October 10, 2001

Mr. Charles H. Cruse
Vice President
Constellation Nuclear
Calvert Cliffs Nuclear Power Plant, Inc.
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS UNITS 1 AND 2 - NRC FIRE PROTECTION INSPECTION REPORT NO. 50-317/01-007 and 50-318/01-007

Dear Mr. Cruse:

On September 14, 2001, the NRC completed a triennial fire protection inspection at the Calvert Cliffs Nuclear Power Plant. The enclosed report documents the inspection findings which were discussed at an exit meeting on September 14, 2001, with Mr. Peter Katz and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's regulations and with the conditions of your license. The purpose of the inspection was to evaluate your fire protection program and post-fire safe shutdown capability. Within these areas, the inspection consisted of examinations of selected procedures and records, observations of activities, and personnel interviews.

Based on the results of this inspection, the team identified two issues of very low safety significance (Green). These issues involved violations of NRC requirements; however, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating the issues as non-cited violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny these non-cited violations, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington DC 205555-0001; and the NRC Resident Inspector at the Calvert Cliffs Nuclear Power Plant.

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Sincerely,

/RA/

James C. Linville, Chief
Electrical Branch
Division of Reactor Safety

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

Enclosure: NRC Inspection Report 50-317/01-007 and 50-318/01-007

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos:	50-317, 50-318
License Nos:	DPR-53, DPR-69
Report No:	50-317/01-007; 50-318/01-007
Licensee:	Calvert Cliffs Nuclear Power Plant, Inc.
Facility:	Calvert Cliffs Nuclear Power Plant
Location:	Lusby, Maryland
Dates:	August 27 - September 14, 2001
Inspectors:	L. Scholl, Sr. Reactor Inspector, Division of Reactor Safety (DRS) N. Merriweather, Sr. Reactor Inspector, DRS, Region II G. Morris, Reactor Inspector, DRS K. Young, Reactor Inspector, DRS L. Cline, Resident Inspector, DRP
Approved By:	James C. Linville, Chief Electrical Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000317/2001-007; 05000318/2001-007 on 08/27- 09/14/01, Calvert Cliffs Nuclear Power Plant, Inc., Calvert Cliffs Units 1 & 2, Triennial Fire Protection.

The inspection was conducted by Region I specialist inspectors with part-time participation by the resident inspector and a Region II specialist inspector during procedure walkdowns. The inspection identified two green findings which were determined to be non-cited violations. The significance of most issues is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply are indicated by "no color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at http://www.nrc.gov/NRR/OVERSIGHT/index.html.

A. Inspector Identified Findings

Cornerstone: Mitigating Systems

- Green. The team identified a non-cited violation of 10 CFR 50, Appendix R, for failure to have adequate procedures to assure safe shutdown capability. The team found that abnormal operating procedures AOP-9A and -9B (Unit 1) were inadequate in that they contained numerous deficiencies that could challenge to the ability to achieve and maintain safe shutdown. The safety significance of this finding was very low because the procedure deficiencies did not result in the loss of a safety function identified in the licensee's Individual Plant Examination for External Events (IPEEE). (Section 1R05.07)

- Green. The team identified a non-cited violation of 10 CFR 50, Appendix B, for failure to properly verify the adequacy of engineering calculations and analysis associated with abnormal operating procedures and the UFSAR Chapter 14 loss of feedwater analysis. The team found that the licensee failed to account for steam generator inventory losses due to steam generator blow down flow. This issue was determined to be of very low safety significance because the magnitude of the error did not result in the loss of a safety function identified in the licensee's IPEEE. Also, the licensee subsequently identified additional margins in the loss of feedwater analysis which would bound the effects of not accounting for inventory loss due to blow down flow. (Section 1R05.07)

B. Licensee Identified Findings

Violations of very low significance which were identified by the licensee have been reviewed by the inspector. Corrective actions taken or planned by the licensee appear reasonable. These violations are listed in section 4OA7 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) 71111.05, "Fire Protection." The objective of the inspection was to assess whether Calvert Cliffs Nuclear Power Plant, Inc. has implemented an adequate fire protection program and that post-fire safe shutdown capabilities have been established and are being properly maintained. The following fire areas (FAs) were selected for detailed review based on risk insights from the Calvert Cliffs Individual Plant Examination of External Events (IPEEE):

- Control Room (FA 24)
- Unit 1 Cable Spreading Room (FA 16)
- Unit 2 Switchgear Room 45 Ft. Elevation (FA 25)

This inspection was a reduced scope inspection in accordance with the September 22, 2000, revision to IP 71111.05, "Fire Protection." Issues regarding equipment malfunction due to fire-induced failures of associated circuits were not inspected. Criteria for review of fire-induced circuit failures are currently the subject of a voluntary industry initiative. The definition of associated circuits of concern used was that contained in the March 22, 1982, memorandum from Mattson to Eisenhut, which clarified the requests for information made in NRC Generic Letter 81-12.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems

1R05 Fire Protection (71111.05)

.1 Fire Area Boundaries and Barriers

a. Inspection Scope

The team reviewed the adequacy of the design, installation and maintenance of the fire area boundaries including fire doors and fire dampers for the selected fire areas. The team also selected three fire barrier penetration seals for detailed inspection, including a review of the associated design drawings and qualification test reports. The team compared the observed in-situ seal configurations to the design drawings and tested configurations and ensured the seals were consistent with the ratings of the barriers in which they were installed. Additionally, the team observed the material condition of the selected penetration seals.

b. Findings

No findings of significance were identified.

.2 Post-Fire Safe Shutdown Lighting and Communications

a. Inspection Scope

The team observed the placement and aim of 8-hour emergency lights throughout the selected fire areas to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation for post-fire safe shutdown. The team also reviewed preventive maintenance procedures and various documents, including the vendor manual and surveillance tests, to determine if adequate surveillance testing and periodic battery replacements were in place to ensure reliable operation of the emergency lights.

