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

December 19, 2013

EA 13-248

Mr. George Gellrich
Site Vice President
Constellation Energy Nuclear Group, LLC
Calvert Cliffs Nuclear Power Plant, LLC
1650 Calvert Cliffs Parkway
Lusby, MD 20657

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1 AND 2
NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT
05000317/2013007 AND 05000318/2013007 AND EXERCISE OF
ENFORCEMENT DISCRETION

Dear Mr. Gellrich:

On November 8, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at your Calvert Cliffs Nuclear Power Plant. The enclosed inspection report documents the inspection results, which were discussed on November 8, 2013, with yourself and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed station personnel. The inspectors also reviewed mitigation strategies for addressing large fires and explosions. Based on the results of this inspection, no findings were identified.

The enclosed report discusses an issue which Constellation identified during the process of converting to a risk-informed performance-based fire protection program under National Fire Protection Association Standard 805. The NRC screened the issue and determined that it warranted enforcement discretion per Section 9.1 of the NRC Enforcement Policy, “Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48).”

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of the NRC's document system, Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Raymond K. Lorson, Director
Division of Reactor Safety

Docket No: 50-317; 50-318
License No: DPR-53; DPR-69

Enclosure: Inspection Report 05000317/2013007 and
05000318/2013007 w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos:	50-317; 50-318
License Nos:	DPR-53; DPR-69
Report Nos:	05000317/2013007 and 05000318/2013007
Licensee:	Constellation Energy Nuclear Generation, LLC
Facility:	Calvert Cliffs Nuclear Power Plant
Location:	1650 Calvert Cliffs Parkway Lusby, MD 20657
Dates:	October 21 – November 8, 2013
Inspectors:	R. Fuhrmeister, Senior Reactor Inspector (Team Leader) C. Cahill, Senior Reactor Analyst D. Orr, Reactor Inspector J. Rady, Reactor Inspector
Approved by:	John F. Rogge, Chief Engineering Branch 3 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000317/2013007 and 05000318/2013007; 10/21/2013 – 12/08/2013; Calvert Cliffs Nuclear Power Plant, Triennial Fire Protection Inspection.

This report covered a two week on-site triennial fire protection team inspection by specialist inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Initiating Events, Mitigating Systems

No Findings were identified.

Other Findings

A licensee-identified violation of low to moderate safety significance for Unit 1 and very low safety significance for Unit 2 was reviewed by the inspectors. Corrective actions taken or planned by Constellation have been entered into Constellation's corrective action program. The NRC is exercising discretion and not issuing a violation for this issue as described in Section 1R05.06 of this report.

REPORT DETAILS

Background

This report presents the results of a triennial fire protection inspection conducted in accordance with NRC Inspection Procedure (IP) 71111.05T, "Fire Protection." The objective of the inspection was to assess whether Constellation Energy Nuclear Generation (Constellation) had implemented an adequate fire protection program and whether post-fire safe shutdown capabilities had been established and were properly maintained at Calvert Cliffs Nuclear Power Plant Units 1 and 2 (Calvert Cliffs, CCNPP). The following fire areas (FAs) and associated fire zones (FZs) were selected for detailed review based on prior inspection results and risk insights from the Calvert Cliffs Individual Plant Examination of External Events (IPEEE):

Fire Areas (Fire Zones)

- 27 Unit 2 West Electrical Penetration Room
- 30 1B Emergency Diesel Generator Room
- 40 Unit 2 Service Water Pump Room
- IS Intake Structure

Inspection of these fire areas/zones fulfilled the inspection procedure requirement to inspect a minimum of three samples.

The inspection team evaluated Constellation's fire protection program (FPP) against applicable requirements which included Technical Specifications, Operating License Conditions 2.E for both units, NRC Safety Evaluation Reports (SERs), 10 CFR 50.48, and 10 CFR 50, Appendix R. The team also reviewed related documents that included the Updated Final Safety Analysis Report (UFSAR), Section 9.9, fire protection plan, fire hazards analysis (FHA), and post-fire safe shutdown analyses.

The team evaluated aspects of three mitigating strategies for responding to large fires and explosions, as required by Operating License Condition 2.C (5) for Unit 1 and 2.C(7) for Unit 2 and 10 CFR 50.54(hh)(2). The team also reviewed related documents that included NEI 06-12, "B.5.b Phases 2 & 3 Submittal Guidance," Revision 2 (ML070090060). Inspection of these strategies fulfills the inspection procedure requirement to inspect a minimum of one sample.

Specific documents reviewed by the team are listed in the attachment to this report.

REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (IP 71111.05T)

.01 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the Fire Hazards Analysis (FHA), post-fire safe shutdown analyses, and supporting drawings and documents to verify whether the safe shutdown capabilities were properly protected from fire damage. The team evaluated equipment and cable separation to determine whether the applicable separation requirements of Section III.G of 10 CFR 50, Appendix R, and the CCNPP design and licensing bases were maintained for the credited safe shutdown equipment and their supporting power, control, and instrumentation cables. The team's review included an assessment of the adequacy of the selected systems for reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and associated support system functions.

b. Findings

No findings were identified.

