



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713**

May 21, 2019

Mr. Bryan C. Hanson
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO), Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

**SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 –
NOTIFICATION OF CONDUCT OF A TRIENNIAL FIRE PROTECTION
BASELINE INSPECTION AND REQUEST FOR INFORMATION**

Dear Mr. Hanson:

The purpose of this letter is to notify you that the U.S. Nuclear Regulatory Commission (NRC) staff will conduct a triennial fire protection baseline inspection at Calvert Cliffs Nuclear Power Plant, Units 1 and 2, in September 2019. The inspection team will be led by Mr. Eugene DiPaolo from the NRC Region I Office. The team will be composed of personnel from the NRC Region I Office. The inspection will be conducted in accordance with Inspection Procedure 71111.05XT, the NRC's baseline fire protection inspection procedure.

The schedule for the inspection is as follows:

- Information Gathering Visit: August 27 - 29, 2019
- On-Site Inspection: September 9-13, 2019 and September 23-27, 2019

The purpose of the information gathering visit is to obtain information and documentation needed to support the inspection, to become familiar with the station fire protection programs, fire protection features, nuclear safety capability and performance criteria, plant layout, and mitigating strategies to address Title 10 of the *Code of Federal Regulations* (10 CFR) 50.54(hh)(2); and obtain plant specific site access training and badging for unescorted access.

An initial list of the documents the team will review during the conduct of the inspection are listed in Enclosures 1 and 2. The team leader will contact you with any additional specific document requests prior to the information gathering visit.

Your cooperation and support during this inspection will be appreciated. If you have questions concerning this inspection, or the inspection team's information request or logistical needs, please contact Mr. Eugene DiPaolo, Team Leader at (610) 337-6959, or via e-mail at eugene.dipaolo@nrc.gov.

B. Hanson

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Sincerely,

/RA/

Glenn T. Dentel, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-317 and 50-318
License Nos. DPR-53 and DPR-69

Enclosures:

1. Fire Protection Program Supporting Documentation
2. Mitigating Strategies Supporting Documentation

cc: Distribution via ListServ

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 NOTIFICATION OF CONDUCT OF A TRIENNIAL FIRE PROTECTION
 BASELINE INSPECTION AND REQUEST FOR INFORMATION DATED
 MAY 21, 2019

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Fire Protection Program Supporting Documentation

If you have any questions regarding this information request, please contact Mr. Eugene DiPaolo as soon as possible, at (610) 337-6959 or via e-mail at eugene.dipaolo@nrc.gov.

Electronic format on compact disc (CD) or digital versatile disc (DVD) is the preferred media, except where specifically noted. If electronic media is made available via an internet based remote document management system, then the remote document access must allow inspectors to download, save, and print the documents in the NRC's regional office. Paper records (hard copy) are of course always acceptable. At the end of the inspection, the documents in the team's possession will not be retained.

This document request is based on *typical documents* that a generic plant might have. As such, this generic document request is not meant to imply that any specific plant is required to have all of the listed documents. It is recognized that some documents listed below may not be available for your plant. In addition, the document titles listed below are based on typical industry document names; your plant specific document titles may vary.

I. Information Requested Prior to the Information Gathering Visit

Preferably no later than three weeks prior to the information gathering visit, provide these documents to the inspection team leader in the Region I Office.

A. DESIGN AND LICENSING BASIS DOCUMENTS

- A.1 Post-Fire Nuclear Safety Capability, Systems, and Separation Analysis
- A.2 Fire Hazards Analysis and/or NFPA 805 Design Basis Document
- A.3 Fire Probabilistic Risk Assessment (PRA) Summary Document or full PRA Document (if summary document not available)
- A.4 NFPA 805 Transition Report, developed in accordance with NEI 04-02
- A.5 Fire Risk Evaluations (i.e., NFPA 805 Section 2.4.3)
- A.6 Plant Change Evaluations (i.e., NFPA 805 Section 2.4.4)
- A.7 Analysis that demonstrates that nuclear safety performance criteria can be achieved and maintained for those areas that require recovery actions
- A.8 Fire protection program and/or fire protection plan

C. CLASSIC FIRE PROTECTION

- C.1 Pre-fire plans for all fire areas (Electronic copies)

Based on review of the above documents, the team leader should identify a preliminary list of fire areas being considered for inspection prior to the on-site information gathering visit. During the information gathering visit, or shortly thereafter, the fire areas selected for inspection will be determined.

