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May 15, 1995

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 2; Docket No. 50-318; License No. DPR 69
Licensee Event Report 95-004
Fire in Wall Expansion Joint

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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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

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

FACILITY NAME (1) Calvert Cliffs, Unit 2	DOCKET NUMBER (2) 05000 318	PAGE (3) 1 OF 06
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TITLE (4)
Fire in Wall Expansion Joint

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)
04	14	95	95	-- 004 --	00	05	15	95		05000 05000

OPERATING MODE (9)	6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more) (11)							
POWER LEVEL (10)	0	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
		20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
		20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER	
		20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)	
		20.405(a)(1)(iv)	X	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)			
		20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)			

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 April 14, 1995, a fire occurred in a section of expansion joint material in the "K" line wall that separates the Auxiliary Building from the Turbine Building. The fire was extinguished in about 15 minutes. Approximately three linear feet of cork expansion joint material was burned. Unit 2 was in Mode 6 "Refueling" with Reactor Coolant System temperature at 98 degrees Fahrenheit.

The fire resulted when some welding sparks were pulled into contact with the expansion joint by air flow through the joint. The material in many of the expansion joints has degraded such that a tight bond no longer exists.

An operability evaluation was performed for all expansion joints in the plant. Fire watches will be performed as required by Technical Specifications until all inoperable expansion joints are returned to operability.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

I. DESCRIPTION OF EVENT

On the morning of April 14, 1995, welding was in progress in the Calvert Cliffs Unit 2 Turbine Building. The welding was being conducted in accordance with established plant procedures with a fire watch at the job site. At 0515 the Unit 2 Auxiliary Building Operator responded to a fire system alarm in the Unit 2 Auxiliary Building 5-foot Fan Room. Upon arriving, he and a member of the Fire and Safety Unit entered the room and discovered a fire in a section of expansion joint material in the "K" line wall that separates the Auxiliary Building from the Turbine Building. They called the Control Room to report the fire and activate the Fire Brigade. They then attempted to extinguish the fire with a carbon dioxide fire extinguisher. The fire extinguisher was successful in extinguishing the fire for approximately one minute after it was applied. One minute after the application of the carbon dioxide fire extinguisher the fire reflashed. The two individuals then proceeded to leave the room until the Fire Brigade arrived.

On the Turbine Building side of the wall no evidence of the fire was apparent to the personnel at the welding job site. The Fire Protection System Engineer proceeded to the area after the fire alarm and stopped the job, even though he did not notice any evidence of a fire.

At 0525 the fire brigade was at the fire and started spraying water on the fire from the Auxiliary Building side of the wall. Upon application of water, smoke was finally evident on the Turbine Building side. Water was then applied on the Turbine Building side of the joint. At 0528 the Shift Supervisor declared an Unusual Event due to the fire being in an area containing safety related equipment and the fact that the fire could not be extinguished within 10 minutes. At 0529 the fire was reported to be extinguished. By 0544 the expansion joint material that was burning had been removed from the expansion joint. Approximately three linear feet of the cork expansion joint material was burned (the wall is three feet thick). The Unusual Event was terminated at 0555. At 0615 a continuous fire watch was established.

After securing from the Unusual Event at 0555, air samples and swipes were taken in the 5-foot Fan Room to verify it was radiologically

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clean. Approximately 50-70 gallons of water used to extinguish the fire was drained from the room. A continuous fire watch was established at 0615 in accordance with Technical Specification 3/4.7.12 due to the breach in the expansion joint.

At the time the event occurred, Unit 2 was in Mode 6 "Refueling" with the reactor vessel head removed and Reactor Coolant System temperature at 98 degrees Fahrenheit.

II. CAUSE OF EVENT

The immediate cause of the fire was the welding activity on the 12 foot level of the Turbine Building near the "K" line wall. Sparks from the welding were pulled into contact with the cork material in the expansion joint. It appears the cork expansion joint material had shrunk over time and created an air space between the cork and the concrete wall. The Auxiliary Building is maintained at a negative pressure compared to the Turbine Building. Sparks from the welding in the Turbine Building were pulled into the expansion joint by the negative pressure in the Auxiliary Building and ignited the cork expansion joint material. The fire was fed by the forced draft from the differential pressure between the Auxiliary Building and the Turbine Building.

A Root Cause Analysis team was established to determine the root causes and generic implications of the event and to develop an action plan to address them. This team investigated the status of other expansion joints and found that the material in many of the expansion joints at CCNPP has degraded such that a tight bond in the joint area no longer exists. After over twenty years of expansion and contraction the cork has lost its resiliency. The cork also appears to have dried out, which further reduced its resiliency and caused shrinkage. As a result, gaps have formed between the concrete and the cork.