.02 Passive Fire Protection

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to evaluate whether the material conditions of the fire area boundaries were adequate for the fire hazards in the area. The team compared the fire area boundaries, including walls, ceilings, floors, fire doors, fire dampers, penetration seals, electrical raceway and conduit fire barriers, and redundant equipment fire barriers and radiant energy heat barriers to design and licensing basis requirements, industry standards, and the CCNPP FPP, as approved by the NRC, to identify any potential degradation or non-conformances.

The team reviewed selected engineering evaluations, installation and repair work orders, and qualification records for a sample of penetration seals to determine whether the fill material was properly installed and whether the as-left configuration satisfied design requirements for the intended fire rating.

The team also reviewed recent inspection records for fire dampers, and the inspection records for penetration seals and fire barriers, to verify whether the inspection and testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

b. Findings

No findings were identified.

.03 Active Fire Protection

a. Inspection Scope

The team evaluated manual and automatic fire suppression and detection systems in the selected fire areas to determine whether they were installed, tested, maintained, and operated in accordance with NRC requirements, National Fire Protection Association (NFPA) codes of record, and the CCNPP FPP, as approved by the NRC. The team also assessed whether the suppression systems capabilities were adequate to control and/or extinguish fires associated with the hazards in the selected areas.

The team reviewed the as-built capability of the fire water supply system to verify whether the design and licensing basis and NFPA code of record requirements were satisfied, and to assess whether those capabilities were adequate for the hazards involved. The team reviewed the fire water system hydraulic analyses to assess the adequacy of a single fire water pump to supply the largest single hydraulic load on the fire water system plus concurrent fire hose usage. The team evaluated the fire pump performance tests to assess the adequacy of the test acceptance criteria for pump minimum discharge pressure at the required flow rate, to verify whether the criteria was adequate to ensure that the design basis and hydraulic analysis requirements were satisfied. The team also evaluated the underground fire loop flow tests to verify whether the tests adequately demonstrated that the flow distribution circuits were able to meet design basis requirements. In addition, the team reviewed recent pump and loop flow test results to verify whether the testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

The team walked down accessible portions of the detection and water suppression systems in the selected areas and major portions of the fire water supply system, including motor and diesel driven fire pumps and fire water storage tanks, interviewed system and program engineers, and reviewed selected condition reports (CRs) to independently assess the material condition of the systems and components. In addition, the team reviewed recent test results for the fire detection and suppression systems for the selected fire areas to verify whether the testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

The team assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The team also reviewed Constellation's fire fighting strategies (i.e., pre-fire plans) and smoke removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown capability. The team independently inspected the fire brigade equipment, including personnel protective gear (e.g., turnout gear) and smoke removal equipment, to determine operational readiness for fire fighting.

In addition, the team reviewed Constellation's fire brigade equipment inventory and inspection procedure and recent inspection and inventory results to verify whether adequate equipment was available, and whether any potential material deficiencies were identified.

b. Findings

No findings were identified.

.04 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

The team performed document reviews and plant walkdowns to determine whether redundant trains of systems required for hot shutdown, located in the same or adjacent fire areas, were not subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. Specifically, the team evaluated whether:

- A fire in one of the selected fire areas would not release smoke, heat, or hot gases that could cause unintended activation of suppression systems in adjacent fire areas which could potentially damage all redundant safe shutdown trains; or

- A fire suppression system rupture, inadvertent actuation, or actuation due to a fire, in one of the selected fire areas, could not directly damage all redundant trains (e.g. sprinkler caused flooding of other than the locally affected train); and

- Adequate drainage was provided in areas protected by water suppression systems.

b. Findings

No findings were identified.

.05 Alternative Shutdown Capability

a. Inspection Scope

The team reviewed the safe shutdown analysis, operating procedures, piping and instrumentation drawings (P&IDs), electrical drawings, the UFSAR, and other supporting documents for the selected fire areas to verify whether Constellation had properly identified the systems and components necessary to achieve and maintain post-fire safe shutdown conditions. The team evaluated selected systems and components credited by the safe shutdown analysis for reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions to assess the adequacy of Constellation's alternative shutdown methodology. The team also assessed whether alternative post-fire shutdown could be performed both with and

without the availability of off-site power. The team walked down selected plant configurations to verify whether they were consistent with the assumptions and descriptions in the safe shutdown and fire hazards analyses. In addition, the team evaluated whether the systems and components credited for use during post-fire safe shutdown would remain free from fire damage.

The team reviewed the training program for licensed and non-licensed operators to verify whether it included alternative shutdown capability. The team also verified whether personnel required for post-fire safe shutdown, using either the normal or alternative shutdown methods, were trained and available on-site at all times, exclusive of those assigned as fire brigade members.

The team reviewed the adequacy of procedures utilized for post-fire shutdown and performed an independent walk through of procedure steps (i.e., a procedure tabletop) to assess the adequacy of implementation and human factors within the procedures. The team also evaluated the time required to perform specific actions to verify whether operators could reasonably be expected to perform those actions within sufficient time to maintain plant parameters within specified limits.

Specific procedures reviewed for normal and alternative post-fire shutdown are listed in the attachment to this report.