II. Information Requested during the Information Gathering Visit

On the first day of the information gathering visit, provide these documents to the inspection team:

A. DESIGN AND LICENSING BASIS DOCUMENTS

- A.9 LIST of post-fire safe shutdown components (i.e., safe shutdown equipment list)
- A.10 Design Basis Documents for the Fire Protection System and Nuclear Safety Capability Features
- A.11 LIST of applicable NFPA codes and standards and issuance dates (i.e., codes of record)
- A.12 LIST of deviations from (a) NFPA codes of record, or (b) NFPA 805 fundamental fire protection program and design elements (i.e., NFPA 805, Chapter 3)
- A.13 LIST of nuclear capability design changes completed in the last three years (including their associated 10 CFR 50.59 and NFPA 805 plant change evaluations)
- A.14 Three nuclear safety capability assessment or safe shutdown capability impact screening reviews for recent design changes, modifications, or temporary modifications (e.g., a Generic Letter 86-10 review that screened out, or an NFPA 805 plant change evaluation that screened out)
- A.15 NFPA Compliance Review Report
- A.16 Report or evaluation that compares the fire protection program to the NRC Branch Technical Position (BTP) 9.5-1 Appendix A
- A.17 COPY of licensee submittals and NRC safety evaluation reports that are specifically listed in the facility operating license for the approved fire protection program
- A.18 COPY of NRC safety evaluation reports that form the licensing basis for the Fire Protection Program and post-fire nuclear safety capability
- A.19 COPY of NRC-approved exemptions for plant fire protection and post-fire nuclear safety capability features
- A.20 COPY of exemption requests submitted but not yet approved for plant fire protection and post-fire nuclear capability features
- A.21 Facility Operating License
- A.22 Technical Specifications (electronic format only)
- A.23 Technical Requirements Manual (electronic format only)
- A.24 Updated Final Safety Analysis Report (only the Fire Protection Section)

B. GENERAL PLANT DESIGN DOCUMENTS

- B.1 Piping and instrumentation diagrams (P&IDs) and legend list for components used to achieve and maintain nuclear safety performance criteria for: (C-size paper drawings)
- fires outside the main control room; and
 - fires in areas requiring recovery actions at other than primary control stations
- B.2 P&IDs and legend list for fire protection systems, including fire water supply, water suppression sprinklers & deluge, and CO₂ & Halon systems (C-size paper drawings)
- B.3 Yard layout drawings for underground fire protection buried piping (C-size paper drawings)
- B.4 Plant layout or hazard barrier drawings showing the fire area boundaries and combustible control zones (C-size paper drawings)
- B.5 AC and DC electrical system single line diagrams, from off-site power down to the highest safety-related bus level (e.g., typically 4kV diesel bus) (C-size paper drawings)
- B.6 Equipment location drawings which identify the physical plant locations of post-fire nuclear safety capability equipment (C-size paper drawings)

C. CLASSIC FIRE PROTECTION

- C.2 Impairment Log for fire protection features that are out of service
- C.3 COPY of fire protection program implementing procedures (e.g., administrative controls, surveillance testing, fire brigade)
- C.4 LIST of calculations and engineering analyses, studies, or evaluations for the fire protection system, including the fire water system
- C.5 Hydraulic calculation or analysis for fire protection water system
- C.6 LIST of routine tests, surveillances, and preventive maintenance on fire pumps, including pump controllers and batteries
- C.7 Last two completed annual or 24 month fire pump pressure and flow tests
- C.8 Last two completed monthly or quarterly fire pump tests
- C.9 Last two completed fire loop flow tests and loop flushes
- C.10 COPY of the complete test, surveillance, or maintenance procedure (current document control copy), including any associated data forms, for the completed surveillances requested above in C.7, C.8, and C.9
- C.11 LIST of penetration seal work, re-work, or installation activities, in the last three years
- C.12 LIST of fire wrap work, re-work, or installation activities, in the last three years

C.13 Last five hot work permits (at power)

C.14 Last five transient combustible permits (at power)

C.15 For Fire Brigade Drills, provide the following:

- Last five fire brigade drill critiques
- Last drill critique for a drill with off-site fire department support
- Last unannounced drill which was critiqued by a qualified individual independent of the licensee's staff
- Last unannounced drill critique
- Last back-shift drill critique
- Dates, shifts, and locations of unannounced drills for last three years

Summary of any unsatisfactory drill performance items for last three years

C.16 For Fire Brigade Equipment, provide the following:

- Procedure for inventory and inspection
- Most recent inspection and inventory results

C.17 LIST of fire brigade training lesson plans

C.18 For credited radio communications, provide the analysis or evaluation which demonstrates the adequacy and availability of the radio communications for a post-fire safe shutdown scenario, for all fire areas (e.g., repeater power supply availability, radio coverage tests, etc.)

