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October 14, 1994

U.S. Nuclear Regulatory Commission
Washington, DC. 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317; License No. DPR 53
Licensee Event Report 94-008; Technical Specification Violation Due to Two Reactor Protective System Channels Out-of-Service During Surveillance Test

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,

Charles H. Cruse

CHC/CDS/bjd

Attachment

cc: D. A. Brune, Esquire
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NRC FORM 366 (6-89) U. S. NUCLEAR REGULATORY COMMISSION

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, D.C. 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Calvert Cliffs Unit 1	0 5 0 0 0 3 1 7	1 OF 7

TITLE (4) Technical Specification Violation Due to Two RPS Channels Out-of-Service During Surveillance Test

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 9	1 5	9 4	9 4	0 0 8	0 0	1 0	1 4	9 4	None	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)	1 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)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 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
Craig Sly, Compliance Engineer	AREA CODE 4 1 0 2 6 0 - 4 8 5 8

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 September 15, 1994, while performing Engineered Safety Features Actuation System (ESFAS) surveillance testing at Calvert Cliffs Unit 1, an Instrument Maintenance (IM) technician installed test equipment and opened slide links for the wrong instrument channel. As a result, for about 15 seconds, two channals of the Reactor Protective System (RPS) were not available. This was a condition prohibited by Technical Specifications. At the time of the event, the Unit was at 100 percent power.

The causes of the event were: 1) established self-checking practices were not adequately applied to ensure intended actions were correct; and, 2) the technicians performing the procedure completed two steps in reverse order.

Appropriate personnel actions have been taken; we will be reviewing this event with appropriate plant personnel to reemphasize the self-verification process and procedural adherence. Actions have been initiated to determine and correct the reasons why the self-verification process was not successful in preventing this event.

I. DESCRIPTION OF EVENT

On September 15, 1994, while performing ESFAS surveillance testing at Calvert Cliffs Unit 1, an IM technician installed test equipment and opened slide links for the wrong instrument channel. As a result, for about 15 seconds, two channels of the RPS were not available. This was a condition prohibited by Technical Specifications. At the time of the event, the Unit was at 100 percent power.

On September 15, three Instrument Technicians were scheduled to perform channel functional surveillance tests of the ESFAS. They obtained copies of the test procedures and performed the required page checks. The page check found that a single page was missing from the procedure for the ESFAS Channel ZE test. During the pre-job brief, they decided to conduct the tests on two other channels first, then return to the Channel ZE test once the missing page had been obtained. While this is technically and administratively permissible, it deviated from the normal sequence of testing.

The first two channels (ZD and ZF) were tested in the morning. After lunch, the technicians rotated roles and re-commenced testing, planning to do Channel ZE. In accordance with the test procedure, Operators in the Control Room bypassed the RPS Channel B trip unit, which is fed from the same sensor as the ESFAS Channel ZE. In the Cable Spreading Room, one IM technician installed the test equipment (a transmitter simulator) while the second IM retrieved a tool for opening the channel slide links. The technician installing the test equipment made two errors: He installed the transmitter simulator before opening the slide links which isolate the containment pressure sensor, and he was working in the wrong cabinet (ESFAS Channel ZF/RPS Channel C instead of ZE/B). The result was an actuation of ESFAS containment pressure-high for one channel, and subsequently, when the slide links were opened, a second channel of RPS was effectively bypassed in addition to the one bypassed in the Control Room at the start of the test.

Control Room Operators reacted to the ESFAS actuation alarm caused by hooking up the transmitter simulator and, deducing that the IM technician was working on the wrong channel, alerted him just after he opened the slide links. The technician then closed the slide links, disconnected the transmitter simulator, and reset the alarm. The total time the second channel was disabled was about 15 seconds.

II. CAUSE OF EVENT

The causes of this event are as follows:

A. Established self-checking practices were not adequately applied to ensure the intended actions were correct. The IM technicians were working Channel ZE/B in the Control Room. IM Technician No. 1 checked the transmitter device number only and did not ensure the transmitter was on the appropriate channel. When IM Technician No. 1 went to the

ESFAS Sensor cabinet to perform the STP on Channel ZE, he focused on the fact they were now going to perform the STP for the third time that day and went to the third channel in sequence (Channel ZF). He did not focus on which channel was being worked but only on how many had already been worked and the sequence they are normally worked. Cabinet labeling was not considered a contributing factor to this event since the RPS and ESFAS sensors and trip units are clearly labeled at the sensor cabinets.

