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R. E. DENTON
GENERAL MANAGER
CALVERT CLIFFS

April 26, 1991

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 91-001, Revision 00

Gentlemen:

The attached report is being sent to you under the guidelines of NUREG-1022 and 10 CFR 50.73. Should you have any questions regarding this report, we will be pleased to discuss them with you.

Very truly yours,

RED/DWM/bjd
Attachment

cc: D. A. Brune, Esquire
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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-630), 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 1 8	1 OF 0 7

TITLE (4)

Reactor Coolant Inadvertently Drained Through Containment Spray Header Due to Operator Error

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 NUMBER(S)
											0 5 0 0 0
0 3	1 2	9 1	9 1	-	0 0 1	- 0 0	0 4	2 6	9 1		0 5 0 0 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 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)	X 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)	Voluntary
		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
D. W. Muth, Compliance Engineer	3 0 1 2 6 0 - 3 5 9 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	

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 March 12, 1991 at 12:48 a.m., plant operators inadvertently drained approximately 1900 gallons of Reactor Coolant System water through the Calvert Cliffs Unit 2 containment spray ring and a drain line. This incident occurred while operators were lining up to fill the Unit 2 Safety Injection Tanks.

The root cause of this event was personnel error in that the Plant Watch Supervisor misinterpreted procedures, inappropriately performed procedure steps concurrently, and failed to verify the position of an isolation valve. Verbal communication by the operators in the field was deficient.

Appropriate personnel actions were taken.

All shift crews were instructed on management expectations concerning correct procedure interpretation, verbal communications, and appropriate lines of authority.

We are revising the procedural controls for performing steps concurrently.

We are enhancing continuing training coverage of important control processes in the operations area where deviations in the field could reduce the defense-in-depth intended by these controls.

I. DESCRIPTION OF EVENT

On March 12, 1991 at 12:48 a.m., plant operators inadvertently drained approximately 1900 gallons of Reactor Coolant System (RCS) water through the Calvert Cliffs Unit 2 containment spray ring and a drain line. This incident occurred while operators were lining up to fill the Unit 2 Safety Injection Tanks (SITs). At the time of the incident, Unit 2 was in MODE 5 at 100 psi on Shutdown Cooling.

On March 12, 1991 at approximately midnight, the on-shift Plant Watch Supervisor (PWS), Unit 2 Auxiliary Building Operator (ABO) and three other operators were dispatched to line up containment spray piping for filling the SITs. Figure 1 shows the affected section of piping. At the time of this event, Operations Instruction OI-3A required valves SI-453 and SI-457 to be shut first to isolate containment spray piping from RCS. SI-325 was to be shut next and independently verified before SI-329 could be opened. The operators had a copy of the OI and the appropriate system drawing. Having reviewed the drawing, the PWS realized that, since the Containment Spray Pump was idle, there would be no driving head in the affected section of piping once SI-453 and SI-457 were shut. He concluded that SI-329 (which is physically located in the same general area as SI-453 and SI-457) could be opened at the same time SI-325 (which is located two floors above) was being shut.

Two of the operators shut SI-453. The ABO and another operator had partially shut SI-457 and were resting when the PWS, who had been in the hall, looked in the room in which they were working. The PWS, seeing that the stem of SI-457 was apparently down and the operators were no longer working on it, assumed the valve was shut and directed the first two operators to open SI-329. This opened a path for RCS flow through one Containment Spray Header. The operators heard flow and immediately shut the valve. The PWS contacted the Control Room and was told that pressurizer level had dipped slightly but was now okay. This was not considered significant since pressurizer level had been slowly decreasing all day. The PWS directed the operators to open SI-329 while he left to close SI-325.

Air operated Control Valve CV-4151, which was shut, did not stop the flow since its air pressure setpoint had previously been lowered from 60 psia to 25 psia in order to minimize excess forces on the control valve diaphragm. CV-4151 was lifted off its seat and RCS water entered one of Unit 2's two containment spray rings. Some of the water flowed into a drain line located upstream of the spray ring. The incorrect lineup was discovered in the field by flow noise and observed spray at about the same time as the drop in pressurizer level was seen in the Control Room. The operators in the field shut SI-329 and 457 simultaneously, ending the event. Roughly 1900 gallons of RCS inventory were drained in the approximately 10 minute duration of the event.

The operators in the Control Room had been monitoring pressurizer level when the event started. As pressurizer level decreased, the Control Room Supervisor (CRS) ordered the No. 23 High Pressure Safety Injection (HPSI) Pump started to make up pressurizer level. Once the event was over, the HPSI Pump was used to gradually restore pressurizer level.

II. CAUSE OF EVENT

The root cause of this event was personnel error in that the PWS misinterpreted procedures and failed to verify the position of SI-457. Verbal communication by the operators in the field was inadequate.

