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R. E. DENTON  
GENERAL MANAGER  
CALVERT CLIFFS

April 10, 1992

U.S. Nuclear Regulatory Commission  
Washington, D.C. 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 92-002

Gentlemen:

The attached report is being sent to you as required under 10 CFR 50.73 guidelines. This item was due April 6, 1992, but was delayed when additional details came to light near the end of our investigation. Should you have any questions regarding this report, we will be pleased to discuss them with you.

Very truly yours,

RED/RCG/bjd  
Attachment

cc: D. A. Brune, Esquire  
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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)

Calvert Cliffs, Unit 2

DOCKET NUMBER (2)

050003181 OF 05

PAGE 15

TITLE (3) Technical Specification 3.0.3 Entered, Both Containment Spray Systems Inoperable Due to 21 Emergency Diesel Generator and 21 Shutdown Cooling Heat Exchanger Inoperability

| EVENT DATE (5) |     |      | LER NUMBER (6) |                   |                 | REPORT DATE (7) |     |      | OTHER FACILITIES INVOLVED (8) |  |  |
|----------------|-----|------|----------------|-------------------|-----------------|-----------------|-----|------|-------------------------------|--|--|
| MONTH          | DAY | YEAR | VEIR           | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH           | DAY | YEAR | FACILITY NAMES                |  |  |
| 03             | 05  | 92   | 92             | 002               | 000             | 04              | 10  | 92   | DOCKET NUMBER(S)<br>0500000   |  |  |

| OPERATING MODE (9) |     | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5 (Check one or more of the following) (11) |                   |                    |   |
|--------------------|-----|---|-------------------|--------------------|---|
| POWER LEVEL (10)   | 100 | 20.402(a)   | 20.406(a)         | 50.73(a)(2)(iv)    | 75.71(a)  |
|                    |     | 20.406(a)(1)(ii)  | 50.36(a)(1)(i)    | 50.73(a)(2)(iv)    | 75.71(a)  |
|                    |     | 20.406(a)(1)(iii)   | 50.36(a)(2)       | 50.73(a)(2)(iv)    | OTHER (Specify in Abstract Area and in Text Area from 305A) |
|                    |     | 20.406(a)(1)(iv)  | X 50.73(a)(2)(ii) | 50.73(a)(2)(iv)(A) |   |
|                    |     | 20.406(a)(1)(v)   | 50.73(a)(2)(ii)   | 50.73(a)(2)(iv)(B) |   |
|                    |     | 20.406(a)(1)(vi)  | 50.73(a)(2)(iii)  | 50.73(a)(2)(iv)(C) |   |

LICENSEE CONTACT FOR THIS LER (12)

| NAME         | TELEPHONE NUMBER |
|--------------|------------------|
| R. C. Gradle | 1071-10-137138   |

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC |
|-------|--------|-----------|--------------|-------------------|-------|--------|-----------|--------------|-------------------|
| B     | L      | C         | F            | L                 | T     | N      | 1         | 6            | 1                 |

SUPPLEMENTAL REPORT EXPECTED (14)

| YES (If yes, complete EXPECTED SUBMISSION DATE) | NO | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|----|-------------------------------|-------|-----|------|
| X   |    |                               |       |     |      |

ABSTRACT (Limit to 7400 characters. Exceeding limit will result in truncation of text) (16)

On March 5, 1992, at 5:10 a.m., both independent containment spray systems were declared inoperable at Calvert Cliffs Unit 2. Technical Specification 3.0.3 was entered. Immediate corrective action restored both containment spray systems to OPERABLE status at 5:20 a.m. Unit 2 was at 100 percent power at the time of the event.

Two independent, but related, equipment problems caused the event. First, 21 Emergency Diesel Generator (EDG) was rendered inoperable due to a failed air filter in its air start system. The loss of 21 EDG caused 22 containment spray pump (22 containment spray system) to also become inoperable. Second, 21 containment spray system was declared inoperable due to low component cooling water (CCW) flow through 21 shutdown cooling (SDC) heat exchanger.

This event did not result in any significant safety consequences.

