

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

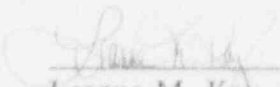
DOCKET/REPORT NOS: 50-317/94-15
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LICENSEE: Baltimore Gas and Electric Company (BG&E)

FACILITY: Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Lusby, Maryland

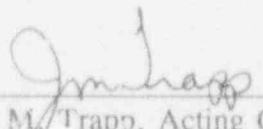
DATES: April 4-8, 1994

INSPECTOR:


Leanne M. Kay, Reactor Engineer
Electrical Section
Division of Reactor Safety


Date

APPROVED BY:


James M. Trapp, Acting Chief
Electrical Section
Division of Reactor Safety


Date

Area Inspected: This was an announced inspection to review the overall adequacy and implementation of BG&E's fire protection program at the Calvert Cliffs Nuclear Power Plant. During this inspection, administrative controls and procedures established to implement the fire protection program were reviewed. Procedures reviewed included those related to the control of combustibles, fire-risk evaluations, and fire barrier breach permits. Maintenance and testing records for fire detection and suppression systems were reviewed to assess plant fire control capabilities. Additionally, design control procedures for fire protection screening of plant modifications, and quality assurance audits of the fire program were reviewed. Individual plant walkdowns were performed to assess housekeeping and equipment conditions, and hands-on hot work firewatch training was observed to evaluate the adequacy of the fire simulations and firefighter's extinguishing capabilities.

Results: The inspector determined that the fire protection program at Calvert Cliffs complies with the program requirements provided in the technical specifications and licensing documents. The controls of combustibles and ignition sources were well implemented. The inspector determined that the housekeeping was good. The maintenance program for fire protection equipment was effectively implemented and the material conditions of fire protection equipment was also good. Firewatch and general employee training were effective in providing necessary knowledge and skills. Lesson plans and fire brigade training

procedures were adequate. However, the readability of pre-fire plans used by brigade members for developing firefighting strategies, identification of firefighting equipment, and fire area layouts were found to need improvements. The licensee stated they would review and revise these plans as required.

A weakness was identified regarding the lack of a formal engineering evaluation and test documentation to support the acceptance and qualification of certain temporary fire barrier penetration seal materials. This issue was of minor safety significance because temporary seal materials that lacked adequate documentation were not currently installed in the plant. To preclude future installations of these materials, the licensee stated that Administrative Procedure SA-1-100, Revision 0, would be revised to only permit materials with test qualification documentation. An issue report was issued by BG&E to track this deficiency.

DETAILS

1.0 PURPOSE

The purpose of this inspection was to assess the overall adequacy and implementation of the fire protection program at Calvert Cliffs, Units 1 and 2. The inspection included verifications of procedure implementation and evaluation of the technical adequacy of procedures and programs. Assessments were made of plant fire equipment condition and housekeeping via plant walkdowns and maintenance records reviews. Evaluations were made of fire brigade and firewatch personnel qualifications in comparison with program requirements. Program assessments conducted by BG&E were reviewed to evaluate the effectiveness of the audits performed.

2.0 INSPECTION FINDINGS

2.1 Fire Program - Procedure Review and Implementation (64704)

The fire protection procedures listed in Attachment 2 of this report were reviewed by the inspector to verify that the fire protection program requirements, as described in the Updated Final Safety Analysis Reports (UFSARs) and other licensing documents, have been adequately implemented.

Baltimore Gas and Electric Company (BG&E) has established a Nuclear Program Directive SA-1, "Fire Protection Program," to present requirements and departmental responsibilities for the fire protection program. This directive clearly described the fire protection system design basis for both units. However, clarifications of the fire protection program commitments were contained in letters between BG&E and the NRC, and were not included in the directive. The licensee stated that they planned to establish a Fire Protection Program Plan containing design and operational basis information on fire protection system and 10 CFR 50 Appendix R information in a single source document. This document was scheduled to be completed in accordance with the Upgrade Project Plan. This Upgrade Project was the result of a licensee self-assessment of Calvert Cliffs' compliance to 10 CFR 50, Appendix R, "Fire Protection Program For Nuclear Power Facilities Operating Prior To January 1, 1979." Results of this assessment led to the development of nine project tasks to enhance the Appendix R program. The establishment of a fire protection design basis document summarizing the commitments as described above is one of these nine tasks. The inspector concluded that a complete design basis document would be a valuable addition to the fire protection program.