The team reviewed selected operator manual actions to verify whether they had been properly reviewed and approved and whether the actions could be implemented in accordance with plant procedures in the time necessary to support the safe shutdown method for each fire area. The team also reviewed the periodic testing of the alternative shutdown transfer and isolation capability, and instrumentation and control functions, to evaluate whether the tests were adequate to ensure the functionality of the alternative shutdown capability.

b. Findings

No findings were identified.

.06 Circuit Analysis

a. Inspection Scope

The team reviewed Constellation's post-fire safe shutdown analysis for the selected fire areas to determine whether the analysis identified both required and associated electrical circuits and cables for the systems and components necessary to achieve and maintain safe shutdown. The team reviewed electrical schematics and cable routing data for power, control, and instrument cables associated with selected components. Specifically, the team evaluated the selected circuits and cables to determine whether they were (a) adequately protected from potential fire damage, or (b) analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not

prevent safe shutdown, or (c) analyzed to show that potential damage could be mitigated with approved operator manual actions, in order to verify whether fire-induced faults could adversely impact safe shutdown capabilities. The team's evaluations considered credible fire scenarios, cable insulation attributes, cable failure modes, cable routing, and common power supply or electrical bus configurations. In addition, the team reviewed cable raceway drawings and cable routing databases for a sample of components required for post-fire safe shutdown to determine whether those cables were routed as described in the safe shutdown analysis.

Cable failure modes were reviewed for the following components:

- 1A Emergency Diesel Generator Output Breaker;
- 21 Auxiliary Feedwater (AFW) Pump Speed Control;
- 2FIC4512A Flow Indicating Controller for 21 and 22 AFW Pump Flow to the 22 Steam Generator (SG);
- 2FT4510A Flow Transmitter for 21 and 22 AFW Pump Flow to the 22 SG; and,
- 2NE001, Wide Range Neutron Monitoring System Channel A.

The team reviewed a sample of circuit breaker and fuse over-current protection coordination studies to determine whether equipment needed for post-fire safe shutdown activities could be adversely affected due to a lack of coordination that could result in a common power supply or common electrical bus concern. The team also evaluated whether coordination studies appropriately considered multiple faults due to fire.

The team assessed the transfer of control from the control room to the alternative shutdown locations to determine whether it would be affected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for alternative shutdown control circuits).

b. Findings

Failure to Adequately Ensure Cable Protection and Eliminate Potential Secondary Fires

Introduction: Constellation identified a violation of low to moderate safety significance of Calvert Cliffs Nuclear Power Plant Operating License Condition 2.E. for Unit 1 and a violation of very low safety significance for Calvert Cliffs Nuclear Power Plant Operating License Condition 2.E for Unit 2. Constellation identified seven Unit 1 cables and three Unit 2 cables for which overcurrent protection was not coordinated, i.e. the cables were undersized and could overheat due to fire induced faults causing secondary fires. The cables traversed multiple fire areas where secondary fires could render additional redundant or alternate safe shutdown equipment unavailable. This issue was determined to satisfy the criteria specified for the exercise of enforcement discretion for plants in transition to a fire protection program that meets the requirements of 10 CFR 50.48(c), “National Fire Protection Association Standard NFPA 805.”

Description: As a result of transitioning to NFPA 805, Constellation identified on June 18, 2013 that several common enclosure cables were not coordinated. This was a legacy issue that was not identified when the original safe shutdown analysis was developed. For a fire-induced fault on these associated circuits, the protective devices may not trip in sufficient time to preclude large currents from overheating the cables beyond ignition temperatures. Additionally, these cables traverse in multiple fire areas potentially causing a secondary fire along any point or length of the cable. Ten common enclosure cables were affected; seven on Unit 1 and three on Unit 2.

Constellation entered this issue into its corrective action program as CR-2013-005206. As an interim compensatory measure, Constellation ensured daily inspections were being conducted in all affected fire areas for inappropriate storage of transient combustibles and flammable materials. The issue is included in the NFPA 805 transition project and planned corrective actions include plant modifications to replace the undersized cables. The NRC concluded that Constellation's interim compensatory measures were commensurate with the risk significance.

Analysis. Constellation's failure to ensure seven Unit 1 cables and three Unit 2 cables were coordinated with their associated protective devices such that a fire induced fault would clear before high currents potentially caused secondary fires in adjacent fire areas was a performance deficiency. This finding was more than minor because it adversely affected the protection against external factors (i.e., fire) attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. Constellation reviewed the cable routes and evaluated this issue through use of its fire probabilistic safety assessment (PRA). Constellation determined that the change in core damage frequency attributed to the issue for Unit 1 was 2E-6 per reactor year (White) and negligible (Green) for Unit 2. NRC staff reviewed this evaluation and concluded that the risk numbers were bounded by conservative assumptions and that this issue would be of no greater than low to moderate safety significance for Unit 1 and of very low safety significance for Unit 2.

Cross-cutting aspects are not applicable to findings involving enforcement discretion.