The team reviewed the Calvert Cliffs communication plan, communication systems surveillance procedures, transponder locations and maintenance performed on the portable radio battery system to determine if communications would be maintained in the event of a fire at the site.

b. Findings

No findings of significance were identified.

.3 Programmatic Controls

a. Inspection Scope

The team performed tours of various areas of the plant to assess the material condition of fire protection systems and equipment, the storage of permanent and transient combustible materials, and the control of ignition sources. The team also reviewed procedures that control hot work activities and combustible materials on the site. These reviews were performed to evaluate the adequacy of the fire protection program administrative controls. The team also reviewed design control procedures to verify that plant changes were adequately reviewed to assess the potential impact on the fire protection program and the safe shutdown equipment and procedures.

b. Findings

No findings of significance were identified.

.4 Fire Detection Systems and Equipment

a. Inspection Scope

The team reviewed smoke and thermal detector installation drawings and performed a walkdown of detection systems in the selected fire areas to verify the adequacy of the fire detection system design and installation. In addition, the team reviewed completed surveillance procedures to verify the adequacy and frequency of fire detection systems testing.

b. Findings

No findings of significance were identified.

.5 Fixed Fire Suppression Systems

a. Inspection Scope

The team evaluated the adequacy of the design and installation of the automatic total flooding halon system in the switchgear room and the cable spreading room by performing a walkdown of the system and by reviewing system discharge and functional testing. The team also reviewed several completed surveillance test procedures to assess the adequacy of surveillance testing for ensuring the functionality of the halon system and associated fire dampers.

b. Findings

No findings of significance were identified.

.6 Manual Fire Suppression Equipment

a. Inspection Scope

The team walked down selected standpipe systems and portable fire extinguishers to assess the material condition of manual fire fighting systems. The electric and diesel driven fire pump flow and pressure tests were also reviewed to ensure the pumps met their design requirements. Also, the team reviewed fire main loop flow tests and a standpipe calculation to ensure adequate flow and pressure could be delivered to hose and sprinkler systems.

The team inspected the fire brigade protective equipment, including self-contained breathing apparatus, communications equipment and various other equipment to assess the material condition and operational readiness of the fire fighting equipment.

b. Findings

No findings of significance were identified.

.7 Alternative Shutdown Capability

a. Inspection Scope

The team reviewed the Calvert Cliffs Interactive Cable Analysis, fire response procedures and abnormal operating procedures (AOPs) for the selected fire areas to evaluate the methods and equipment used to achieve hot shutdown following a fire. The team also reviewed piping and instrumentation drawings for post-fire safe shutdown systems to identify required components for establishing flow paths, to identify equipment required to isolate flow diversion paths, and to verify appropriate components were properly evaluated and included in the safe shutdown equipment list. The team also reviewed selected alternate shutdown components and their control circuits to ensure that proper isolation was provided for alternate shutdown capability and

performed field walkdowns to evaluate the protection of the equipment from the effects of fires.

Post-fire shutdown procedures for the selected areas were also reviewed to determine if appropriate information was provided to plant operators to identify protected equipment and instrumentation and if recovery actions specified in post-fire shutdown procedures considered manpower needs for performing restorations and area accessibility. The team also reviewed training lesson plans for the alternative shutdown procedures, discussed training with licensed operators, reviewed selected alternate shutdown equipment tests, reviewed the adequacy of shift manning, and evaluated the accessibility of the alternative shutdown operating stations and required manual action locations.

Specific procedures reviewed included AOP-9A, "Control Room Evacuation and Safe Shutdown Due to a Severe Control Room Fire," Revision 7; AOP-9B, "Safe Shutdown Due To A Severe Cable Spreading Room Fire," Revision 8 and AOP-9Q, "Safe Shutdown Due to a Severe Fire in Room 407 Unit 2 Switchgear Room 45'," Revision 8. The team also reviewed the associated bases documents for these procedures and supporting engineering evaluations and calculations.

A procedure walkdown was performed for procedure AOP-9B, "Safe Shutdown Due To A Severe Cable Spreading Room Fire," Revision 8. The walkdown was performed on Unit 1 by a licensed operating crew and focused primarily on the portion of the procedure associated with achieving stable hot shutdown conditions. Five of the plant operators were accompanied by an NRC team member during the walkdown and the approximate time for critical steps, such as establishing auxiliary feedwater flow to the steam generators and establishing charging flow and boration of the reactor coolant system, were noted and compared to the procedural limits.

b. Findings

Procedures

During the performance of procedure reviews and walkdowns, the team identified a number of discrepancies with procedures AOP-9A and -9B. The following are examples of the types of discrepancies identified:

- Procedures AOP-9A and -9B assume instrument air will be available to support turbine driven auxiliary feedwater (TDAFW) pump speed control from the auxiliary shutdown panel (ASP). However, instrument air may not be available, requiring local operation of the pumps using the governor speed control knob.

- Procedure AOP-9A assumes air will be available for operating the atomospheric steam dump valves (ADVs) from the ASP prior to starting a salt water air compressor (SWAC). Again, instrument air may not be available and local operation of the ADVs may be required.

- Procedure AOP-9B does not properly control the starting and operation of the SWAC relative to the stripping and re-energization of the electrical buses. For

example, the procedure steps do not ensure that electrical bus 14 is re-energized prior to attempting to start the SWAC. Also, following the procedure steps that would start the SWAC, the motor control center (MCC) that powers the SWAC is stripped of unnecessary loads and then required loads are re-energized. However, the procedure does not include a step to re-close the circuit breaker for the SWAC.

