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September 15, 1995

U.S. Nuclear Regulatory Commission  
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant  
Unit Nos. 1 and 2; Docket Nos. 50-317 and 50-318  
Licensee Event Report 95-004  
Discovery of Inoperable Fire Barrier Penetration Seal

The attached report is being sent to you as required under 10 CFR 50.73 guidelines. Should you have questions regarding this report, we will be pleased to discuss them with you.

Very truly yours,

CHC/CDS/bjd

Attachment

cc: D. A. Brune, Esquire  
J. E. Silberg, Esquire  
L. B. Marsh, NRC  
D. G. McDonald, Jr., NRC  
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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1) Calvert Cliffs, Unit 1	DOCKET NUMBER (2) 05000 317	PAGE (3) 1 OF 07
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TITLE (4) Discovery of Inoperable Fire Barrier Penetration Seal
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EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBERS(S)
08	16	95	95	-- 004 --	00	09	15	95	Calvert Cliffs, U2	05000 318
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more) (11)							
1			20.2201(b)		20.2203(a)(2)(v)		X		50.73(a)(2)(i)	50.73(a)(2)(viii)
POWER LEVEL (10)			20.2203(a)(1)		20.2203(a)(3)(i)				50.73(a)(2)(ii)	50.73(a)(2)(x)
100			20.2203(a)(2)(i)		20.2203(a)(3)(ii)				50.73(a)(2)(iii)	73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)				50.73(a)(2)(iv)	OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)				50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)				50.73(a)(2)(vii)	

## LICENSEE CONTACT FOR THIS LER (12)

NAME Craig D. Sly, Senior Engineer	TELEPHONE NUMBER (include Area Code) 410-260-4858
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## COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

## SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-space typewritten lines) (16)

On August 16, 1995, during a routine walkdown, a breach was found in a fire barrier. The breach was a 3/4 inch gap located between a ventilation duct and the wall it penetrates. The Control Room was immediately contacted and declared the fire barrier inoperable and entered the Technical Specification Action Statement for inoperable fire barrier penetration seals. A Fire Barrier Permit was initiated and appropriate fire watches were established within one hour of the discovery of the gap.

The causes of the inoperable fire barrier were inadequate engineering oversight and a less than adequate surveillance procedure. This duct was not included as part of two separate projects, that together, were expected to verify that all fire barrier penetrations are properly sealed.

The penetration seal was sealed and is now operable. Other ventilation ducts that could have similarly been overlooked during the separate projects have been identified and verified to be operable. The surveillance procedure is being upgraded.

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## I. DESCRIPTION OF EVENT

On August 16, 1995, during a routine walkdown by a Fire and Safety Technician, a breach was found in a Technical Specification required fire barrier. The breach was a 3/4 inch gap located between a ventilation duct and the wall it penetrates. The wall is located between the Unit 1 Cable Spreading Room (CSR) and Cable Chase 1B. The Control Room was immediately contacted with the operability concern. The Control Room declared the fire barrier inoperable and entered Technical Specification 3.7.12 Action a. A fire barrier permit was initiated and appropriate fire watches were established within one hour of the discovery of the gap.

The ventilation duct is a supply duct from the 69 foot plant main fan room to the battery rooms for both units. The ventilation duct runs from the fan room down through the Unit 1 CSR, through Cable Chase 1B and discharges air into each of the four battery rooms (two per unit). The ventilation duct is 24 inches by 12 inches at the CSR to Cable Chase 1B wall penetration. This ventilation duct contains no discharge openings into either the CSR or Cable Chase 1B.

The duct was installed in the wall during initial plant construction. Initially this duct was insulated on the outside with approximately 3/4 inches of insulation. The duct was installed after the wall was constructed. Insulation was then installed on the duct up to and stuffed approximately one inch into the wall, but not through the wall. Thus, an air space was present between the wall and the duct since initial plant construction. This air space was not visible.

At the time the inoperable fire seal was discovered, scaffolding was being erected in Cable Chase 1B. During a walkdown by a Fire and Safety Technician in Cable Chase 1B it was noticed that an unsealed gap existed around the ventilation duct at the CSR.

It was concluded that this gap has existed since the plant was initially constructed. At the time of discovery both Units were at 100 percent rated thermal power.