Degradation of some expansion joints was already being identified and corrected at Calvert Cliffs. At the time this event occurred, Calvert Cliffs was in the process of conducting a Fire Barrier Penetration Seal Review Project. This project consists of inspecting, individually numbering, and proceduralizing each fire barrier penetration seal in the plant. Previously, fire barrier

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penetration seals were not individually inspected during the TS Surveillance. Rather, the whole wall was inspected for any degradation in the seals and the wall itself. During the project walkdowns, several expansion joints had been noted as needing upgrades to their material condition and they were identified for repair. The expansion joint involved in this event had not yet been inspected under the ongoing Fire Barrier Penetration Seal Project.

III. ANALYSIS OF EVENT

This event is considered reportable in accordance with 10 CFR 50.73(a)(2)(ii), "Any event or condition that resulted in the nuclear power plant, including its principal safety barriers, being seriously degraded, or that resulted in the nuclear power plant being: (a) in an unanalyzed condition that significantly compromised plant safety; (b) in a condition that was outside the design basis of the plant; or (c) in a condition not covered by the plant's operating or emergency procedures."

The functional integrity of the Technical Specification penetration fire barriers ensures that fires will be confined or adequately retarded from spreading to adjacent portions of the facility. This design feature minimizes the possibility of a single fire rapidly involving several areas of the facility prior to detection and being extinguished.

At CCNPP Horn Cork Brand cork was the material used to create the expansion joints. In some cases a sealant was applied on at least one side of the joint. In other cases a metal cover plate was installed over one or both sides of the expansion joint.

In addition to permitting movement of the concrete structure, requirements for Flooding, High Energy Line Break (HELB), and Fire Protection have been placed on the expansion joints. In the case of Flooding, expansion joints have the potential to be a route of water flow between areas. The expansion joints represent a potential path for steam in the event of a HELB. For Fire Protection, expansion joints may be a path for fire spread between separate fire areas. When the expansion joint material completely fills the gap created by the joint, a tight bond exists. This bond would prevent the passage of water and steam. An operability evaluation conducted after the

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event concluded all of the expansion joints in the plant were operable as HELB and Flooding barriers.

The operability evaluation concluded that expansion joints where the cork is exposed on both sides of a wall were not operable as fire barriers. Exposure of the cork combined with its loss of resiliency and shrinkage rendered these expansion joints questionable in their effectiveness for preventing the spread of fire from one fire area to another.

Even though some of the expansion joints may have been incapable of preventing a fire from propagating through a wall, the probability of a fire starting in, and spreading through, one of the expansion joints and affecting equipment on the other side is considered small. Calvert Cliffs has programs in place to control combustibles in the plant as well as monitor hot work that has the potential to initiate fires. In addition, the plant has various forms of automatic and manual fire suppression and detection mechanisms designed to ensure any fires that do start are identified and extinguished prior to presenting a threat to the plant. Based on the existence of these controls and design features it is concluded that this event and its generic implications did not result in a significant decrease in protection to the health and safety of the public.

IV. CORRECTIVE ACTIONS

An analysis was made of the ability of the plant's cork expansion joints with exposed cork surfaces to meet their design functions for fire, flooding, and High Energy Line Break. Our initial conclusions were that these joints were effective for their flooding and HELB functions, but their effectiveness in preventing the spread of fire was questionable. The following actions were taken:

- A. Determined which barriers had Fire Protection functions.
- B. Performed a walkdown of the expansion joints in barriers to identify each of the following conditions:
 1. Expansion joints covered by metal plates on one or both sides.

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2. Expansion joints coated with a sealant on one or both sides.
 3. Expansion joints with no covering of any type over the cork.
 4. Expansion joints with no cork or any other material.
- C. Declared those joints with exposed cork on both sides of the wall inoperable and stationed compensatory fire watches in accordance with Technical Specification 3.7.12 Action a.
- D. Root Cause Analysis team is currently developing new design details and generating Maintenance Orders to correct all of the deficient expansion joints found in the plant.
- E. Expansion joints will be added to a revision of the surveillance procedure for penetration seals that will result from completion of the ongoing Fire Barrier Penetration Seal Review Project.
- F. Special Welding Precautions have been issued to the welders and fire watch personnel to minimize the potential for similar fires. Specifically the welders were instructed to place fire resistive blankets over expansion joints in the welding area. These special precautions will remain in place until all expansion joints that are currently degraded are returned to service.

V. ADDITIONAL INFORMATION

- A. Identification of components referred to in this LER:

Component	IEEE 803 EIIIS Funct	IEEE 805 System ID
Penetration Seal	SEAL	KP

- B. Previous Similar Events

Calvert Cliffs has not experienced any previous fires in expansion joints.