- During the walkdown of procedure AOP-9B, the requirements were not accomplished for restoration of AFW flow in 30 minutes and charging flow in 60 minutes. The walkdown results were approximately 48 minutes to restore AFW flow and 92 minutes to restore charging flow. The procedure bases documents indicate that longer times for restoration of these items are supported by calculations. The calculations show that approximately 45 minutes is available to restore AFW flow before steam generator dryout would occur and approximately 85 minutes are available to restore charging flow before pressurizer level indication would be lost.

The team determined that the procedure deficiencies had a credible impact on safety in that they could result in delays that could challenge the ability to remove decay heat following a fire in the control room or cable spreading room. The team also determined that the procedure deficiencies represented a degradation of the Mitigating Systems Cornerstone. Because the procedure deficiencies did not result in the loss of safety function identified in the licensee's IPEEE, the team concluded that the procedure deficiencies constituted a finding of very low safety significance (Green) using the Significance Determination Process (SDP) Phase I Screening Worksheet in Inspection Manual Chapter 0609, "Significance Determination Process," Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations."

The team determined that the decay heat removal function could be maintained because manual operation of systems, in accordance with emergency operating procedures, was available to compensate for the potential unavailability of instrument air. Additionally, the times for accomplishing time critical tasks during the procedure walkdown were adversely affected by factors such as a very high noise level at the auxiliary shutdown panel caused by the operating control rod drive motor-generator (MG) set. During an actual implementation of the procedure, one of the first steps would be to shut down the MG sets to ensure control rods were inserted and to eliminate the source of noise.

Also, during walkdowns of the AOP-9A procedure that were performed following procedure upgrades, the licensee was able to restore AFW and charging system flow, well within the procedural requirements. The licensee's position was that the ability to successfully implement procedure AOP-9A would ensure the remaining AOP-9 procedures could also be properly implemented within all time constraints. However, the upgrade of procedure AOP-9B for Unit 1, to make it consistent with the AOP-9A procedure, had been inadvertently missed due to personnel changes within the procedure writing group. Procedure AOP-9B for Unit 1 was revised prior to the completion of the inspection to resolve the more significant procedure deficiencies.

10 CFR 50, Appendix R, Section III.L.3, “Alternative and Dedicated Shutdown Capability,” requires, in part, that alternative shutdown capability accommodate post-fire conditions and that procedures be in effect to implement this capability. Contrary to this requirement, procedures AOP-9A and -9B (Unit 1) were inadequate in that they contained numerous deficiencies that presented challenges to the operators’ ability to achieve and maintain safe shutdown. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. The procedure deficiencies have been entered into the licensee’s corrective action program as Issue Reports IR3-076-835, IR3-076-859, IR3-076-860, and IR3-076-955. **(NCV 50-317/01-007-01)**

Calculations

During a review and walkdown of procedure AOP-9B the team noted that steam generator blow down flow was secured relatively late in the procedure at step BR. The team also reviewed calculation NEU 000-TH-8910, “AOP-9 Simulation,” to determine whether the steam generator inventory loss due to blow down flow was properly accounted for when determining how much time was available to restore AFW flow to prevent the loss of the steam generators as a method for the removal of decay heat. Based on this review, and discussions with licensee engineering staff, it was determined that steam generator blow down flow was not accounted for in the calculation. Issue report IR3-075-583 was initiated and an operability review was performed. The licensee concluded that compensatory measures were necessary to limit blow down flow to 100 gpm to ensure that 30 minutes would be available to the operators to restore AFW flow, consistent with the existing AOP. Existing operating procedure limits would allow blow down flow to be as high as 180 gpm which would reduce the time for restoration of AFW flow to approximately 26 minutes.

As a result of the team’s questions related to the AOP-9 simulation calculation, the licensee also identified that the UFSAR Chapter 14 analysis for a loss of feedwater transient also failed to account for steam generator blow down flow inventory loss. Issue report IR3-075-582 was initiated and the licensee initially determined that there was a potential for steam generator dryout to occur during the transient. Subsequent engineering reviews identified that there were conservative assumptions utilized in the analysis of record which off set the effects of not accounting for blow down flow, such that steam generator dryout conditions would not occur even at 180 gpm blow down flow.

The team determined that the calculation deficiency had a credible impact on safety in that it resulted in a non-conservative abnormal operating procedure. The team also determined that the calculation deficiency represented a degradation of the Mitigating Systems Cornerstone. Because the magnitude of the deficiency did not result in the loss of safety function identified in the licensee’s IPEEE, the team concluded that the deficiency constituted a finding of very low safety significance (Green) using the Significance Determination Process (SDP) Phase I Screening Worksheet in Inspection Manual Chapter 0609, ”Significance Determination Process,” Appendix A, “Significance Determination of Reactor Inspection Findings for At-Power Situations.”

10 CFR 50, Appendix B, Criteria III, “Design Control,” requires, in part, that design control measures shall be provided for verifying or checking the adequacy of design. Contrary to this requirement, design calculations and analysis for AOP-9 and loss of feedwater analysis were not adequate in that they failed to include inventory losses due to steam generator blow down flow. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. The procedure deficiencies have been entered into the licensee’s corrective action program as Issue Reports IR3-075-582 and IR3-075-583. **(NCV 50-317/01-007-02)**

.8 Safe Shutdown Circuit Analyses

a. Inspection Scope

The team reviewed the Calvert Cliffs Fire Hazards Analysis Summary Document and the Interactive Cable Analysis (ICA) to assess the adequacy of the methodology applied in the analysis. The team also reviewed assumptions utilized in the analysis, the application of NRC guidance and the adequacy of engineering evaluations of design vulnerabilities.

The team reviewed power and control cable routing for a sample of components required for post-fire safe shutdown to determine if the cables were properly routed outside the fire area of concern or protected against the effects of fire.