Enforcement. Calvert Cliffs Nuclear Power Plant Operating License conditions 2.E. for both Unit 1 and Unit 2, require that Calvert Cliffs Nuclear Power Plant, LLC, shall implement and maintain in effect all provisions of the approved fire protection program as described in the approved fire protection program (FPP) as described in the Updated Final Safety Analysis Report (UFSAR). UFSAR Section 9.9.1 states in part that the FPP has been developed in accordance with the documents listed in Section 9.9.12 (References 1 through 19). References 4 and 5 are the Interactive Cable Analysis (ICA) for Calvert Cliffs Nuclear Power Plant – Unit 1 and Unit 2 respectively. Assumption 5 in the ICA Manual for Units 1 and 2 states:

If a fire causes electrical shorts or overloads, protective devices are assumed to function properly except as affected by the postulated fire.

Contrary to the above, on June 18, 2013, Constellation identified seven Unit 1 cables and three Unit 2 cables which were not coordinated, i.e. the cables were undersized and could overheat due to fire induced faults causing secondary fires. The cables traversed multiple fire areas where secondary fires could render additional redundant or alternate safe shutdown equipment unavailable. The violation was historical and occurred when Calvert Cliffs completed its first safe shutdown analysis.

Constellation is in transition to NFPA 805 and, therefore, this licensee-identified violation was evaluated in accordance with the criteria established in Section 9.1 of the NRC Enforcement Policy, "Enforcement Discretion for Certain Fire Protection issues (10 CFR 50.48)." Specifically, because all of the criteria were met, the NRC is exercising discretion and not issuing a violation for this issue.

.07 Communications

a. Inspection Scope

The team reviewed safe shutdown procedures, the safe shutdown analysis, and associated documents to verify whether an adequate method of communications would be available to plant operators following a fire. Specifically, the team evaluated whether plant telephones, page systems, and portable radios would be available for use and were properly maintained. During this review, the team considered the effects of ambient noise levels, clarity of reception, reliability, and coverage patterns. The team inspected selected emergency storage lockers to independently verify whether portable communication equipment was available for the fire brigade and plant operators. In addition, the team evaluated whether radio or phone repeaters, transmitters, and power supplies would be reasonably unaffected by a fire.

b. Findings

No findings were identified.

.08 Emergency Lighting

a. Inspection Scope

The team walked down the emergency lights in the selected fire areas to independently evaluate the placement and coverage areas of the lights. The team assessed whether the lights provided adequate illumination on local equipment and instrumentation required for post-fire safe shutdown, to ensure local operations could be reliably performed under expected post-fire conditions. Emergency light placement was also evaluated to determine adequate illumination of local area access and egress pathways.

The team verified whether the emergency light batteries were rated for at least an eight-hour capacity. Preventive maintenance procedures, the vendor manual, completed surveillance tests, and battery replacement practices were also reviewed to evaluate whether the emergency lighting had been maintained in a manner that would ensure reliable operation.

b. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed Constellation's dedicated repair procedures, for components which might be damaged by fire and were required to achieve post-fire cold shutdown. The team evaluated selected cold shutdown repairs to determine whether they could be achieved within the time frames assumed in the design and licensing bases. In addition, the team verified whether the necessary repair equipment, tools, and materials (e.g., pre-cut cables with prepared attachment lugs) were available and accessible on site.

b. Findings

No findings were identified.

.10 Compensatory Measures

a. Inspection Scope

The team verified whether compensatory measures were in place for out-of-service, degraded, or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems and equipment, passive fire barriers, pumps, valves, or electrical devices providing safe shutdown functions or capabilities). The team evaluated whether the short term compensatory measures adequately compensated for the degraded function or feature until appropriate corrective action could be taken and whether Constellation was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings were identified.

.11 Review and Documentation of FPP Changes

a. Inspection Scope

The team reviewed recent changes to the approved fire protection program to assess whether those changes had an adverse effect on the ability to safely shutdown.

b. Findings

No findings were identified.

.12 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

The team reviewed Constellation's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the FHA. A sample of hot work and transient combustible control permits were reviewed to assess the adequacy of Constellation's fire protection program administrative controls. The team performed plant walkdowns to independently verify whether transient combustibles and ignition sources were being properly controlled in accordance with the administrative controls.

b. Findings

No findings were identified.

.13 Large Fires and Explosions Mitigation Strategies

a. Inspection Scope

The team reviewed selected mitigation strategies intended to maintain or restore core cooling, containment integrity, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to large fires or explosions. The team assessed whether Constellation continued to meet the requirements of license condition C.5. The team reviewed six mitigation strategies:

- External Make-up
- External Spray
- Local Make-up
- Local Spray
- Spray into Containment
- Inject into the Steam Generators

The team's review included: a detailed assessment of the procedural guidance; a walkdown of the strategy with a trained operator to assess the feasibility of the strategy and operator familiarity; a review of maintenance and surveillance test records for the strategy equipment; and an independent inventory check of the strategy equipment, materials, and tools to ensure the appropriateness of equipment storage and availability.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

a. Inspection Scope

The team reviewed a sample of condition reports associated with the fire protection program, post-fire safe shutdown issues, and mitigation strategy issues to determine whether Constellation was appropriately identifying, characterizing, and correcting problems associated with these areas and whether the planned or completed corrective actions were appropriate. The condition reports reviewed are listed in the attachment.

b. Findings

No findings were identified.