Calvert Cliffs Nuclear Power Plant Administrative Procedure SA-1-100, "Fire Program," provides guidance for implementing the requirements of the fire protection program. The procedure delineates responsibilities and describes procedures for controlling combustible materials, ignition sources, fire barrier penetrations, impairing fire protection systems, performing firewatches, and conducting plant fire protection inspections. The inspector

concluded that the fire program procedure adequately designated the personnel and qualification requirements for those responsible for implementing the program.

The inspector reviewed the general employee training program and corresponding lesson plan to verify that workers have been provided the necessary information pertaining to fire program requirements. The general employee training program included information on hot work permits, fire door closure and use, types of fire suppression systems, and good housekeeping practices. The inspector determined that adequate measures had been established for employees to comply with requirements of the fire protection program.

In addition, the inspector reviewed the licensee's established controls for performing plant modifications. The purpose of this review was to verify that potential impacts on fire protection were made prior to modification installation. The inspector determined that engineering activities that could affect fire protection documents and procedures were controlled by engineering procedures. The inspector found that BG&E Design Engineering Section Procedure No. 18, for performing plant modifications, did require an engineering evaluation for assessing the potential impact on fire protection during the preliminary engineering phase. The inspector concluded that adequate direction for performing fire protection engineering reviews had been established.

The inspector concluded that the policies and procedures documentation reviewed were technically sound and effectively implemented. The fire program adequately designated personnel to implement the program and delineated training and qualification requirements necessary for the program to be effective for protecting the plant from fire.

2.2 Facility Tour

The inspector toured accessible vital and nonvital areas of the site and inspected the fire protection water suppression systems, fire pumps, firewater piping and distribution systems, post indicator valves, yard hydrants, contents of indoor and outdoor fire protection equipment storage cabinets, emergency lighting patterns, and the condition of fire brigade equipment. The tour also included inspection of the various types of fire detectors, alarm panels, positions of automatic and manual fixed suppression instruments, firehose stations, fireloading, fire barrier penetrations, fire detection systems, fire doors, and discussions with firewatch personnel encountered during the tour.

Tank gauges on fire equipment, including extinguishers and halon tanks, were found by the inspector to be adequate. Fire doors were found to latch properly. Fire brigade members clothes were in good condition and well organized in the turn-out gear closet.

The inspector identified two emergency lights that failed to illuminate in the Unit 1 main steam isolation valve room and Unit 1 component cooling room. The licensee initiated issue reports and maintenance orders to document these deficiencies. In addition, a few discrepancies were noted where equipment identification numbers were not present or were incorrect on either the emergency lighting box or the controlled drawing. The licensee stated that illumination levels, identification of emergency lighting equipment, and drawing updates are planned to be reviewed in accordance with the Fire Protection/Appendix R Upgrade Project Plan tasks. The inspector reviewed this project plan and determined that these planned actions were adequate. With the previous exceptions, sufficient emergency lighting existed to illuminate required equipment and access and egress pathways for the sampled safety-related equipment.

In general, good housekeeping and good fire protection equipment material conditions were observed. The inspector noted that this condition existed while Unit 1 was involved in outage-related work. The inspector randomly checked inspection tags on portable fire extinguishers and hose reels to verify that the required monthly surveillance inspections were performed. The monthly surveillance inspections for equipment observed were completed in accordance with stated requirements.

Based on interviews with personnel both inside and outside of the fire department, the inspector concluded that licensee personnel were knowledgeable of station policy and procedures for firewatches, reporting of fires, and responding to fires.

Fireloading of combustible materials for areas containing safety-related equipment was reviewed against acceptable values, provided in SA-1-100 and the Combustible Loading Re-Analysis Calculation (EPM Design Calculation No. 185, Revision 0, dated July 1993) to verify that calorific values (BTU/lb) of the materials found were compared to the total BTU content analyzed for that area or zone. In the areas observed, the combustible fireloading was less than the maximum acceptable values. The inspector concluded that the licensee had an adequate combustible control program.

Based on the facility tour, the inspector concluded that fire equipment was properly maintained. Good housekeeping and fire protection equipment material conditions were observed, and fireloading was determined to be within analyzed quantities. Interviews with personnel demonstrated adequate knowledge of station policy and procedures.

