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R. E. DENTON
GENERAL MANAGER
CALVERT CLIFFS

January 31, 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 92-001

Gentlemen:

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

Very truly yours,

RED/EPW/bjd
Attachment

cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
R. A. Capra, NRC
D. G. McDonald, Jr., NRC
T. T. Martin, NRC
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IE22

NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

# LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

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 (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Calvert Cliffs, Unit 2 | 0 5 0 0 0 3 1 8 | 1 OF 0 5 |

TITLE (4)

Manual Trip Following Minor Feedwater Leak and Subsequent Electrical Grounds

| 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 NAME | DOCKET NUMBER(S) |
| 0 1 | 0 2 | 9 2 | 9 2 | - | 0 0 1 | - | 0 0 | 0 1 | 3 1 | 9 2 | | 0 5 0 0 0 |
| | | | | | | | | | | | | 0 5 0 0 0 |

| OPERATING MODE (9) | 1 | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POWER LEVEL (10) | 0 9 2 | | 20.402(b) | | 20.405(c) | X | 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 (Specify in Abstract below and in Text, NRC Form 366A) | | | | |
| | | | 20.405(a)(1)(iii) | | 50.73(a)(2)(i) | | 50.73(a)(2)(viii)(A) | | | | | | |
| | | | 20.405(a)(1)(iv) | | 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 | TELEPHONE NUMBER |
|---|---|
| | AREA CODE |
| Edward P. Wilson, Engineer | 4 1 0 2 6 0 - 2 0 6 2 |

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 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B | S J | R V | C 5 6 0 | NO | | | | | | | |
| | | | | | | | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

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

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)


On January 2, 1992 at 2219 hours, Calvert Cliffs Unit 2 was manually tripped from 92 percent power following a feedwater leak from a lifted 3/4 inch feedwater heater relief valve. A manual trip was initiated after leaking feedwater caused electrical grounds in the secondary system and a charging pump tripped without apparent cause. The failed relief valve has been replaced and an engineering evaluation will recommend corrective actions to prevent future failures of similar valves.

1. DESCRIPTION OF EVENT

On January 2, 1992, power was reduced on Unit 2 to 92 percent to allow technicians to repair the 22 Heater Drain Tank (HDT) normal level controller, which had been operating erratically. During repairs to the controller, 22 Heater Drain Pump (HDP) was secured and tank level controlled via the high level dump valve. At 2015, maintenance on the controller was complete and Operations personnel proceeded to restore the system to the normal lineup. To minimize a possible pressure transient to the feedwater system, HDT level was established at a low level prior to starting the HDP so that the normal level control valve would open gradually as tank level increased.

The 22 HDP was started at 2033. As the normal level control valve gradually opened, a slight system pressure increase of approximately 40 psi was recorded. Normal system operating pressure is 1050 psi. It is believed that at this time the tube side relief valve for 26B Feedwater Heater lifted prematurely and failed to reseat. 26B Feedwater Heater is one of two high pressure feedwater heaters downstream of the Steam Generator Feed Pumps (SGFPs). The setpoint for this relief valve is 1500 psi.

At approximately 2040, personnel noticed steam in various areas of the Unit 2 end of the Turbine Building. This was reported to the Control Room and efforts were begun to locate the origin of the leak. Feedwater temperature was 410 degrees Fahrenheit at the leak source but soon became a saturated mixture when it discharged at atmospheric pressure into the drain header. Because several feedwater heater relief valves and other drains discharge into the common header, locating the leak was difficult when the entire header became hot. In addition, enough pressure developed in the drain header to cause steam and water to flow out of drain openings on the 45 foot and 12 foot levels. Water from the 45 foot level soon began spilling down to the 27 foot level and below through floor gratings, further spreading water and vapor through the Unit 2 end of the Turbine Building.

At 2050, the Control Room started receiving ground alarms for three DC panels. Simultaneously, alarms came in for low suction pressure on 21 and 22 SGFPs. Suction pressure was verified by independent indication to be satisfactory at 380 psi. Although not known at the time, it was later determined that wetted SGFP suction pressure switches and fire detectors wetted by water vapor had caused the ground alarms observed in the Control Room.

By 2106, operators in the Turbine Building had determined that the source of the leak was the 3/4 inch tube side relief valve for 26B Feedwater Heater. The purpose of this relief valve is to provide thermal overpressure protection for the feedwater heater when it is isolated. After attempts to reseat the valve by mechanical agitation failed, isolation of 26B Feedwater Heater was begun in accordance with the applicable Operating Instruction.