4OA6 Meetings, including Exit

The team presented the inspection results to Mr. G. Gellrich, Site Vice President, and other members of Constellation's staff on November 8, 2013. The team verified that this report does not contain proprietary information.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
G. Gellrich, Site Vice President
M. Flaherty, Plant General Manager
H. Daman, Maintenance Manager
D. Dellario, Engineering Manager
M. Milbradt, Director of Quality and Performance Assessment
S. Geier, Engineering Supervisor
A. Simpson, Licensing Supervisor
J. Landale, PRA Engineer
C. Dobry, Fire Protection Engineer
C. Neyman, Licensing Engineer
C. Turner, Safe Shutdown Engineer
R. Haley, CCNPP Fire Marshall

NRC Personnel

S. Kennedy, Senior Resident Inspector, Calvert Cliffs
E. Torres, Resident Inspector, Calvert Clifffs
D. Schroeder, Chief, Projects Branch 1
J. Rogge, Chief, Engineering Branch 3

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Opened and Closed

None

Closed

None

LIST OF DOCUMENTS REVIEWED

Fire Protection Licensing and Design Basis Documents

Calvert Cliffs NPP Units 1 and 2 UFSAR, Section 9.9, Calvert Cliffs Nuclear Power Plant Fire Protection Program, Rev. 39
Calvert Cliffs NPP Units 1 and 2 Safety Evaluation Report (SER) dated 09/14/79
Calvert Cliffs NPP Units 1 and 2 SER Supplements dated 10/02/80, 03/18/82, and 09/27/82
Calvert Cliffs NPP Units 1 and 2 Exemptions dated 08/16/82, 04/21/83, 03/15/84, 08/22/90, and 04/07/99
FP00002, Calvert Cliffs Fire Hazard Analysis, Rev. 2
NO-TRM, Calvert Cliffs Technical Requirements Manual, Rev. 17
AOP-9A/Unit1, Unit 1 AOP-9A Bases Document, Rev. 12
AOP-9A/Unit2, Unit 2 AOP-9A Bases Document, Rev. 11
AOP-9F/Unit 2, AOP-9F Unit 2 Bases Document, Rev. 7
AOP-9S/Unit 2, AOP-9S Unit 2 Bases Document, Rev. 6

Calculations, Analysis, and Engineering Evaluations

Appendix R Component Evaluation Package for 1GENEDG1A, 5/12/00
Appendix R Component Evaluation Package for 2FT4510A, 2/6/03
Appendix R Component Evaluation Package for 2PUMPAFWTD21, 9/13/95
Appendix R Component Evaluation Package for 2PUMPAFWTD22, 9/13/95
Calvert Cliffs Nuclear Plant Units 1 and 2 Multiple Spurious Operations (MSO) Report for Fire PRA, Rev. 0
CCN0005-17-STUDY-002, 480Vac Motor Control Center Coordination Study in Support of the NFPA-805 License Submittal, Rev. 0
ES199602086, Fire Protection Engineering Evaluation of Fire Area 11, Rev. 0
FP00002, Fire Hazards Analysis Summary Document, Rev. 002
Interactive Cable Analysis for Calvert Cliffs Nuclear Power Plant Unit 1 and Unit 2, Rev. 8
NFPA-805-00006, Constellation Energy Nuclear Group (CENG) Calvert Cliffs Nuclear Power Plant (CCNPP) Nuclear Safety Capability Assessment Report (NSCA), Attachment 7-10, Rev. 0
Technical Report on Identification & Classification of the CCNPP MSO Scenarios Using An Expert Panel, Rev. 00
CA04007, Appendix ‘R’ Analysis of Inadvertent Lifting of Both Pressurizer PORV’s, Rev. 0
CA05974, Appendix ‘R’ Fire Protection AOP-9 Simulations, Rev. 0
CA07457, Simplified Modeling of Postulated Pressurizer Pressure Control Malfunctions, Rev. 0
SA-18, Manual Action Feasibility, Dated 4/97
Interactive Cable Analysis for Calvert Cliffs Nuclear Power Plant Units 1 and 2, Rev. 8
FPEE-13, Evaluation of Tendon Access Hatches Installed in Fire Barriers Providing Separation Of Safe Shutdown Components
ECP-13-000362, Evaluation of Adequacy of Exterior Fire Barriers on the 45’-0” and 69’-0” Aux Building to Provide Required Fire Area Separation
RAN 97-031, Calvert Cliffs Nuclear Power Plant, Individual Plant Examination of External Events, August 1997