C.19 For Emergency Lighting Units (ELU), provide the following:

- COPY of performance based emergency lighting assessments
- LIST of Preventive Maintenance tasks and frequencies
- Most recently performed monthly or quarterly functional test
- Most recently performed battery discharge performance test
- ELU battery loading analysis, for ELUs that supply more than two light heads
- Vendor manual(s) for on-site inspector use
- Results of black-out testing (if performed)
- Maintenance Rule program information related to the ELUs
- Compensatory measures taken when ELUs are out of service

C.20 Fire protection system health reports for the two most recent quarters

C.21 Fire protection program health report for the two most recent quarters

C.22 Emergency lighting system health reports for the two most recent quarters

C.23 Three fire protection system impact screening reviews for recent design changes, modifications, or temporary modifications (e.g., a Generic Letter 86-10 review that screened out, or an NFPA 805 plant change evaluation that screened out)

C.24 LIST of fire protection system design changes completed in the last three years (including their associated 10 CFR 50.59 and Generic Letter 86-10 evaluations or NFPA 805 plant change evaluations)

C.25 LIST of fire protection system NFPA 805 engineering equivalency evaluations completed in the last three years

C.26 Licensee evaluation of industry operating experience:

- NRC IN 2008-05, Fires Involving Emergency Diesel Generator Exhaust Manifolds
- NRC IN 2016-08, Inadequate Work Practices Resulting in Faulted Circuit Breaker Connections
- NRC IN 2017-04, High Energy Arc Faults in Electrical Equipment Containing Aluminum Components
- NRC IN 2018-09, Electrical Arc Flash Caused by Foreign Material Damages Fire Door

D. ELECTRICAL

D.1 Identify whether the cables in the plant are predominantly Thermoset or Thermoplastic

D.2 Maintenance procedures that verify breaker over-current trip settings to ensure coordination remains functional, for nuclear safety capability components

D.3 System health reports for all credited AC and DC electrical systems for the two most recent quarters

D.4 Last surveillance demonstrating operability of those components operated from the primary control stations (i.e., all of the transfer/isolation devices)

D.5 LIST of nuclear safety capability system and component design changes completed in the last three years. This should include all plant changes for which a change evaluation was required per the approved fire protection program

D.6 Administrative or configuration control procedures that govern fuse replacement (e.g., fuse control procedures)

D.7 LIST of all Variances from Deterministic Requirements

E. OPERATIONS

E.1 LIST of calculations and engineering analyses, studies, or evaluations for the nuclear safety capability methodology

E.2 Thermal hydraulic calculation or analysis that determined the time requirements for time-critical operator actions

E.3 Operating procedures to achieve and maintain nuclear safety performance criteria from the control room, for a postulated fire in the selected fire areas

- E.4 Operating procedures to achieve and maintain nuclear safety performance criteria from outside the control room, for a postulated fire in the control room, cable spreading room, or any area requiring recovery actions (other than recovery actions performed in the control room or primary control stations)
- E.5 For post-fire operator actions, provide the following:
- Manual Action Feasibility Study
 - Operator Time Critical Action Program
 - Time lines for time-critical recovery actions
 - Time line validations
- E.6 Environmental and habitability evaluations for post-fire operator actions (temperature, smoke, humidity, SCBAs, etc.)
- E.7 LIST of licensed operator Job Performance Measures (JPMs) for operator actions required to achieve and maintain nuclear safety performance criteria
- E.8 LIST of non-licensed operator training associated with operator actions to achieve and maintain nuclear safety performance criteria which would be performed by a non-licensed operator (including JPMs, in-field training walkdowns, simulations, or initial qualification)
- E.9 Lesson plans for post-fire nuclear safety capability training for licensed and non-licensed operators
- E.10 For safe shutdown equipment and tools, provide the following:
- Procedure for inventory and inspection
 - Most recent inspection and inventory results
- E.11 LIST of procedures that implement Cold Shutdown Repairs
- E.12 For Cold Shutdown Repairs, provide the following:
- Procedure for inventory and inspection (i.e., needed tools, material, etc.)
 - Most recent inspection and inventory results
- F. ADMINISTRATIVE CONTROL, OVERSIGHT, AND CORRECTIVE ACTION PROGRAMS
- F.1 Corrective actions associated with operator actions to achieve and maintain post-fire nuclear safety performance criteria
- F.2 Self assessments, peer assessments, and audits of fire protection activities for the last three years
- F.3 Self assessments, peer assessments, and audits of the post-fire nuclear safety capability methodology and nuclear safety performance criteria for the last three years
- F.4 LIST of open and closed condition reports for the fire protection system for the last three years

- F.5 LIST of fire event analysis reports for the last three years
- F.6 LIST of open and closed condition reports for emergency lighting units for the last three years
- F.7 LIST of open and closed condition reports for post-fire nuclear safety capability issues for the last three years. This includes issues affecting the nuclear safety capability analysis, fire hazards analysis, NFPA 805 design basis, fire risk evaluations, plant change evaluations, post-fire operating procedures and/or training, time line evaluations for operator actions, and supporting engineering evaluations, analysis, or calculations
- F.8 LIST of procedures that control the configuration of the fire protection program, features, and post-fire nuclear safety capability methodology and system design

