and that EMT is used to route cables in various locations throughout the plant. The licensee also requested permission to use a performance-based approach to evaluate and self-approve the use of non-metallic conduits that are neither concrete-embedded nor underground.

It states in 10 CFR 50.48(c)(2)(vii), in part, that performance-based methods that are used to evaluate FPP elements and minimum design requirements of NFPA 805, Chapter 3, must meet certain criteria. It must be determined that the method:

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

The NRC staff requests the following information to evaluate the approval request:

- a. For use of non-metallic raceways (conduits):
 - i. The approval request states that the use of non-metallic conduit is required by CCNPP drawings/specifications for concrete-embedded and underground installations where metal raceways do not meet design requirements. The approval

request further states that new applications of non-metallic conduit are approved and evaluated in accordance with design procedures which include a review of fire protection design requirements. Describe the acceptance criteria that is included in the current design procedures that allow the installation of non-metallic conduit at CCNPP, and clarify whether the current design procedure includes (or will include) criteria that involve: satisfying the nuclear safety and radiological release performance goals, performance objectives and performance criteria; maintaining safety margins; and maintaining fire protection defense-in-depth. Also, identify the implementation item to revise the procedure(s), if needed.

- ii. The licensee stated during a June 4, 2015, public meeting that Approval Request 8 will be revised and resubmitted to remove the use of non-metallic raceways (conduit) in applications that are neither embedded in concrete nor buried underground. Confirm that this is correct.

b. For use of electrical metallic tubing (EMT):

- i. Provide a technical justification which does not rely on an unendorsed edition of NFPA 805 (i.e., the 2015 edition) or any other unendorsed NFPA code (e.g., NFPA 70).
- ii. Confirm that the EMT is not installed in any location subject to physical damage, and describe the criteria by which it will be used to ensure that future EMT installations will not be in locations subject to physical damage.
- iii. Provide additional detail regarding the extent of installation of EMT at CCNPP (e.g., a few specific fire areas or throughout the plant). Confirm whether EMT is used for any power, control, or instrument cables associated with Nuclear Safety Capability Assessment components.
- iv. The licensee stated that EMT is non-combustible and will not contribute to the fire load, and stated that neither non-EMT nor EMT metallic conduits are credited in the NFPA 805 analyses to prevent or delay damage due to the fire. Confirm that fire damage and circuit failure assumptions for circuits in non-EMT metallic conduit and EMT conduit are the same, or describe the differences.

Safe Shutdown Analysis (SSA) RAI 11.01

Safe Shutdown Analysis (SSA) RAI 11 requested information on how the Marinite boards were credited in NFPA 805, Chapter 4. In its response to SSA RAI 11.a (by letter dated April 13, 2015), the licensee stated that the Marinite boards will no longer be credited to provide 20 foot separation in Unit 1 and Unit 2 containments; and that the Marinite boards are credited in the Fire PRA as a "fire break" to prevent fire spread across the east and west portions of Unit 1 and 2 containments. The licensee stated that a minimum of 25 feet of each cable tray (that traverses between containment east to west) is covered (top and bottom) with 1/2-inch Marinite XL and the Marinite boards are banded to the trays with 3/8-inch stainless steel banding, minimum of 12 gauge steel.

It states in NFPA 805, Section 4.1, that once a determination has been made that a fire protection system or feature is required to achieve the performance criteria of Section 1.5, its design and qualification shall meet the applicable requirement of Chapter 3. Based on discussions with the licensee during a public meeting on June 4, 2015, the NRC staff understands that the Marinite boards have been installed and are being credited in a similar manner to metal cable tray top and bottom covers. Describe the Marinite board performance assumptions, as credited in the performance-based analysis for the Marinite board.

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Sincerely,

/RA/

Alexander N. Chereskin, Project Manager
Plant Licensing Branch I-1
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Docket Nos. 50-317 and 50-318

Enclosure:
Request for Additional Information

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