Calvert Cliffs has conducted extensive training and reemphasis on a self-verification process called the STAR (Stop, Think, Act, Review) process over the past several years. Despite continual repetition of the need to perform STAR, IM Technician No. 1 only partially performed the STAR process during his setup to perform the third test that day.

B. Contrary to plant administrative procedures, IM Technician No. 1 completed the STP for Channel ZE, Step 9 prior to Step 8. When IM Technician No. 2 left to get the slide link tool, IM Technician No. 1 had time to prepare for the test. After opening the ESFAS Cabinet doors and routing the cables over the cabinets, the next step was to open the slide links (Step 8) and then connect the test equipment (Step 9). Without the slide link tool, the slide links could not be opened, so he connected the test equipment first. Connection of the test equipment first generated a voltage spike causing a trip of ESFAS bistable ZF prior to the slide link being opened. This caused the ESFAS actuation logic (in this case a safety injection actuation signal [SIAS]) to be in a 1/3 ESFAS trip logic rather than a 2/3 logic as desired.

III. ANALYSIS OF EVENT

From the time the slide links for Channel C/ZF were open, two of the four (2/4) containment pressure-high RPS sensor channels were out-of-service and effectively bypassed. This left the RPS logic in a 2/2 to trip condition. At the same time ESFAS Channel ZF remained sealed in the tripped condition placing the containment pressure-high ESFAS logic in a 1/3 actuation logic. Therefore, the RPS and ESFAS logic associated with containment pressure-high were in a 2/2 and 1/3 logic, respectively, for approximately 15 seconds.

During that 15 second time period the containment pressure-high input signal to RPS and ESFAS was not single failure proof. A single failure could have prevented the RPS protective system response to a high containment pressure. In addition, with the ESFAS in a 1/3 trip logic, any single failure causing trip of a channel would have resulted in an unnecessary SIAS actuation. Finally, combining the two resultant effects placed the plant in a condition that did not assure the reactor would be tripped prior to or at least concurrent with a safety injection actuation, as specified in the Updated Final Safety Analysis Report.

The potential for a heat cycle thermal stress due to an unnecessary plant trip and the potential failure of a safety system to perform its design safety

function presented a risk to the plant. Considering the short time these vulnerabilities existed, the fact that all remaining channels were fully operable, the fact that this condition was self-disclosing (ESFAS alarm) and easily discoverable, and the fact that a single failure would have been required to prevent the trip circuit from performing properly, this event is considered to have had very minor actual and potential safety significance.

This event is considered reportable in accordance with 10 CFR 50.73(a)(2)(i)(b), "Any event or condition prohibited by the plants Technical Specifications."

IV. CORRECTIVE ACTIONS

A. The personnel involved in this event have been appropriately counseled concerning the inappropriate actions that caused this event.

B. We will be reviewing this event with appropriate E&C personnel to explain in detail how the bases for performing STAR, and requirements for following procedures in the order which they are written, were overlooked in this event.

C. We have initiated actions to determine why the STAR process was not successful in preventing this event.

D. Based on the results of C above, we will be initiating actions to promote and reinforce use of the STAR program.

V. ADDITIONAL INFORMATION

A. Failed Component Identification

Engineered Safety Features	N/A	JE
Safety Injection System	N/A	BP, BQ, CB
Bistable Module	1MOD	JE
Trip Unit	IMOD	JE

B. Similar Events

There have been previous incidences where personnel have failed to work on the correct channel or apply the right action by not successfully performing the STAR program. The occurrence of this event indicates these types of events have not been completely eliminated. However, the frequency of errors has significantly declined since the establishment of the STAR process at Calvert Cliffs.

The only previous similar reportable event where the STAR process was inadequately implemented is described in LER 318/94-002. In this event an inadvertent ESFAS actuation occurred during STP O-7A-2, ESFAS Monthly Logic Test, when a Senior Reactor Operator (SRO) manually actuated the

wrong module after being distracted. SIAS logic trip lights intermittently blinked off, causing the SRO to look away and shift his finger to the wrong module. The root causes included the SRO did not restart self-checking after being distracted. Corrective actions included restating management's expectations on restarting STAR when interrupted for Operations, Mechanical, and E&C Maintenance.