Immediate corrective actions restored adequate CCW flow to 21 SDC heat exchanger and new style air filters were installed on 21 EDG. Planned corrective actions to prevent recurrence include installation of helical spacers in all SDC heat exchangers which will remove the necessity to throttle CCW flow through the SDC heat exchangers, and the installation of the new style air filters on 11 and 12 EDG.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| FACILITY NAME          | DOCKET NUMBER | LER NUMBER | PAGE     |
|------------------------|---------------|------------|----------|
| Calvert Cliffs, Unit 2 | 05000318      | 92-002-00  | 02 OF 05 |

TEXT (if more space is required, use additional forms)

## I. DESCRIPTION OF EVENT

On March 5, 1992, at 5:10 a.m., both independent containment spray systems were declared inoperable at Calvert Cliffs Unit 2. Both containment spray systems via their respective shutdown cooling (SDC) heat exchangers, were determined to be inoperable per the Technical Specifications (TSs). Since there is no ACTION requirement for two inoperable containment spray systems, the plant was placed in TS 3.0.3. Immediate corrective action restored both containment spray systems to OPERABLE status at 5:20 a.m. At the time of the event, Unit 2 was at 100 percent power.

Technical Specification 3.6.2.1 Limiting Condition for Operation (LCO) for the containment spray systems requires two independent containment spray systems to be OPERABLE via an OPERABLE shutdown cooling heat exchanger. This LCO is applicable in MODES 1, 2, and 3.

The containment spray systems are designed to provide sufficient heat removal capability to maintain containment pressure and temperature below established design values following a loss-of-coolant incident (LOCI). The containment spray system is redundant to the containment air cooling system which consists of two independent groups of containment air coolers, with two units in each group cooled by the service water system. With three of four cooling units in operation, the containment air cooling system provides the same heat removal capability as the two containment spray systems.

On March 5, 1992, at 5:10 a.m., two independent but related occurrences resulted in both containment spray systems becoming concurrently inoperable. First, Emergency Diesel Generator (EDG) 21 was rendered inoperable when one of the two redundant EDG Starting Air (DSA) supply header isolation valves was shut to isolate a subsystem air leak at approximately 4:30 a.m. The redundant air start supply header to 21 EDG remained in service. 21 EDG was in its normal alignment to supply emergency power to 22 containment spray pump, which supplies flow to 22 containment spray system. Second, after a manual gear operator on 22 SDC heat exchanger component cooling water (CCW) inlet throttle valve was replaced, a post-maintenance test [Engineering Test Procedure (ETP)-91-73R], "SDC Heat Exchanger Inlet Valves Flow Verification Settings," revealed that CCW flow was 1350 gallons per minute (gpm) through the 21 SDC heat exchanger. This was below the required low specification of 1600 gpm. CCW flow through 22 SDC heat exchanger was 2800 gpm. CCW flow is normally lined up to provide cross connected supply to both SDC heat exchangers as required. With 21 SDC heat exchanger receiving less than adequate flow to ensure its capability to remove design heat loads, the 21 containment spray header was declared inoperable.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| FACILITY NAME          | DOCKET NUMBER | LER NUMBER | PAGE     |
|------------------------|---------------|------------|----------|
| Calvert Cliffs, Unit 2 | 05000318      | 92-002-00  | 03 OF 05 |

TEXT (If more space is required, use additional forms)

Technical Specifications 3.0.3 and 3.0.5 were entered at 5:10 a.m. Operations personnel conducting ETP-91-73R took prompt corrective action and returned the flow rate to between 1700 and 1760 gpm by adjusting the CCW inlet valve to 22 SDC heat exchanger.

By 5:20 a.m., the nominal component cooling flow was restored and verified through both SDC heat exchangers and TSs 3.0.3 and 3.0.5 ACTION Statements were exited. The duration of this event was approximately ten minutes. 21 EDG remained inoperable with the DSA isolation valve shut until the air leak was repaired. 21 EDG was verified operable at 10:25 p.m.

## II. CAUSE OF EVENT

The cause of this event is a combination of two independent equipment problems. These equipment problems and their resultant effects are described below.

1. The 21 EDG air start system had a poorly designed air filter. The flat seating surface for the O-ring on the filter bowl made it difficult to properly seat the O-ring during filter reassembly. An approved modification existed which changed the style of the air filter bowl. The new filter bowl has an improved seating surface design which permits easier and better O-ring seating and filter reassembly.

On March 4, 1992, 21 EDG was removed from service to perform scheduled maintenance including the annual 21 EDG Air Start Valve Inspection. During this inspection the two air filters were disassembled, inspected, and returned to service. During post-maintenance testing activity a senior mechanic in the 21 EDG room identified an air leak from one of the filters. The Shift Supervisor directed an Operator to shut the associated starting air supply header isolation valve and 21 EDG became inoperable. Since the 22 containment spray header relies upon the 21 EDG for emergency power, it was also considered inoperable.