Drawings and Wiring Diagrams

61001SH0001, Electrical Main Single Line Diagram FSAR Fig. No. 8-1, Rev. 44
62-638-B Sh. 1, 21 AFW Pump Turbine Speed Control 202-36-IHC3987A&B, Rev. 3
63-077-A, Block Diagram Steam Gen Aux Feed Pump Turbine Speed Control, Rev. 5
63-077-B Sh. 536, Block Diagram Wide Range Neutron Monitoring Sys Channel a, Rev. 0
61-499-E Sh. 04, Diesel Generator Project Electrical Equip't Layout Diesel Generator Building El. 45'-6", Rev. 1
63-079-B Sh. 59, Schematic Diagram AFW System No Flow Alarms, Rev. 3
63-079-D Sh. 26, Schematic Diagram Condensate & Feedwater Aux. Feed Pump Turbine Trip 2CV3986 & 3988, Rev. 14
61071SH0001, Schematic Diagram 4kV Bus 11 Feeder Breaker 152-1115, Rev. 19
61071SH0002, Schematic Diagram 4kV Bus 11 Feeder Breaker 152-1101, Rev. 21
60277, Control Room Panel Arrangement, Rev. 29
60911SH0001, Loop Diagram 11 & 12 SG Main Steam Line Atmos Dump and Turbine Bypass 1PT4056, Rev. 13
61005, Meter and Relay Diagram 4kV System Unit Buses 11 and 14 FSAR Fig. No. 8-4, Rev. 36
61068SH0005, AC Schematic Block Diagram Diesel Generator 1A, Rev. 3
61069, Schematic Diagram Turbine Steam Dump and Bypass Controls, Rev. 24
61071SH0016, Schematic Diagram Bus Load Shedding Verification Relay, Rev. 17
61052SH0002, AC Schematic Diagram 4kV Unit Bus 17, Rev. 6
61086SH0002, Schematic Diagram 4kV Bus 11 Diesel Generator OC Feeder Breaker 152-1106, Rev. 35
61086SH0084A, Schematic Diagram 4kV Unit Bus 17 Diesel Generator 1A Breaker 152-1703, Rev. 4
61086SH0084B, Schematic Diagram 4kV Unit Bus 17 Diesel Generator 1A, Rev. 3
61086SH0084, Schematic Diagram 4kV Unit Bus 17 Diesel Generator 1A Breaker 152-1703, Rev. 4
61305, Equipment Layout Cable Spreading Room Aux Bldg Area 15 El. 27'-0", Rev. 32
62632SH0001, Loop Diagram Alternate Shut-Down Related Circuits Unit No. 2 AFWS Throttle And Miscellaneous Control Valves, Rev. 5
62639SH0056, Loop Diagram Wide Range Neutron Monitoring System Channel A 2NE001, Rev. 10
62631SH0003, Loop Diagram 22 S/G AFW Flow Turb Driven Feed Pumps 2FT4510A, Rev. 10
63077SH0395, Block Diagram Steam Generator AFW Flow Cont Vlv I/P's 2I/P4511A, 12A, 25A, & 35A, Rev. 1
63077SH0396, Block Diagram Steam Generator AFW Flow Cont Vlv I/P's 2I/P4511B, 12B, 25B & 35B, Rev. 1
63077SH0391, Block Diagram AFW Flow Channels 2F4509A, 2F4510A, 2F4524B & 2F4534B, Rev. 3
2E-075SH0047, Schematic Diagram for Charging Line Isolation Valves 2CV518 and 2CV519, Rev. 10
2E-075SH0048, Schematic Diagram for Auxiliary Spray Control Valve 2CV517, Rev. 8

62152SH0001, Appendix ‘R’ Separation Requirements for Auxiliary Building and Containment Structure Floor Plan at Elevation 45’-0’’, Rev. 12
62153SH0001, Appendix ‘R’ Separation Requirements for Auxiliary Building and Containment Structure Floor Plan at Elevation 69’-0’’, Rev. 10
62150SH0001, Appendix “R” Separation Requirements, Aux. Bldg. & Cntmt. Struct., Floor Plan At El. 5’-0”, Rev. 7
52153SH0001, Appendix “R” Separation Requirements Aux. Bldg. &Cntmt. Struct., El. 69’-0”, Rev. 10
62152SH0001, Appendix “R” Separation Requirements, Aux. Bldg. & Cntmt. Struct., Floor Plan At 45’-0”, Rev. 12

Piping and Instrumentation Diagrams
60700SH0001, Main Steam and Reheat, Rev. 51
60729SH0001, Reactor Coolant System, Rev. 79
62583SH0002, Auxiliary Feedwater, Rev. 3
62729SH0001, Reactor Coolant System, Rev. 103
60583SH0001, Unit 1 Auxiliary Feedwater System, Rev. 63
60583SH0002, Unit 1 Auxiliary Feedwater System, Rev. 2
60700SH0001, Unit 1 Main Steam System, Rev. 47
60700SH0002, Unit 1 Main Steam System, Rev. 27
60700SH0003, Unit 1 Main Steam System, Rev. 20
60700SH0004, Unit 1 Main Steam System, Rev. 2
60708SH0001, Unit 1 Circulating Salt Water Cooling System, Rev. 43
60729SH0001, Unit 1 Reactor Coolant System, Rev. 77
60729SH0002, Unit 1 Reactor Coolant System, Rev. 27
60730SH0001, Unit 1 Chemical and Volume Control System, Rev. 87
62700SH0001, Unit 2 Main Steam System, Rev. 49
62700SH0002, Unit 2 Main Steam System, Rev. 13
62708SH0001, Unit 2 Circulating Water Cooling System, Rev. 33
62729SH0001, Unit 2 Reactor Coolant System, Rev. 99
62729SH0002, Unit 2 Reactor Coolant System, Rev. 10
62730SH0001, Unit 2 Chemical and Volume Control System, Rev. 82

Large Fires and Explosions Mitigation Strategies Documents
ERPIP-611, Severe Accident Mitigation Restorative Actions, Rev. 00302
ERPIP- 612, Candidate High Level Actions SFP Uncovered, Rev. 00400
ERPIP-613, Candidate High Level Actions Large Area Loss, Rev. 00301