The team reviewed electrical fuse and circuit breaker coordination studies to ensure equipment needed to conduct post-fire safe shutdown activities would not be impacted due to a lack of coordination. The team also reviewed the electrical isolation capability of selected equipment needed for post-fire safe shutdown to ensure that such equipment could be operated locally, if needed.

Due to the issuance of Change Notice 00-020 to Inspection Procedure 71111.05, “Fire Protection,” the team did not review associated circuit issues during this inspection. This change notice has suspended this review pending completion of an industry initiative in this area.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

.1 Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team reviewed the fire impairments log, open corrective maintenance work orders for fire protection and safe shutdown equipment, selected issue reports for fire protection and safe shutdown issues to evaluate the prioritization for resolving fire protection related deficiencies and the effectiveness of corrective actions. The team also reviewed recent Quality Assurance Audits, and Engineering Self-Assessments of the fire protection program to determine if Calvert Cliffs was identifying program deficiencies and implementing appropriate corrective actions.

b. Findings

No findings of significance were identified.

4OA3 Event Follow-up

.1 (Closed) LER 50-318/2001-001 22 Saltwater Air Compressor Appendix R Handswitch Fuses Shunted

While performing preventive maintenance the licensee found that an extra (spare) wire was installed in the circuit breaker control circuit for the 22 salt water air compressor (SWAC). This wire should have been removed during a modification that was performed in 1999. In the event of a control room fire, this wire could shunt the control power fuses and thereby remove the overcurrent protection for the control transformer. The transformer is necessary to operate the circuit breaker locally as was assumed in the Appendix R analysis. The spare wire was removed to correct this deficiency.

The team determined that the deficiency represented a degradation of the Mitigating Systems Cornerstone. Because the deficiency did not result in the loss of safety function identified in the licensee's IPEEE, the team concluded that the deficiency constituted an issue of very low safety significance (Green) using the Significance Determination Process (SDP) Phase I Screening Worksheet in Inspection Manual Chapter 0609, "Significance Determination Process," Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations." Without a SWAC operating, the affected equipment could have been operated by either using nitrogen to pressurize the instrument air system or by using local manual operation.

However, the failure to remove the wire constitutes a violation of 10 CFR 50, Appendix R, Section III.G.3, which requires that alternative shutdown capability be independent of the area of concern. Since this issue was identified by the licensee, found to be of very low safety significance, and has already been corrected, the violation

is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy, issued on May 1, 2000 (65FR25368). **(NCV 50-318/01-007-03)**

4OA6 Meetings, Including Exit

.1 Exit Meeting Summary

The team presented their preliminary inspection results to Mr. Peter Katz and other members of the Calvert Cliffs Nuclear Power Plant at an exit meeting on September 14, 2001.

4OA7 Licensee Identified Violations. The following finding of very low significance was identified by Calvert Cliffs and was a violation of NRC requirements which met the criteria of Section VI.A of the NRC Enforcement Policy for being dispositioned as a Non-Cited Violation.

10 CFR 50, Appendix R, Section III.G.3, requires that the alternative shutdown capability be independent of the fire area of concern. The licensee identified a jumper that could result in the loss of the 22 salt water air compressor during a fire in the control room. (Section 4OA3.1). Reference LER 50-318/2001-01.

KEY POINTS OF CONTACT

Calvert Cliffs Nuclear Power Plant, Inc

D. Buffington, System Engineer, Fire Protection
S. Collins, Principal Engineer, Electrical Engineering Unit
M. Finley, Principal Engineer, Nuclear Engineering
M. Gahan, Supervisor, Issues Assessment Unit
R. Hammans, Control Room Operator
W. Holsten, General Supervisor, Design Engineering
P. Katz, Plant General Manager
T. Kazukynas, Design Engineer, Fire Protection
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R. Szoch, Principal Engineer, Electrical and Controls Systems Engineering
M. Talbot, Outside Operator

Nuclear Regulatory Commission

J. Linville, Chief, Electrical Engineering Branch
D. Beaulieu, Senior Resident Inspector, Calvert Cliffs Nuclear Power Plant
L. Cline, Resident Inspector, Calvert Cliffs Nuclear Power Plant

LIST OF ITEMS OPENED AND CLOSED

Opened and Closed

50-317/01-007-01	NCV	Inadequate abnormal operating procedures for post-fire safe shutdown. (Section 1R05.07)
50-317/01-007-02	NCV	Failure to account for steam generator inventory losses due to blow down flow. (Section 1R05.07)
50-318/01-007-03	NCV	22 Saltwater air compressor Appendix R handswitch fuses shunted. LER 50-318/2001-001 (Section 4OA3.1)

Opened

None

Closed

50-318/01-001	LER	22 Saltwater Air Compressor Appendix R Handswitch Fuses Shunted

(2) SUPPLEMENTAL INFORMATION (Cont'd)

LIST OF ACRONYMS USED

AOP	Abnormal Operating Procedure
AFW	Auxiliary Feedwater
ADV	Atmospheric Dump Valve
ASP	Auxiliary Shutdown Panel
CFR	Code of Federal Regulations
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
FHA	Fire Hazards Analysis
FPEE	Fire Protection Engineering Evaluation
ICA	Interactive Cable Analysis
IEEE	Institute of Electrical and Electronics Engineers
IPEEE	Individual Plant Examination of External Events
IR	Issue Report
MCC	Motor Control Center
MG	Motor-Generator
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
P&IDs	Piping and Instrumentation Drawings
QA	Quality Assurance
RCP	Reactor Coolant Pump
SCBA	Self-Contained Breathing Apparatus
SDP	Significance Determination Process
SWAC	Salt Water Air Compressor
TDAFWP	Turbine Driven Auxiliary Feedwater Pump
UFSAR	Updated Final Safety Analysis Report