2. At flow rates above 2700 gpm, the SDC heat exchangers are prone to flow induced tube vibration which causes metal to metal impact. This problem was discovered in November 1989 and is fully discussed in LER 317/90-005. This tube rattling phenomena was fully analyzed and is being controlled by throttling the SDC heat exchanger CCW inlet valves. The CCW inlet valve positions are administratively controlled and are normally locked in the established throttled position. ETP-91-73R ensures CCW flow is maintained in an established band to prevent tube rattle and maintain adequate flow to the SDC heat exchangers to perform their intended safety function.



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| FACILITY NAME          | DOCKET NUMBER | LER NUMBER | PAGE     |
|------------------------|---------------|------------|----------|
| Calvert Cliffs, Unit 2 | 05000318      | 92-002-00  | 04 OF 05 |

TEXT (if more space is required, use additional forms)

Following replacement of the inlet valve manual operator to 22 SDC heat exchanger, the throttled flow to 21 SDC heat exchanger fell below its minimum required flow, rendering 21 SDC heat exchanger inoperable. Since TSs specify that an OPERABLE containment spray system must have an OPERABLE SDC heat exchanger, the 21 containment spray system was declared inoperable until adequate CCW flow could be restored.

## III. ANALYSIS OF EVENT

The short time that both trains of the containment spray system were inoperable resulted in no significant consequences to the public health and safety. This conclusion is based on the following factors:

1. The scenario of concern is a LOCI concurrent with a Loss of Off-site Power (LOOP), a highly unlikely scenario. The probability of such an event occurring in the short, 10 minute, time period that both containment spray trains were inoperable was extremely low.
2. Two of four containment air coolers were available (with 21 EDG inoperable) and capable of removing their design heat loads from containment, which equates to approximately 66 percent capacity for the containment air cooler system. When combined with the containment spray cooling available, total capacity exceeded 100 percent.

This event is considered reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), "Any event or condition prohibited by the plant's TS." The ten minute period that the plant was in TS 3.0.3 constituted a condition prohibited by the plant's TS.

## IV. CORRECTIVE ACTIONS

Immediate corrective actions were completed as follows:

- A. The CCW inlet valve to 22 SDC heat exchanger was adjusted to establish adequate flow through 21 SDC heat exchanger immediately after the condition was noted. Technical Specification 3.0.3 was subsequently exited at 5:20 a.m. on March 5, when measurements confirmed proper flow had been restored.
- B. The 21 EDG air filters were replaced with new style filters and the EDG was returned to service at 10:25 p.m. on March 5, 1992.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| FACILITY NAME          | DOCKET NUMBER | LER NUMBER | PAGE     |
|------------------------|---------------|------------|----------|
| Calvert Cliffs, Unit 2 | 05000318      | 92-002-00  | 05 OF 05 |

TEXT (if more space is required, use additional forms)

Actions to prevent recurrence include:

- A. We plan to install helical spacers into the SDC heat exchangers tube bundles during the current Unit 1 refueling outage and during the next scheduled Unit 2 refueling outage to eliminate the tube rattling problem and the need to throttle the CCW inlet flow.
- B. We plan to replace all remaining EDG air filters with the new style filter that permits easier seating of the O-ring. One of the two air filters on 11 EDG has been replaced.

## V. ADDITIONAL INFORMATION

- A. Identification of Components and Systems referred to in this LER:

| Component or System                   | IEEE 803A/83<br>Function ID | IEEE 805/84<br>System ID |
|---------------------------------------|-----------------------------|--------------------------|
| Containment Spray System              | N/A                         | BE                       |
| Containment Spray Pump                | P                           | BE                       |
| Diesel Generator                      | DG                          | N/A                      |
| Diesel Generator Starting Air Systems | N/A                         | LC                       |
| Filter                                | FLT                         | N/A                      |
| Containment Fan Cooling System        | N/A                         | OK                       |
| Component Cooling Water System        | N/A                         | CC                       |
| Service Water System                  | N/A                         | BI                       |
| Cooler                                | CLR                         | N/A                      |
| Valve                                 | V                           | N/A                      |
| Heat Exchanger                        | HE                          | N/A                      |

- B. Previous Similar Events

There have been no previous similar events involving entry into TS 3.0.3 caused by a concurrent inoperability of both containment spray trains at Calvert Cliffs.