Modifications and Design Changes
FCR 92-205, 800 MHz Plant Radiotelephone System, Bidirectional Amplifiers, Power5 Supplies And Antennas are Installed
FCR 83-1063-1, Fire Protection – Upgrade Fire Barriers

Quality Assurance Audits and Self Assessments
SA-2013-000067, Fire Protection Focused Area Self-Assessment Report, Date 5/20/13

System Health Reports
Fire Protection System Health Report, 3rd Qtr. 2013
Fire Protection Program Health Report, 3rd Qtr, 2013

Procedures
ES-004, Fire Protection/Appendix R Review of Engineering Services, Rev. 02
OI-20A, Fire Protection Performance Evaluations and Fire System Inspections, Rev. 01900
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, Rev. 25
CNG-OP-1.01-1002, Conduct of Operability Determinations/Functionality Assessments, Rev. 2
ERPIP-3.0, Immediate Actions Technical Procedure, Rev. 53
NO-1-122, Time Critical Action Management Program, Rev. 0
SA-1, Fire Protection Program, Rev. 9
SA-1-100, Fire Prevention, Rev. 19
STP F-76-0, Staggered Test of Electric Fire Pump, Rev. 5
STP F-77-0, Staggered Test of Diesel Fire Pump, Rev. 01002
STP F-592-1, Penetration Fire Barrier Inspection, Rev. 01003
STP F-592-2, Penetration Fire Barrier Inspection, Rev. 01001
STP F-490-0-E, Intake Structure Fire Detection System Test, Unit 1, Rev. 1
STP F-490-0-F, Intake Structure Fire Detection System Test, Unit 2, Rev. 1
STP F-691-0, Fire Suppression System Flow Test, Rev 00301
STP F-696-0, Fire Pump Flow Test, Rev. 00901STP F-697-0, Fire Suppression System Functional Test, Rev. 4
STP M-390-0, Fire Pump Battery Quarterly Checks, Rev. 00801

Operations Procedures
AOP-9G, Unit 1 Safe Shutdown Due to a Severe Fire in Room 227/316 Unit 1 5' & 27' East Piping Penetration Rooms, Rev. 9
AOP-9G, Unit 2 Safe Shutdown Due to a Severe Fire in Room 206/310 Unit 2 5' & 27' East Piping Penetration Rooms, Rev. 9
AOP-9I, Unit 1 Safe Shutdown Due to a Severe Fire in Room 315 Unit 1 Main Steam Penetration Room, Rev. 10
AOP-9I, Unit 2 Safe Shutdown Due to a Severe Fire in Room 309 Unit 2 Main Steam Penetration Room, Rev. 8
AOP-9N, Unit 1 Safe Shutdown Due to a Severe Fire in Room 408, 410, 413, 419, 424, 425, 426, or 428 Auxiliary Building 45' Corridors and Sample Rooms, Rev. 10
AOP-9N, Unit 2 Safe Shutdown Due to a Severe Fire in Room 408, 410, 413, 419, 424, 425, 426, or 428 Auxiliary Building 45' Corridors and Sample Rooms, Rev. 13
AOP-9A-1, Unit 1 Control Room Evacuation and Safe Shutdown Due to a Severe Control Room Fire, Rev. 15
AOP-9A-2, Unit 2 Control Room Evacuation and Safe Shutdown Due to a Severe Control Room Fire, Rev. 14
AOP-9F-2, Unit 2 Safe Shutdown Due to a Severe Fire in Room 205 Service Water Pump Room, Rev. 13
AOP-9S-2, Unit 2 Safe Shutdown Due To a Severe Fire in Room 414 Auxiliary Building 45' West Electrical Penetration Room, Rev. 10

Post-Fire Cold Shutdown Procedures
1-102-54-O-SA, Cold Shutdown Repair Equipment Inspection, Rev. 23
2-102-54-O-SA, Cold Shutdown Repair Equipment Inspection, Rev. 19

Operator Safe Shutdown Training
LOI-202-9A, Simulator Performance Session for the Licensed Operator Initial Training Program, Rev. 10

Fire Fighting Strategies (i.e., Pre-Fire Plans)
Fire Fighting Strategies Manual – 10' Aux Bldg, Rev. 1
Fire Fighting Strategies Manual 45' Aux Bldg, Rev. 0200
Fire Fighter Strategies for 5 Foot Turbine Areas, Rev. 00101
Fire Fighting Strategies for the Emergency Diesel Generators, Rev. 00103
Fire Fighter Strategies For All Levels Of The North Service Building, Rev. 00200

Fire Brigade Drills and Critiques
Announced drill, May 8, 2013
Unannounced drill, April 29, 2013
Announced drill, April 25, 2013
Announced drill, April 15, 2013
Announced drill, May 13, 2013
Unannounced drill, January 22, 2013
Announced drill, February 1, 2013
Announced drill, January 9, 2013
Announced drill, February 5, 2013
Announced drill, January 28, 2013