Calvert Cliffs Instruction CCI-300, "Calvert Cliffs Operating Manual", allows concurrent performance of procedure steps provided two conditions are met: first, the steps must be evaluated in the sequence listed and found not to be dependent on any other steps in the procedure; and second, the Shift Supervisor or CRS must give permission to perform the steps concurrently. The PWS failed to ensure that either condition was met prior to opening SI-329 and closing SI-325 concurrently The OI requires that SI-325 be closed and then independently verified. These steps cannot be performed concurrently since they are dependent on each other. The PWS thought that as a qualified CRS, he had authority to approve concurrent step performance. He therefore did not request permission from the Shift Supervisor or CRS prior to performing the steps concurrently. The PWS did not intend to violate procedures, but he did misinterpret CCI-300.

The PWS did not verify that SI-457 was shut prior to directing that SI-329 opened. He saw the stem down and the operators standing nearby but did not ask whether they had finished closing the valve. He incorrectly assumed the valve was shut. At one point, the ABO (who was working on SI-457) asked if SI-457 should not be shut before SI-329 was opened. He did not use the valve number or name. The PWS assumed he was referring to SI-325.

A contributing cause of this event was that the setpoint for air operated control valve CV-4151 had been lowered from 60 psia to 25 psia in March of 1990. This setpoint change had been made without adequate review or justification. This was caused by insufficient detail in the setpoint change review process procedure and by inattention to detail on the part of the engineer making the change and the personnel reviewing it. Had the setpoint not been changed, CV-4151 would have prevented the loss of RCS inventory.

III. ANALYSIS OF EVENT

There were no safety consequences as a result of this event. The Updated Final Safety Analysis Report Section 6.4.4 states that, "inadvertent initiation of the spray system will not affect the safety of the plant, since all instruments are drip proof or weatherproof and all motors are drip proof." Potential long-term

effects were assessed by an Engineering walkdown of Unit 2 containment following the event to examine the electrical equipment for water damage and to determine the possibility of corrosion. Standing water was cleaned up. No equipment was damaged and the corrosion effects were determined to be minor.

The containment spray piping downstream of SI-325 was examined. The design pressure of this section of pipe is 225 psig. The maximum possible pressure that may have been exerted on the pipe during this event was 280 psig. While this is above the design rating of the pipe, it is well below the hydro test pressure of 325 psig. The total longitudinal pressure stress from this overpressurization is well below the maximum allowable seismic stress. It is unlikely that the design pressure of the pipe was exceeded since CV-4151, due to its low setpoint, probably lifted off of its seat when pressure reached approximately 77 psi.

There were no safety consequences associated with the loss of RCS inventory in this event since RCS level never decreased to the point where shutdown cooling was lost. Had the operators in the Auxiliary Building not closed the valves to end this event, the Control Room operators would have made up the inventory loss with the available HPSI pump. Should the event have continued longer, decay heat removal could have been interrupted either by operator isolation of shutdown cooling or loss of suction pressure. Restoration of shutdown cooling is typically accomplished in a few minutes, before any additional consequences could result. Since the SITs are filled via containment spray only when the plant is in MODE 5, this event could not occur at power.

Based on the above we have concluded that the potential safety significance of this event was low. This item is not reportable under the requirements of 10 CFR 50.73 but is being voluntarily reported as an item of interest to the NRC.

IV. CORRECTIVE ACTIONS

Short Term:

1. The Operations Superintendent notified all Operations Supervisors of the event and directed them to discuss the event and consequences with their subordinates.

2. The General Supervisor - Nuclear Plant Operations (GS-NPO) issued written instructions reinforcing event-free operation, procedural interpretation, performance of steps concurrently, and proper communications.

3. Appropriate personnel actions were taken.

4. The GS-NPO instructed all shift crews on management expectations concerning correct procedure interpretation, verbal communications, and appropriate lines of authority. Maintenance supervisors provided similar instruction.

5. The setpoint for CV-4151 was reset to its original value in both units and other setpoint changes were reviewed for similar errors. Setpoints were revised as appropriate. None were safety significant.

Continuing:

1. We have developed a plan for revising individual procedures in the operations area to incorporate provisions for performing steps concurrently, as appropriate. We will then delete these provisions from CCI-300.

2. We have identified the need to enhance continuing training coverage of important control processes in the operations area where deviations in the field could reduce the defense-in-depth intended by these controls. Appropriate changes will be incorporated.

3. We have revised our process for changing setpoints and will implement additional measures to strengthen process controls.