RPS TRIP UNIT B BYPASSED; STP STEP 3

					ACTUATION LOGIC
RPS Channel	A	B BYPASS	C	D	2/3
ESFAS Channel	ZD	ZE	ZF	ZG	2/4

HOOKUP OF TEST INSTRUMENT CAUSES ESFAS CHANNEL ZF SENSOR TRIP ALARM, STP STEP 9

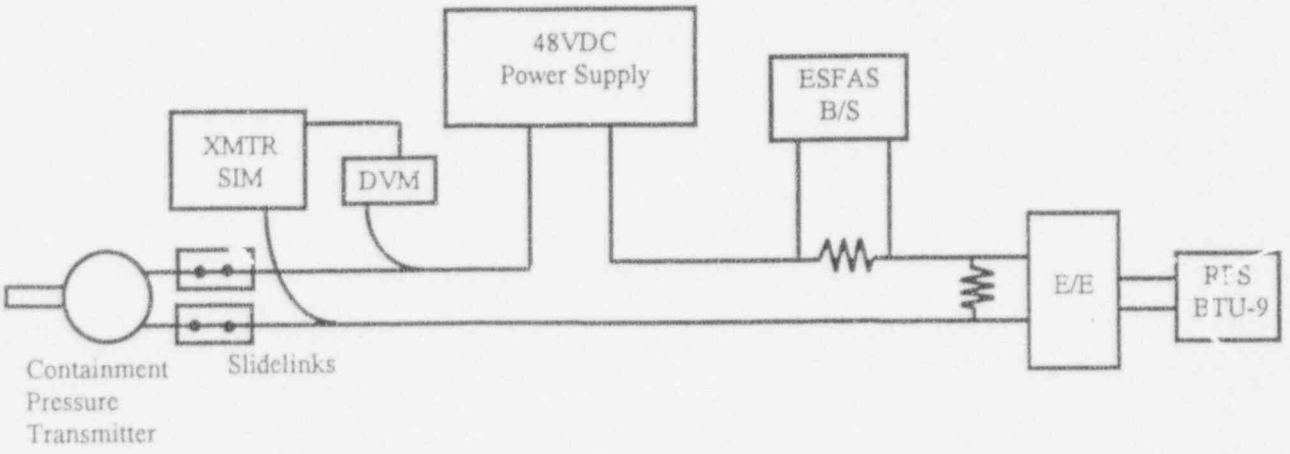
					ACTUATION LOGIC
RPS Channel	A	B BYPASS	C	D	2/3
ESFAS Channel	ZD	ZE	ZF TRIPPED	ZG	1/3

OPEN SLIDE LINK TO CHANNEL C & ZF, ISOLATES TRANSMITTER STP STEP 8

					ACTUATION LOGIC
RPS Channel	A	B BYPASS	C (OOS) TRANSMITTER ISOLATED	D	2/2
ESFAS Channel	ZD	ZE	ZF TRIPPED	ZG	1/3

FIGURE 1

SEQUENCE OF EVENTS AND RESULTING
ESFAS & RPS ACTUATION LOGIC
CIRCUITRY FOR CONTAINMENT PRESSURE-HIGH



Description of Object:

48VDC Power Supply: Power source for loop circuit, a constant voltage source.

XMTR SIM: Transmitter Simulator used to place test signals in loop.

DVM: Digital Voltmeter used to measure circuit response to test signals.

E/E: Voltage-to-voltage signal isolator.

Containment Pressure Transmitter: Senses the ambient pressure in Containment and generates a proportional current output signal which varies with pressure.

Slide Links: Terminals located in back of ESFAS Sensor Cabinets.

ESFAS B/S: ESFAS Bistable module trips on a High Containment Pressure signal corresponding to 2.8 psig.

RPS BTU-9: RPS Bistable Trip Unit for Containment Pressure.

FIGURE 2

CURRENT LOOP SCHEMATIC DIAGRAM FOR HIGH CONTAINMENT PRESSURE