III. Information Requested to be Available On-site on the First Day of the Inspection

On the first day of the on-site inspection, provide these documents to the inspection team:

C. CLASSIC FIRE PROTECTION

C.27 For the specific Penetration Seals selected during the information gathering visit, provide:

- Qualification Records
- Design specifications
- Installation details
- Inspection record which verified proper installation

C.28 For the specific Fire Wraps selected during the information gathering visit, provide:

- Qualification Records
- Design specifications
- Installation details
- Inspection record which verified proper installation

C.29 For the specific fire areas selected for inspection during the information gathering visit, provide the analysis of the effects of fire suppression activities on the ability to achieve the nuclear safety performance criteria, including:

- An automatic or manually actuated suppression system, due to a fire in a single location, will not indirectly cause damage to the success path
- inadvertent actuation or rupture of a suppression system will not indirectly cause damage to the success path
- demonstration of adequate drainage for areas protected by water suppression systems
- hydrostatic rating of any floor penetration seals installed within the fire areas that are credited with keeping water from leaking into fire areas below

C.30 For the specific fire areas selected for inspection during the information gathering visit, provide:

- Last two completed surveillances of fire protection features (e.g., detection, suppression, damper inspections, damper tests, penetration inspections, barrier inspections, etc.)

C.31 COPY of the complete test, surveillance, or maintenance procedure (current document control copy), including any associated data forms, for the completed surveillances requested above in C.30

C.32 For the specific fire areas selected for inspection during the information gathering visit, if any of the selected fire areas use CO₂ or Halon, then provide:

- The initial discharge testing, calculation, or analysis that determined appropriate concentrations and soak or hold times can be achieved

D. ELECTRICAL

D.8 For the specific fire areas selected for inspection during the information gathering visit, specifically identify any Thermoplastic Cable in the selected areas

D.9 For the specific electrical circuits selected for inspection during the information gathering visit, provide schematic or elementary diagrams for circuits to be reviewed (C-size paper drawings)

D.10 For the specific fire areas selected for inspection during the information gathering visit, provide breaker and fuse coordination calculations or analysis for nuclear safety capability components in the selected areas

D.11 Cable routing information, as requested during the information gathering visit

F. ADMINISTRATIVE CONTROL, OVERSIGHT, AND CORRECTIVE ACTION PROGRAMS

F.9 For the specific fire areas selected for inspection during the information gathering visit, provide:

- Corrective actions for fire-induced circuit failures (including but not limited to NRC IN 92-18), both single and multiple spurious actuations

Mitigating Strategies Supporting Documentation

On the first day of the information gathering visit, provide these documents:

G. 10 CFR 50.54(hh)(2) MITIGATING STRATEGIES DOCUMENTS

- G.1 LIST of all changes to regulatory commitments made to meet the requirements of 10 CFR 50.54(hh)(2)
- G.2 LIST of procedures and guidelines that were revised or generated to implement the mitigating strategies. These could be extensive damage mitigation guidelines (EDMGs), severe accident management guidelines (SAMGs), emergency operating procedures (EOPs), abnormal operating procedures (AOPs), etc.
- G.3 A matrix that shows the correlation between the mitigation strategies identified in Nuclear Energy Institute 06-12, Revision 2, "B.5.b Phase 2 & 3 Submittal Guideline," issued December 2006, and the site-specific procedures or guidelines that are used to implement each strategy
- G.4 LIST of engineering evaluations or calculations that were used to verify the engineering bases for the mitigating strategies
- G.5 P&IDs and legend list or simplified flow diagrams for systems relied upon in the mitigating strategies. These could be the type used for training. (C-size paper drawings)
- G.6 LIST of modification packages or summary descriptions of modifications with simplified drawings, for necessary facility changes to implement the mitigating strategies
- G.7 LIST of routine tests, surveillances, and preventive maintenance for equipment and tools needed to implement 10 CFR 50.54(hh)(2) strategies
- G.8 For equipment and tools needed to implement 10 CFR 50.54(hh)(2) strategies, provide the following:
- Procedures for inventory and inspection
 - Most recent inspection and inventory results
- G.9 LIST of 10 CFR 50.54(hh)(2) strategies, if any, which have implementing details that differ from that documented in the submittals or the safety evaluation report.
- G.10 Site general arrangement drawings that show the majority of buildings and areas referenced in 10 CFR 50.54(hh)(2) documents (C-size paper drawings)
- G.11 Training records, training matrix, and lesson plans related to 10 CFR 50.54(hh)(2)
- G.12 Copies of memoranda of understanding (MOU) (e.g., with local fire departments) required to implement any mitigating strategies