(3) LIST OF DOCUMENTS REVIEWED

Fire Protection Program Documents

FP00002, Calvert Cliffs Nuclear Power Plant Fire Hazards Analysis, Rev. 0
- Attachment 1 - Fire Hazards Analysis Summary Table
- Attachment 2 - Comparison to Fire Protection Safety Evaluation Report Fire Hazards Analysis Requirements
- Attachment 3 - Comparison to 10 CFR 50.48 Fire Protection Program Requirements
- Attachment 4 - Appendix R Ventilation Table

Interactive Cable Analysis for Calvert Cliffs Nuclear Power Plant Unit 1 & Unit 2, Rev. 1
Fire Fighting Strategies Manual (FFSM)
- Cable Spreading Room - Unit-1, Room 306, Rev. 2
- Main Control Room Complex, Room 405, Rev. 1
- Switchgear Room - Unit 2, Room 407, Rev. 2

Calvert Cliffs Technical Requirements Manual (TRM), Rev. 5

Training Documents

Fire Brigade Drill Scenario 98-03, A Class C Fire in a Radiological Control Area, 1/8/98
Fire Brigade Drill Scenario 99-02, 52-21647 Smoking, 1/11/99
Fire Brigade Drill Scenario 01-01, Fire on Unit 2 Turbine Bearing #7, 12/15/00
Fire Brigade Drill Scenario 01-02, Fire in Flammable Gas Storage Cage, 12/15/00
Fire Brigade Drill Scenario 01-04, Explosion in Unit 1 Switchgear Room, 5/18/01
Fire Drill Critique, Class “A” Fire Unit TB 27', Completed 3/15/01
Fire Drill Critique, Light Smoke Coming From Breaker 52-21647, Completed 2/11/01
Fire Drill Critique, Class C Fire in a Radiological Control Area, Completed 1/25/01
Fire Drill Critique, Fire in Flammable Gas Storage Cage, Completed 6/6/01 & 6/16/01
Fire Drill Critique, Fire in the Unit 1 45' Switchgear Room, Completed 6/27/01

Fire Protection Engineering Evaluations (FPEEs)

ES199901113, Instrument Air Functionality due to Fire Effects, 10/11/99
ES199901141, Appendix R Communication System Review, Rev. 0
FPEE-11, Adequacy of the Ventilation Penetrations between the Unit 1 CSR & CC1B and Between CC1B andCC1A, 12/21/90
FPEE-18, Fire Door Evaluation, 12/9/94
FPEE-25, Seal for Unistrut Penetrating Wall, 2/22/96
FPEE-26, Evaluation of 16 Fire Dampers Which were Determined to be Acceptably Installed, 11/24/96
FPEE-31, Control Room Fire Damper Installations

Procedures

Abnormal Operating Procedures

AOP 9A	Unit 1, Control Room Evacuation and Safe Shutdown Due to a Severe Control Room Fire, Rev. 8
AOP 9B	Unit 1, Safe Shutdown Due to a Severe Cable Spreading Room Fire, Rev. 8
AOP 9B	Unit 2, Safe Shutdown Due to a Severe Cable Spreading Room Fire, Rev. 9
AOP-9Q	Safe Shutdown Due to a Severe Fire in Room 407 Unit 2 Switchgear Room 45', Rev. 8

(3) LIST OF DOCUMENTS REVIEWED (Cont.)

Alarm Response Procedures

OC188-ALM Page 35, Fuel Oil Day Tank Level Hi-HI, Rev. 5

Maintenance Procedures

PM Basis 465 Vital Instrument AC Inverters
PM Basis 468 Battery Chargers
PM Basis 472 Fuses and Fuse Holders
E-19 ITE Series Motor Control Center Cubicles, Rev. 5
E-19A Westinghouse Motor Control Center Cubicle Inspection, Rev. 0
61406 Section 300, Shs 1,1A & 1B, Approved Material Substitution (Fuses)

Operating Instructions

OI-21C OC Diesel Fuel Oil Day Tank
OI-22H, Switchgear Ventilation and Air Conditioning, Rev. 17

Setpoint Control Procedures

CCI-205 Device O-LS-10022, OC Diesel Fuel Oil Day Tank Level Switch
EN-1-100 Device O-LS-10021, OC Diesel Fuel Oil Day Tank Lo-Lo-Lo Lvl Sw

Surveillance Procedures

ETP 91-079, Fire Damper Testing, Rev. 0
ETP 94-003, Fire Damper Testing (Dual Outage Required), Rev. 0