At 2212, 22 Charging Pump tripped and 23 Charging Pump was put into service. Control Room personnel suspected that 22 Charging Pump had tripped due to ground fault. It was later determined that the pump had actually tripped due to an unrelated low suction pressure switch failure.

At 2219, the Shift Supervisor received a report that 22 Charging Pump had tripped on ground fault. Concerned that the feedwater leak might be causing grounds to safety related equipment, the Shift Supervisor directed the Control Room Supervisor to trip Unit 2. He based his decision on the multiple electrical ground indications and fire alarms, coupled with the trip of 22 Charging Pump. Because he perceived the operability of safety-related equipment to be threatened, he felt it prudent to remove the Unit from service.

Unit 2 was manually tripped at 2219 from 92 percent power. Control Room personnel satisfactorily implemented the appropriate Emergency Operating Procedures for a plant trip and all safety functions were verified. Following the trip, Auxiliary Feedwater flow was initiated and Main Feedwater secured to reduce discharge through the lifted relief valve. Isolation of Feedwater Heater 26B was completed at 2300. Because of residual energy in the feedwater heater, it continued to blow down through the open relief valve until approximately 2330.

II. CAUSE OF EVENT

The primary cause of this event was a faulty tube side pressure relief valve on 26B Feedwater Heater. This valve had been leaking for at least three weeks prior to the event as documented by a maintenance request written on December 9, 1991. Because of the difficulty involved with securing the feedwater heater to repair the valve and the relatively low consequence attributed to a 3/4 inch water relief, work on the valve was not scheduled until the next outage. Post event inspection of the valve showed damage to the spring, spring retaining washers, and the valve seats. An engineering review concluded that this damage had caused a shift in the valve setpoint. Apparently, steam leakage past the valve seat caused scoring of the valve spring thus affecting the spring constant. Over time, this changing of the spring constant effectively reduced the valve setpoint until the point where it lifted just above system pressure. An "as found" setpoint value could not be obtained due to the severity of the valve leak. A review of plant history revealed that numerous maintenance orders have been generated for problems with the high pressure feedwater heater relief valves on both Units.

An additional causal factor was the unrelated trip of 22 Charging Pump due to a failure of its associated suction pressure switch.

III. ANALYSIS OF EVENT

No safety limits were challenged during this event. The system effect of feedwater loss through the 3/4 inch relief valve was negligible. Although the release of water and vapor did cause some minor grounds in secondary system components, there was no threat of grounding to any safety related equipment. Nonetheless, based on the information available at the time, the operators took prudent action to place the plant in a more conservative condition. At no time was there a threat to nuclear safety or the health and safety of the public.

The failure of 22 Charging Pump contributed to this event by influencing the operators' perception of events. However, a redundant pump was immediately started and performed as expected. No plant systems or other component failures resulted from this event.

The event is reportable in accordance with 10 CFR 50.73(a)(2)(iv), any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

IV. CORRECTIVE ACTIONS

Plant Operators took immediate corrective action following the trip in accordance with Emergency Operating Procedures EOP-0 (Post-Trip Immediate Actions) and EOP-1 (Reactor Trip) to stabilize the plant.

The failed relief valve was replaced. Engineering will perform an evaluation of the high pressure feedwater heater relief valves. This evaluation will consider various options to prevent future failures of these valves and will make a recommendation for improvement. In addition, an engineering evaluation will assess the generic implications of leaking relief valves of similar design or application.

The water which caused the electrical grounds was removed and grounds were restored to normal. In addition, an engineering review of this event was completed placing close attention to the grounding problems identified. This review determined that no safety equipment was damaged or challenged.

Electrical technicians performed maintenance on 22 Charging Pump. No electrical grounds were found and the faulty low suction pressure switch was replaced.

V. ADDITIONAL INFORMATION

A. Identification of Components Referred to in this LER:

| | IEEE 803 EIIS Funct | IEEE 805 System ID |
|---|---|---|
| Heater Drain Tank | TK | SN |
| Heater Drain Pump | P | SN |
| Level Controller | LC | SN |
| Feedwater Heater | HX | SJ |
| Relief Valve | RV | SJ |
| Steam Generator Feed Pump | P | SJ |
| Drain | DRN | SN |
| SGFP Low Suction Pressure Switch | PIS | SJ |
| Charging Pump | P | CB |
| Charging Pump Suction Pressure Switch | PIS | CB |
| Reactor Coolant System | N/A | AB |
| Reactor Protection System | N/A | JC |

B. Previous Similar Events.

There have been no previous similar events.