## II. CAUSE OF EVENT

The causes of this event include; (A) a less than adequate Technical Specification Surveillance Test Procedure (STP) to ensure that this fire barrier penetration seal met its required sealing criteria; and (B) a failure to recognize that this fire barrier penetration was not included in either of two efforts, that together, were expected to ensure all fire barrier penetrations were operable.

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## A. Less Than Adequate Technical Specification Surveillance Test Procedure

The STP did not contain adequate detail to ensure that this sealing deficiency was identified. The STP required a visual inspection of each fire wall and not a verification that each individual penetration seal was operable. This created the potential that individual penetration seals could be overlooked completely or not vigorously inspected to ensure operability. We recognized this problem prior to this event and initiated a fire barrier penetration seal project to solve the problem. This project included walkdowns of each individual fire barrier penetration seal to label, determine sealing detail, and verify the operability of each seal. These walkdowns are complete and combined with the corrective actions of this LER we now have a high confidence that all fire barrier penetration seals in the plant are now adequately sealed.

An STP revision is currently in progress that requires individual penetration inspections vice the old wall by wall methodology. The new procedure will increase the effectiveness of verifying that fire barrier penetration seals fully conform to their required design configuration.

## B. Failure to recognize that this fire barrier penetration seal was not included in either of two projects, that together, were expected to ensure all fire barrier penetration seals were operable.

During a project to identify fire dampers inside ventilation ducts penetrating fire barriers, the insulation near the wall was cut away on one side of this and all other such ducts to facilitate cutting an "inspection hole." This inspection hole was used to verify the presence, condition, and operability of fire dampers inside the ducts. Since the insulation on this duct was stuffed approximately one inch into the wall, the cutting away of the insulation, in order to inspect for the presence of a damper, left a small amount of insulation in the gap. This small amount of insulation in the gap created the appearance that the gap was properly sealed.

During the fire damper project, several problems with fire dampers inside similar ducts were discovered and corrected. These problems and their causes and corrective actions are detailed in Licensee Event Report 317/92-004, Supplements 1 through 4. Among these problems was the identification of insufficient gap sealing configurations between the ducts and their associated walls that could prevent the fire dampers from closing properly. This particular duct was noted as not having a fire damper inside, and a Generic Letter 86-10 evaluation was completed, justifying the fact that the duct had no fire damper installed inside at this wall.

One of the corrective actions associated with the insufficient duct to wall gap configurations, affecting damper operation, was to inspect all ventilation ducts with fire dampers to determine their status. Appropriate corrective actions were taken to ensure all fire dampers that became inoperable were returned to a fully qualified status. This ventilation duct

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was not included in the inspection because it does not contain a fire damper.

The fire barrier penetration seal project included walkdowns and inspection of each individual fire barrier penetration seal in the plant. However, all ventilation ducts were excluded from this project based on the presumption that all ventilation ducts had been verified operable as part of the fire damper project. Therefore, due to an engineering oversight, it was not recognized that ventilation ducts without fire dampers had not been inspected as part of the fire damper project corrective actions nor as part of the fire barrier penetration seal project.

## III. ANALYSIS OF EVENT

This event is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), Any operation or condition prohibited by the plants Technical Specifications. The existence of this gap since original plant construction constituted a condition prohibited by Calvert Cliffs Technical Specification 3.7.12 Action a, requiring a fire watch be established for inoperable penetration fire barriers.

The Fire Protection Program at Calvert Cliffs relies on a defense-in-depth strategy of detection, suppression, fire fighting capabilities, passive measures, and administrative controls limiting ignition sources and transient combustibles. Fire barriers fall under the passive measures category.

In this particular case, the Unit 1 CSR has a fire detection system and a Halon system. The CSR detection system was fully operable. The Halon system was conservatively declared inoperable due the existence of the air gap between the ventilation duct and the wall. However, based on engineering judgment we have concluded that the existence of the gap between the ventilation duct and the wall would have had a minimal impact on the ability of the Halon system in the room to perform as designed based on the following:

- A. The ventilation duct penetrates the CSR wall just below the ceiling. Since Halon is heavier than air, the Halon would have settled down below the opening. Thus, the concentration of Halon would have remained basically unaffected by the opening.
- B. The CSR Halon system has extended discharge capability which continues to discharge Halon into the room after the initial discharge. This feature is intended to compensate for potential room leakage such as this opening. The CSR Halon system has a design discharge concentration of about seven percent. Fire extinguishment occurs at three percent Halon concentration.