2.3 Administrative Controls

The inspector reviewed the procedures listed in Attachment 2 to verify that the following attributes had been established for combustible material and ignition source control to prevent fires and protect safety-related equipment:

- Special authorization is required for the use of combustible, flammable, or hazardous explosive material in safety-related areas;

- All waste, debris, rags, oil spills, or other combustible materials resulting from completed work activities have been removed;
- There are periodic inspections for the accumulation of combustibles;
- Transient combustibles are restricted and controlled in safety-related areas,
- Housekeeping is properly maintained in areas containing safety-related equipment and components;
- Smoking in safety-related areas is prohibited, except where 'smoking permitted' areas have been specifically designated by plant management;
- Requirements have been established for special authorization (permits) for activities involving welding, cutting, grinding, open flame or other ignition sources and that they are properly safeguarded in areas containing safety-related equipment and components;
- Work authorization, construction permit, or similar arrangements are provided for review and approval of construction and maintenance activities that could lessen the safety of the facility; and
- Fire reporting instructions for general plant personnel are developed.

The review of procedures and tours of the site identified acceptable conditions. Appropriate permit systems were in place to control ignition sources such as cutting and welding, the storage of combustible materials, and fire barrier/stop breaches. No hot work in progress was observed at either unit. The inspector concluded that the procedures for controlling combustible material were detailed and the procedure requirements were being implemented.

2.4 Fire Program Audits

The licensee is required by technical specifications to perform three types of audits of the Fire Protection Program. These types include an independent fire protection and loss prevention program inspection and audit every 12 months, an audit of the facility fire protection program and implementing procedures every 24 months, and an inspection and audit of the fire protection and loss prevention program by a qualified outside fire consultant at least once per 36 months. The inspector reviewed the fire protection audit program to verify that these audits had been performed satisfactorily and in accordance with technical specification requirements.

The licensee's Quality Assurance (QA) department performs an annual audit of the fire protection program and incorporates the requirements of the annual and 24 month audits into a single audit. The 36-month audit is performed by a member of the Joint Utility

Management Group. This group is comprised of nuclear plant licensees that exchange qualified auditors to fulfill the independent audit requirement. These audits were conducted in accordance with QA Administrative Procedures QL-3-300, Revision 1, "Audit Program," and QL-3-101, Revision 3, "Quality Audits and Surveillances." The audit reports noted in Attachment 2 were reviewed.

The inspector concluded that audit reports were adequate. Audit scopes were appropriate and based on performance perspectives and audit findings were clearly presented. The inspector verified proper reviews and actions were taken to resolve identified deficiencies. No discrepancies were noted for the resolutions reviewed. Based on review of these audits and disposition of identified findings, the inspector concluded that audit inspection findings were qualitatively assessed and corrective actions were being taken for identified problems.

2.5 Training

The inspector performed a review of Calvert Cliffs training documents to verify that the licensee had developed and implemented procedures that require:

- announced and unannounced fire drills;
- a minimum of two drills per year for each fire brigade member;
- at least one backshift drill per year for each brigade member;
- maintenance of training records; and
- fire brigade training and retraining at prescribed frequencies.

The inspector determined that the fire brigade training requirements were documented in Administrative Procedure SA-1-101, Revision 0, "Firefighting," and SA-1-100, Revision 0, "Fire Prevention," for firewatch personnel.

The inspector reviewed 1993 training records of fire brigade members to verify that they completed the required training, drill participation, annual hands-on training, and physicals. The records were complete and up-to-date. Also, prefire plans and lesson plans were reviewed. These prefire plans are used by brigade members for developing fire fighting strategies, identification of firefighting equipment, and fire area layouts. The inspector determined that it was difficult to read room names and identify fire equipment locations from the prefire plans. The licensee stated they would review and revise these plans as appropriate to improve the readability.

In addition, the inspector observed hands-on hot work firewatch personnel training performed onsite. This training demonstrated proficiency in the use of hand held fire extinguishers for varying types of fires.

The inspector determined that the training material presented during recent fire brigade and firewatch training was well organized and clearly presented the information to support the objectives. Discussions held with fire brigade members and firewatch personnel during this inspection indicated that they are cognizant of their responsibilities and that the training helped maintain their fire protection and firefighting skills.

The inspector concluded that procedures had been developed and implemented to properly incorporate training program requirements. Training records were found to be complete and up-to-date, and training materials were well organized. Overall, the inspector concluded the training program was adequate to present fire program requirements.

2.6 Fire Equipment Maintenance and Inspection

The inspector reviewed selected surveillance, maintenance, and inspection procedures for fire protection equipment to verify that the procedures provided adequate detail and were technically sound. Attachment 2 contains a list of the procedures that were reviewed. In addition to reviewing these documents, a sample of completed test and inspection records for these documents marked with an asterisk (*) were reviewed by the inspector to verify compliance with technical specification requirements and to verify that procedure implementation was appropriately documented.

Based on this review, the inspector concluded that procedures were adequate. These procedures provided adequate detail and were effective for maintaining equipment and verifying operability.