NO-1-110, Calvert Cliffs Key & Lock Control, Rev. 4
SA-1, Fire Protection Program, Rev. 3
SA-1-100, Fire Prevention, Rev. 7
SA-1-101, Fire Fighting, Rev. 1
SA-1-102, Fire Protection/Appendix R Compensatory Actions, Rev. 1
SA-2, Industrial Safety Program, Rev. 0
STP F-76-0, Staggered Test of Electric Pump, Rev. 4
STP F-290-0, Hose Station and Hydrant Hose Inspection, Rev. 5
STP F-291-0, Halon System Valve Position Verification, Rev. 4
STP F-489-0, Halon System and Piping Inspection, Rev. 5
STP F-490-0-A, Fire Detection Instruments Functional Tests, Rev. 2
STP F-490-0-B, Fire Detection Instruments Functional Tests, Rev. 2
STP F-490-0-C, Fire Detection Instruments Functional Tests, Rev. 2
STP F-490-0-D, Fire Detection Instruments Functional Tests, Rev. 2
STP F-490-1, Fire Detection Instruments Functional Test Unit 1 (Inaccessible), Rev.3
STP F-490-2, Fire Detection Instruments Functional Test Unit 2 (Inaccessible), Rev.2
STP F-492-0, Halon System Storage Tank Level and Pressure Verification, Rev. 4
STP F-493-0, Fire Suppression System Flush, Rev. 4
STP F-495-0, Semi-annual Visual Inspections of Yard Fire Hydrants, Rev. 3
STP F-496-0, Yard Fire Hydrant Hose Hydrostatic Test and Gasket Inspection, Rev. 3
STP F-497-0, Annual Yard Fire Hydrant Flow Check, Rev. 1
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STP F-691-0, Fire Suppression System Flow Tests, Rev. 1
STP F-692-0, Removal and Replacement of Fire Hose in Unit 1 Containment, Rev. 2
STP F-692-1, Containment Standpipe Valve Cycle Flow Tests U-1, Rev. 2
STP F-692-2, Containment Standpipe Valve Cycle Flow Tests U-2, Rev. 1
STP F-693-0, Fire Suppression System Valve Cycling Test Operations, Rev. 4
STP F-693-1, Removal and Replacement of Fire Hose in Unit 1 Cont., Rev. 2
STP F-693-2, Removal and Replacement of Fire Hose in Unit 2 Cont., Rev. 1
STP F-696-0, Fire Pump Flow Test, Rev. 4
STP F-697-0, Fire Suppression System Functional Test, Rev. 3
1-102-54-O-Q, AOP/EOP Pre-staged Equipment, Rev. 16
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IR3-000-536, Issues with Emergency Lighting, 7/10/98
IR3-001-048, Prematurely Releasing the Fire Watch before DOW Corning 3-6548 Silicone RTV Foam was Cured, 7/21/99
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IR3-021-830, Fire Occurred in the 22 RCP Pump Bay, 5/4/99
IR3-021-854, Hanging Fire Alarms in the Intake Structure, 10/29/99
IR3-021-942, Bags of Combustibles Found in Control Room HVAC Room, 10/6/99
IR3-023-823, Qualification of Hot Work Watches, 11/17/99
IR3-038-009, Cable Tray Only Sealed on One Side of Barrier, 2/22/99
IR3-038-095, Fire Reported Out, 3/17/99
IR3-039-708, Breaker 52-2430 caught fire when opening, 11/12/98
IR3-041-047, Communication Problems During Fire Drills, 6/27/01
IR3-041-105, Fire Brigade SCBA's Found in Unsatisfactory Condition, 4/19/01
IR3-044-606, 3 way Alarm Test Valve for Unit 2 Bearing Spray #1 will not Move, 1/10/01
IR3-047-785, Commitment to Conduct Fire Drills with Offsite Fire Departments, 7/18/00
IR3-050-467, Two Emergency Lights Found Out of Alignment, 9/13/01
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IR3-073-329, CCW to the RCP Seals no Credited in the ICA for Appendix R, 7/11/01
IR3-076-911, Fire Brigade Equipment Issues, 4/24/01
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Drawings

Equipment Location/General Arrangement Drawings

60202 Containment and Auxiliary Building, El. 27, Rev. 14
60204 Containment and Auxiliary Building, El. 45, Rev. 35
60277 Control Room, Rev. 27
61305 Cable Spreading Room, Rev. 27
62203 Containment and Auxiliary Building, El. 27, Rev. 12
62204 Containment and Auxiliary Building, El. 45, Rev. 32

Piping and Instrument Diagrams

60700SH0001, Main Steam and Reheat, Rev. 39
60583, Auxiliary Feedwater System, Unit 1, Rev. 53
60712SH0003, Compressed Air System, Instrument Air & Plant Air, Rev. 98
60712SH0006, Compressed Air System, Instrument Air & Plant Air, Rev. 9
60712SH0005, Compressed Air System, Instrument Air & Plant Air, Rev. 9
60714SH0001, Plant Fire Prot. System Fire Pump House and Main Header, Rev. 39
60714SH0002, Plant Fire Protection System Aux. and Containment Building, Rev. 24
60714SH0003, Plant Fire Prot. System Turb. and Ser. Bldg. and Int. Structure, Rev. 26
60714SH0004, Plant Fire Protection and Halon Fire Suppression System, Rev. 12
60714SH0005, Plant Fire Protection System Figure Numbers 1, 2, 3, 4, and 5, Rev. 19
60714SH0006, Plant Fire Prot. System Outside Prot. Area and Int.m Office Bldg, Rev. 14
60714SH0007, Plant Fire Protection System Hose Station Locations, Rev. 9
60729SH0001, Reactor Coolant System, Rev. 69
60730SH0001, Chemical and Volume Control System, Rev. 72
60730SH0002, Chemical and Volume Control System, Rev. 61
62421, Sh.2, Fuel Oil System (OC Diesel Generator). Rev.4
62583, Auxiliary Feedwater System, Unit 2, Rev. 48

Instrument Loop Diagrams

60903, Sh.1, PT1013A SG11 Pressure Alternate Shutdown, Rev. 5
60903, Sh.2, PT1013B SG11 Pressure Alternate Shutdown, Rev. 5
60904, Sh.1, LT1114A SG11 Wide Range Level Alternate Shutdown, Rev. 5
60904, Sh.2, LT1114B SG11 Wide Range Level Alternate Shutdown, Rev. 4
60905, Sh.1, LT5610A CST 12 Level Alternate Shutdown, Rev. 10
60910, AFW Throttle and Control Valves, Rev. 6
60929, Sh.1, HC 3987A&B TDAFWP Speed Controller, Rev. 3
60929, Sh.1, HC 3989A&B TDAFWP Speed Controller, Rev. 2

Panel Layout Drawings

60276, Sh. 43, Panel 1C43 (Alternate Shutdown Panel)