V. ADDITIONAL INFORMATION

A. Affected Component Identification:

	IEEE 803 EIIS Funct	IEEE 805 System ID
Containment Spray Header	PSP	BE
Containment Spray Ring	NZL	BE
Containment Spray Pump	P	BE
Safety Injection Tank	TK	BQ
Isolation Valve	ISV	BE
Control Valve	PCV	BE
HPSI Pump	P	BQ

B. Previous Similar Events:

LER 317/87-008 documented a similar event in which an operator confused the Unit 1 manual isolation valve (SI-325) with the Unit 2 manual isolation valve. As a result, OI-3A was revised to require independent verification of SI-325. If the procedure as revised had been correctly followed, this requirement would have prevented this event.

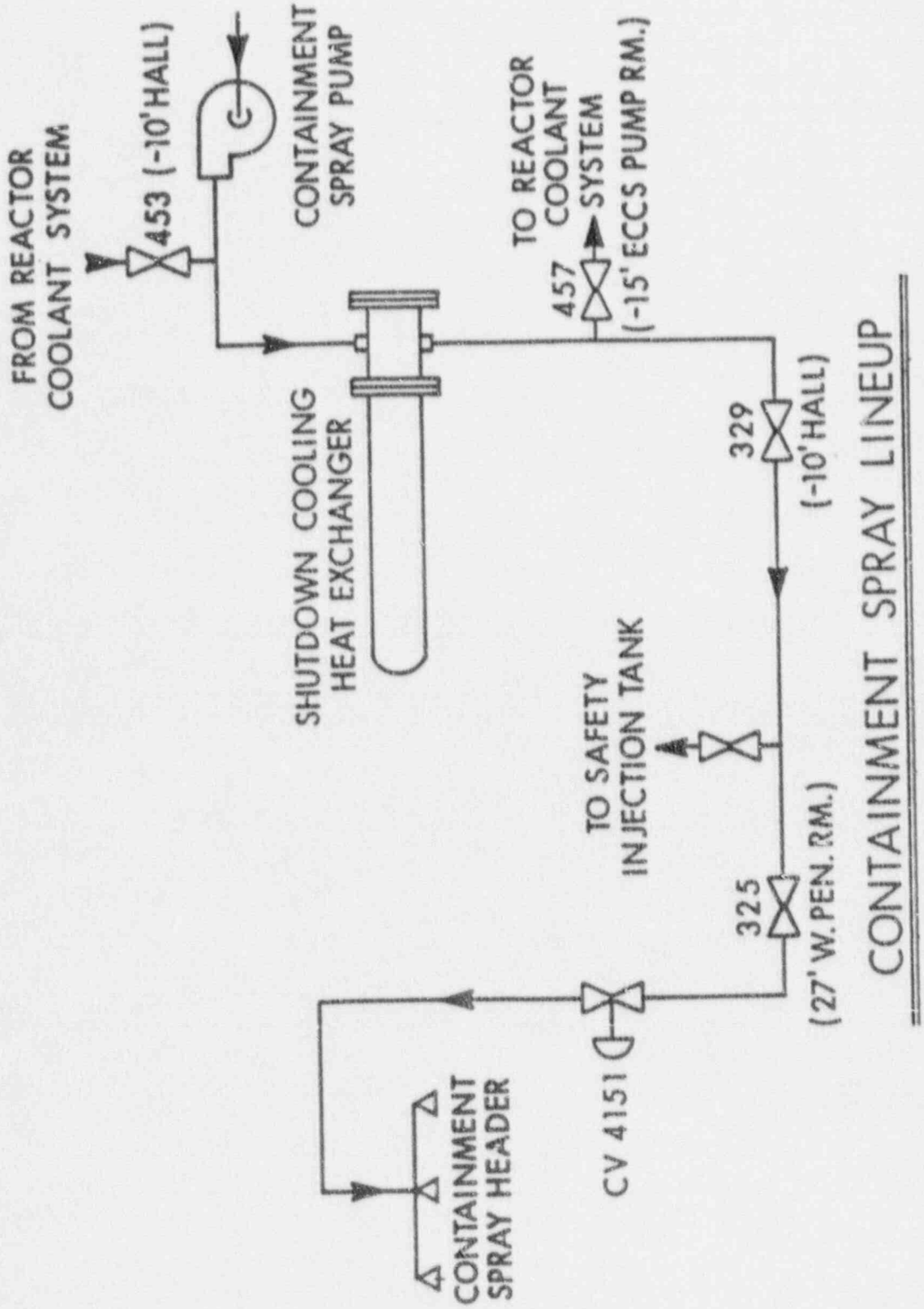
FROM REACTOR COOLANT SYSTEM
453 (-10' HALL)
CONTAINMENT SPRAY PUMP
SHUTDOWN COOLING HEAT EXCHANGER
TO REACTOR COOLANT SYSTEM
457
(-15' ECCS PUMP RM.)
329
(-10' HALL)
TO SAFETY INJECTION TANK
325
(27' W. PEN. RM.)
CV 4151
CONTAINMENT SPRAY HEADER
CONTAINMENT SPRAY LINEUP

FIGURE 1