2.7 Fire Barrier Penetrations

Fire Prevention Procedure SA-1-100 establishes administrative controls and requirements to prevent fires and to ensure activities are conducted in a manner that promotes fire prevention. Attachment 7 to this procedure presents four materials as acceptable for use as temporary fire barriers or stops. These materials are fire plug pillows, Kaowool, silicone foam, and link seal.

The inspector determined that no supporting evaluations nor apparent tested configurations for fire plug pillows, silicone foam, or link seal existed to justify their qualification for use as temporary fire barrier seals. Supporting documentation had been presented by the licensee for Kaowool. This documentation included a three hour endurance qualification test and a subsequent hose stream test in accordance with ASTM-E-119, 1976, "Fire Endurance Test," for time and temperature requirements. Results of these tests, for varied cable configurations surrounded by Kaowool, demonstrated that none of the seals allowed the passage of flames

during the fire exposure period of the test nor the passage of water during the hose stream test. The licensee stated that Kaowool has been the only material used for temporary fire barrier penetrations. In addition, the licensee committed to remove the other materials from Procedure SA-1-100 as acceptable means for temporary fire stops and will verify the qualification of all penetrations as part of the Appendix R Upgrade Project.

The licensee has scheduled a review of all plant penetrations to verify the adequacy of each installation. In addition, established administrative controls prohibit temporary seals from becoming permanent. Based on these actions, established controls, and commitment to revise Procedure SA-1-100, the inspector concluded that no safety significant issue resulted from the lack of this supporting documentation.

3.0 EXIT MEETING

The inspector met with BG&E personnel denoted in Attachment 1 of this report at the conclusion of the inspection on April 8, 1994. The scope of the inspection and inspection results were summarized. During this meeting, the licensee acknowledged the inspection findings and stated commitments as detailed in this report. Also at this exit, it was established that Mr. Cliff Sinopoli would be the Calvert Cliffs technical contact for future NRC discussions regarding the issues covered by this report.

ATTACHMENT 1

Persons Contacted

Baltimore Gas and Electric Company

* A. Anuje	Supervisor, Quality Assurance Unit
* A. Broch	Senior Engineer, Quality Assurance Unit
* D. Buffington	Fire Protection System Engineer
* J. Carlson	Supervisor, Technical Training
* K. Cellars	General Supervisor
* F. Deller	Supervisor, Safety and Fire Prot. Unit
W. Hale	Senior Technical Instructor
P. Katz	Manager
* L. Russell	Manager
* C. Sinopoli	Fire Protection Program Manager
* C. Sly	Senior Engineer, Compliance
L. Wenger	Compliance
* J. Wood	Fire Protection Design Engineer

U.S. Nuclear Regulatory Commission

* K. Lathrop	Resident Inspector
F. Lyon	Resident Inspector

* Indicates those in attendance at the exit meeting held on April 8, 1994.

ATTACHMENT 2

Documents Reviewed

Procedures

QL-3-101, Rev. 3	Quality Audits and Surveillances
QL-3-300, Rev. 1	Audit Program
QL-2-100, Rev. 1	Issue Reporting and Assessment
SA-1-100, Rev. 0	Fire Prevention
SA-1-101, Rev.0	Firefighting
DESP-18, Rev. 0	Fire Protection/Appendix R Review of FCRs and FECs
STP-F-592-1, Rev.1	Penetration Fire Barrier Inspection
STP-F-690-0, Rev.1	Sprinkler System Inspection
STP-M-21-0, Rev.5*	Fire Pump Diesel Inspection
STP-F-696-0, Rev.1*	Fire Pump Flow Test
OI-20, Rev.14	Fire Protection System (Common)

Surveillance Tests

STP-M-190-0, Rev.4*	Diesel Fire Pump Battery Weekly Check
STP-F-694-0, Rev.0*	Inspection and Hydrostatic Test of Firehose (Outside Containment)
M-390-0, Rev.5*	Fire Pump Battery Quarterly Checks
FP-PE-D-2, Rev.0	Daily Combustible Loading Check
FP-PE-M-5, Rev.1	Emergency Fire Equipment Lockers Inspection
FP-PE-A-8, Rev.0	Dry Pipe Sprinkler System Functional Test

Audits

Quality Assurance Audit Report No. 91-16*
Quality Assurance Audit Report No. 92-22*
Quality Assurance Audit Report No. 93-18*

Lesson Plans

FP-341-1-4	Hot Work Firewatch Training
GOT-341-14F-7	General Employee Training