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Electrical Single Line Diagrams

61001, Sh. 1, Electrical Main Single Line , Rev. 36
61001, Sh. 2, Electrical Main Single Line , Rev. 5
61022, Sh. 1, 120V AC Vital System, Rev. 45
61024, Sh. 3, 125V DC Bus 15, Rev. 2
61025, 125V DC Buses 12 and 22, Rev. 30
61030, Vital 120V AC & 125V DC, Emergency 250V DC, Rev. 31
63005, Sh. 1, Unit Buses 21 and 24 Meter and Relay Diagram, Rev. 32
63022, 120V AC Vital System, Rev. 34

Electrical Panel Schedules

61020, Sh. 1, Panel 11, Rev. 26

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18002-99, Sh. 74, Fuel Oil Transfer Pumps Control, Rev. 2
18002-99, Sh. 75, Fuel Oil Transfer Pumps Control, Rev. 2
61052, Sh. 3, 4KV Unit Bus 07, Rev. 2
61071, Sh. 25, Tie Breaker 152-0701, Rev. 2
61071, Sh. 27, Feeder Breaker 152-0704 (From SMECO), Rev. 2
61075, Sh. 23, Charging Pump 13
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61079, Sh. 54B, Auxiliary Feedwater Motor Driven Pump 13
61079, Sh. 54C, Auxiliary Feedwater Motor Driven Pump 13
61086, Sh. 156, Diesel Generator OC Breaker 152-0703, Rev. 2
61094, Sh. 4A, 7.5 KVA Inverter No. 11
63052, Sh. 2, 4 KV Unit Bus 24
63076, Sh. 46B, Salt Water System Air Compressor 22, Rev. 0
63076, Sh. 46B, Salt Water System Air Compressor 22, Rev. 1
63076, Sh. 46B, Salt Water System Air Compressor 22, Rev. 2
63086, Sh. 1, 4K Bus-21 Diesel-2A Feeder Breaker 152-2103, Rev. 26
63086, Sh. 2, Bus 21 Diesel OC Feeder Breaker 152-2106, Rev. 33
63086, Sh. 4, Bus 24 Diesel OC Feeder Breaker 152-2406, Rev. 28
63086, Sh. 27, Diesel Generator No. 2A Engine Control, Rev. 8

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61154, Sh. 4, Panel 1B004 - Before, Rev. 9
61154, Sh. 4, Panel 1B004 - After, Rev. 9
61161, Sh. 4, Panel 1B004 - After, Rev. 5
82530, Sh.1A, Size 2 Starter Elementary and Control Wiring Diagram, Rev. 9

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61068, Sh. 7, Diesel Generator OC, Rev. 1
61086, Sh160A, Diesel Generator Start Control
61086, Sh162, Diesel Generator Speed Control
61086, Sh162, A Diesel Generator Speed Control
61086, Sh165A, Diesel Generator Voltage Control

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61237 Sh. 2, Underground Conduit West of Turbine Building, Rev. 0
61249, Trays and Conduits, Auxiliary Building, El. 27', Rev. 42
61250, Trays and Conduits, Auxiliary Building, El. 27', Rev. 56
61263, Trays and Conduits, Auxiliary Building, El. 5', Rev. 60
61268, Trays and Conduits, Auxiliary Building, El. 27', Area 16, Rev. 37
61269, Trays and Conduits, Auxiliary Building, El. 27', Rev 72
61272, Tray and Conduit Sections, Auxiliary Building, Rev 16
61275, Sh. 1, Trays and Conduits, Auxiliary Building, El. 45', Rev 67
61275, Sh. 2, Tray and Conduits, Auxiliary Building, El. 45', Rev 4
61278, Trays and Conduits, Auxiliary Building, El. 69, Rev. 62
61283, Tray and Conduit Sections, Auxiliary Building, Rev. 13
61284, Tray and Conduit Sections, Auxiliary Building, Rev. 14
61285, Trays and Conduits, Auxiliary Building, El. 27', Rev. 42
61286, Sh. 1, Trays and Conduits, Auxiliary Building, El. 45', Rev. 79
61286, Sh. 2, Trays and Conduits, Auxiliary Building, (Control Room), Rev. 6
61286, Sh. 3, Sections and Details, Auxiliary Building, (Control Room), Rev. 3
61286 Sh. 6, Trays and Conduits, Auxiliary Building, El. 45', Rev 07
61297, Tray and Conduit Sections, Vertical Cable Chase, Rev. 34
61300, Tray and Conduit Sections, Auxiliary Building, Rev. 14
61301, Tray and Conduit Sections, Auxiliary Building, Rev. 17
61302, Tray and Conduit Sections, Auxiliary Building, Rev. 9
61303, Sh. 5, Tray and Conduit Sections, Auxiliary Building, Rev. 16
61307, Sh. 3, Tray and Conduit Sections, Auxiliary Building, Rev. 28
61307, Sh. 10,Trays and Conduits, Auxiliary Building Roof, Rev. 1
61307, Sh. 11,Trays and Conduits, Auxiliary Building Roof, Rev. 1
61308, Sh. 1, Trays and Conduits, Auxiliary Building, El. 27', Rev. 72
63276, Sh. 1, Trays and Conduits, Auxiliary Building, El. 45' (Unit 2), Rev. 63
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12263-0003, Halon 1301 Fire Suppression System, Rev. 11
60331SH0001, Fire Damper Installation, Rev. 18
60331SH0002, Fire Damper & Fusible Link Schedule and Details, Rev. 14
60477B, Sh. 8, Fire Damper Installation Aux. Bldg., Rev. 0
60477C, Sh.1, Fire Damper Installation Aux. Bldg., Rev. 2
60733E, Sh 2, Piping and Instru. Diagram Aux. Bldg. Unit 2 Waste Process Equipment and Area Drains, Rev. 8
60733SH0001, Aux. Building Waste Processing Equipment and Area Drains, Rev. 27
61402SH0025, Emer. Lighting and Com. Elevation 5'-0" & 10'-0" Aux. Building, Rev. 20
61402SH0030, Emer. Lighting and Com. Elevation 27'-0" Unit 1 Aux. Bldg., Rev. 13
61402SH0039, Emer. Lighting Control Room Aux. Building Elevation 45'-0", Rev. 1
61406SEC108.3, Sh. 1, Fire Barriers/Stops, Rev. 5
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62149SH0001, Appendix R Separation Requirements Aux. Bldg. & Cntmt. Struct. El. (-) 10'-0" & (-) 15'-0", Rev. 6
62150SH0001, App. R Sep. Req. Aux. Bldg. & Cntmt. Struct. Floor Plan at El. 5'-0", Rev. 7
62151SH0001, Appendix R Separation Req. Aux. Bldg. & Cntmt Struct. Floor Plan at El. 27'-0", Rev. 9
62152SH0001, App. R Sep. Req. Aux. Bldg. & Cntmt Struct. Floor Plan at El. 45'-0", Rev. 10
62152SH0024, Barrier Segment Drawing for Plant Elevation 45' 0"
61286SH0001, Trays and Conduits Aux. Bldg. El. 45'-0", Area 15, Rev. 79
61343SH0001, Plant Fire Protection Riser Diagram, Rev. 27
61343SH0002, Plant Fire Protection Riser Diagram, Rev. 4
61343SH0003, Plant Fire Protection Riser Diagram, Rev. 3
63402SH0024, Emer. Light and Com. Elevation 5'-0" & 10'-0" Unit 2 Aux. Bldg., Rev. 7
63402SH0028, Emer. Lighting and Com. Elevation 45'-0" Aux. Bldg., Rev. 17