Cable Chase 1B had a fully operable fire detection and sprinkler system.



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Based on the above considerations, we have concluded this event did not pose a significant threat to the health and safety of the public or site personnel. This conclusion is based on the following:

- A. Had a fire occurred in either room it would have been detected and most likely been extinguished by either the Halon (on the CSR side) or the sprinkler system (on the Cable Chase 1B side) or by the fire brigade prior to reaching a stage where it would be a threat to spread through the air gap around the ventilation duct.
- B. The gap was free of intervening combustibles (such as cable insulation material) which would have facilitated the spread of fire through the gap. Thus, the spread of fire would depend on flame or hot gas propagation through the opening. The spread of fire via flame propagation through the wall was unlikely given the 3/4 inch gap in a 24 inch thick wall. The spread of fire via propagation of hot gasses through the wall was also unlikely given the size of the rooms on both sides of the wall. The size of the rooms would disperse the hot gasses permitting them to cool prior to exposing combustibles on either side of the wall.

## IV. CORRECTIVE ACTIONS

The fire seal around the ventilation duct has been adequately sealed and is now considered operable as a fire barrier penetration seal.

The STP for fire barrier penetration seal verifications will be upgraded. The penetration seal review project individually identified and labeled each fire barrier penetration seal in the plant by walkdowns. For each seal, the required seal configuration was determined and documented. The new STP will list each fire barrier penetration seal in the plant and its required sealing detail. Each penetration seal will be individually inspected and verified properly sealed during the STP. We plan to conduct on the job training to ensure the personnel implementing this new STP understand the expectations for inspecting and verifying these seals are operable. Continuing training to reemphasize these expectations will be incorporated into the Qualification Programs of those conducting the inspections.

The upgraded STP and enhanced expectations of the personnel performing the visual inspections will ensure that penetration seal deficiencies are not overlooked in the future.

A review was conducted to ensure that all ventilation ducts without fire dampers in fire barriers have been inspected and are adequately sealed.

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Several other ventilation duct wall penetrations with no dampers were identified and verified to be properly sealed as follows:

- A. Data Acquisition System Computer Rooms to Piping Areas walls: There are two such walls (one for each unit) and each wall is penetrated by two ventilation ducts without a fire damper. These penetrations have been closely inspected for gaps and were found sealed properly.
- B. North Service Building to Intake Structure walls: There are eight ventilation ducts without fire dampers penetrating this wall. These have been reviewed for gaps around the penetrations and were found sealed properly.

This event has been discussed with the personnel responsible for conducting the walkdowns and assuring the operability of fire barrier penetration seals.

## V. ADDITIONAL INFORMATION

## A. Identification of Components referred to in this LER:

Component	IEEE 803 EIIIS Funct	IEEE 805 System ID
Fire Barrier Penetration Seal	Seal	N/A
Fire Damper	BDMP	N/A
Fire Detection System	N/A	IC
DAS Room	N/A	ID
Fire Suppression System	N/A	KP
Halon System	N/A	KG

## B. Previous Similar Events

In the past four years at Calvert Cliffs there have been three reportable events involving fire dampers and/or fire barrier penetration seals.

1. LER 95-004 describes a fire that occurred in a section of expansion joint material in a fire wall on April 14, 1995. These fire barrier penetrations were identified and evaluated during the fire seal project prior to the fire. They were scheduled to be repaired to a fully qualified configuration as part of the project. Due to the fact that these penetrations were identified and scheduled for repairs under the fire barrier seal project, the expansion joint fire event is not considered similar to this event.
2. LERs 92-003 and 92-004 described the discovery of inoperable fire dampers due to STP omission (92-003) and conflicting design

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information (92-004). The STP omission very specifically involved the exclusion of a latch mechanism from a fire damper inspection. The conflicting design information was caused by inconsistent vendor drawings. Neither of these causes is similar to the cause of this event.

Prior to the past four years, there were several reportable events involving fire dampers and fire barrier penetration seals. Review of these events indicate that the underlying concerns of these events were different than for this event. The LERs reviewed include 318/89-002, 317/90-004, and 317/90-006.