Impairment Permits
13-562-01
13-565-01
13-569-01
13-570-01
13-575-01

Hot Work and Ignition Source Permits
Issued October 4, 2013 for work order C90933669
Issued October 8, 2013 for work order C91054662
Issued October 9, 2013 for work order C91224916
Issued October 11, 2013 for work order C91224962
Issued October 19, 2013 for work order C90953699

Completed Tests and Surveillances

PE 1-102-10-O-R, Unit 1 Remote Shutdown Panel Operation Verification, Performed 3/19/10, 3/18/12, 3/19/12, & 3/26/12
STP-O-63-1, Remote Shutdown and Post Accident Monitoring Instr Channel Check, Performed 10/4/13
STP-O-63-2, Remote Shutdown and Post Accident Monitoring Instr Channel Check, Performed 9/20/13
1-102-54-O-SA, Cold Shutdown Repair Equipment Inspection, Rev. 23, Performed 5/12/10
STP M-390-0, Fire Pump Battery Quarterly Checks, Rev. 8, Performed 8/1/13
STP F-76-0, Staggered test of Electric Fire Pump, completed August 19, 2013
STP F-76-0, Staggered Test of Electric Fire Pump, completed July 22, 2013
STP F-77-0, Staggered Test of Diesel Fire Pump, completed July 8, 2012
STP F-592-1, Penetration Fire Barrier Inspection, completed August 28, 2013
STP F-592-2, Penetration Fire Barrier Inspection, completed July 17, 2013
STP F-490-E, Intake Structure Fire Detection System Test, Unit 1, completed December 2, 2012
STP F-490-E, Intake Structure Fire Detection System Test, Unit 1, completed May 13, 2013
STP F-490-F, Intake Structure Fire Detection System Test, Unit 2, completed April 3, 2013
STP F-490-F, Intake Structure Fire Detection System Test, Unit 2, completed May 31, 2013
STP F-691-0, Fire Suppression System Flow Test, completed September 8, 2010
STP F-691-0, Fire Suppression System Flow Test, completed September 12, 2012
STP F-696-0, Fire Pump Flow Test, completed July 21, 2011
STP F-696-0, Fire Pump Flow Test, completed November 1, 2012
STP F-697-0, Fire Suppression System Functional Test, completed January 24, 2011
STP F-697-0, Fire Suppression System Functional Test, performed November 15, 2012
STP M-390-0, Fire Pump Battery Quarterly Checks, completed May 3, 2013
STP M-390-0, Fire Pump Battery Quarterly Checks, completed August 1, 2013

Condition Reports (* denotes NRC identified during this inspection)

CR-2010-012481	CR-2010-011637	CR-2012-010222
CR-2012-002250	CR-2010-012334	CR-2013-008306
CR-2013-003162	CR-2011-004234	CR-2013-006059
CR-2013-003167	CR-2011-010701	CR-2013-006861
CR-2013-003168	CR-2012-002531	CR-2013-008574*
CR-2013-003171	CR-2013-003945	CR-2013-008827*
CR-2013-005206	CR-2013-005662	CR-2013-008872*
CR-2013-006860	CR-2013-005694	CR-2013-008873*
CR-2013-007225	CR-2012-009081	CR-2013-008874*
CR-2013-008305	CR-2012-006698	
CR-2009-009007	CR-2013-007226	

Work Orders

C91947974
C92076695
C92042658
C91094572

Vendor Manuals

GEK-49946E, Time Overcurrent Relays with Voltage Restraint Types IFCV51AD IFCV51BD, Rev. 02

Fire and Safety Watch Qualification Manual, Volume 2, Rev. 03-04

TRAK2000 Cable Routing Data Spreadsheets for cables associated with 1A EDG Output Breaker, 2FT4510A, 2FIC4512A, 21 Turbine Driven AFW Pump, and 2NE001

Memorandum of Understanding with Calvert County Volunteer & Rescue Association, dated December 20, 2012

AIT 4B200500069, NRC IN2005-03, Inadequate Design and Installation of Seismic Gap Barriers

AIT 4B200400105, Indeterminate Conditiohn In Appendix R Fire Barriers

AIT 4B200600358, Perform A Barrier Analysis to ensure that CCNPP has adequate defenses in place to avoid event as described in NRC Information Notice 2006-22

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AFW	Auxiliary Feedwater
APCSB	[NRC] Auxiliary and Power Conversion Systems Branch
ASME	American Society of Mechanical Engineers
ASSS	Alternate Safe Shutdown System
BTP	Branch Technical Position
CCNPP	Calvert Cliffs Nuclear Power Plant
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
CMEB	[NRC] Chemical Engineering Branch
CR	Condition Report
EOP	Emergency Operating Procedure
FHA	Fire Hazards Analysis
FPP	Fire Protection Program
FZ	Fire Zone
ICA	Interactive Cable Analysis
IN	[NRC] Information Notice
IP	[NRC] Inspection Procedure
IPEEE	Individual Plant Examination of External Events
NFPA	National Fire Protection Association
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records System
P&ID	Piping and Instrumentation Drawing
PRA	Probabilistic Risk Assessment
SCBA	Self-Contained Breathing Apparatus
SDP	[NRC] Significance Determination Process
SER	[NRC] Safety Evaluation Report
SSC	Structures, Systems and Components
UFSAR	Updated Final Safety Analysis Report