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CA03813, Fire Protection System Standpipe Calculation-Sprinkler Systems, Rev. 0
D-M-93-12, SBO Diesel Fuel Oil Day Tank Sizing, Rev. 2
E-90-65, (Electrical Protective Device) Coordination Curves, Rev. 1 (Partial)
ES-001, Flooding, Rev. 2
ES200100701, Evaluate Appendix R Necessity for CCW to RCP Seals, Rev. 0
12263-33, Ansul Halon Hydraulic System Design Calculation, 12/1/81
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12263-37, Ansul Halon Hydraulic System Design Calculation, 12/1/81
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ZA-1A116-C	1A01-1C100A
ZA-1D107-P	1D01-1Y01A
ZA-1Y0123-P	1C43-1Y01-1
ZA-1Y0124-P	1C43A-1Y01-1
ZA-1Y0125-P	1Y01-1-2C43A
ZA-1Y0128-P	1Y01-1-2C43
ZA-2Y0224-P	2Y02-1-1C43B
ZA-2Y0228-P	2Y02-1-1C43
ZA-1B115-A	1A01-1B01B
ZA-1B115-C	1B01B-1C67
ZA-1B104-A	1A01-1B01A
ZA-1B104-C	1B01A-1C67
ZA-1B104-D	1B01A-1NB104
ZA-1B104-E	1B01A-1PS224Z
ZA-1B104-F	1B01A-1C06
ZA-1B104-H	1B01A-1C07
A-1B104-X	1B01A-1C07
ZB-1B104-A	1A04-1B04A
ZB-1B104-C	1B04A-1C68
ZB-1B104-D	1B04A-1NB404
ZB-1B104-E	1B04A-1PS224ZA
ZB-1B104-F	1B04A-1C06
ZB-1B104-H	1B04A-1C07
B-1B104-X	1B04A-1C07
ZB-2Y0224-P	1C43B-2Y02-1
ZB-2Y0228-P	1C43-2Y02-1
K-OA701-PD	1J692-1NA406
K-OA701E	1C19-1J688
K-ODGOCA-B	1J687-1J688
K-ODGOCA-C	1C19-1J688
K-ODGOC-B	1J687-1J688
K-ODGOCC-C	1C19-1J688
K-ODGOCG-B	1J6887-1J688
K-ODGOCG-C	1C19-1J688
K-ODGOCJ-C	1C19-1J688

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STP F-493-0, Fire Suppression System Flush, Completed 1/11/00 & 1/15/01
STP F-690-0, Sprinkler System Inspection, Completed 5/4/99 & 10/15/00
STP F-691-0, Fire Suppression System Flow Test, Completed 9/17/98 & 9/15/00
STP F-696-0, Fire Pump Flow Test, Completed 10/7/99 & 9/18/00
STP F-697-0, Fire Suppression System Functional Test, Completed 3/9/99 & 7/24/00
STP M-496-0, Supervisory Test of Fire Detection Instruments, Completed 8/30/00 & 3/1/01

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STP M-498-2, Cable Spreading Room Halon System Fire Detection Instruments Functional Tests, Completed 10/26/00 & 4/26/01
STP M-499-1, 27' & 45' Switchgear Rooms Halon System Fire Detection Instruments Functional Test, Completed 9/7/00 & 3/13/01
STP M-499-2, 27' & 45' Switchgear Rooms Halon System Fire Detection Instruments Functional Test, Completed 10/25/00 & 4/27/01
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STP O-63-2, Remote Shutdown and Post Accident Monitoring Instrumentation Channel Check, Completed 6/22/01 and 7/22/01
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Safety Evaluation Report (SER), Fire Protection, 9/14/79
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Third Supplement to the Fire Protection SER, 9/27/82
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Letter dated 10/1/81, Halon Suppression in the Cable Spreading Rooms
Letter dated 10/15/81, Halon Suppression in the Switchgear Rooms
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