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*A Member of the  
Constellation Energy Group*



March 30, 2000

U.S. Nuclear Regulatory Commission  
Washington, DC 20555

**ATTENTION:** Document Control Desk

**SUBJECT:** Calvert Cliffs Nuclear Power Plant  
Unit Nos. 1 and 2; Docket Nos. 50-317 and 50-318;  
License Nos. DPR 53 and DPR 69  
Licensee Event Report 2000-003  
Incomplete Channel Calibration Procedure Leads to Missed Surveillance

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,

A handwritten signature in cursive script that reads 'Peter Katz'.

PEK/TWG/dlm

Attachment

cc: R. S. Fleishman, Esquire  
J. E. Silberg, Esquire  
Director, Project Directorate I-1, NRC  
A. W. Dromerick, NRC

H. J. Miller, NRC  
Resident Inspector, NRC  
R. I. McLean, DNR  
J. H. Walter, PSC

Handwritten initials 'JE22' in a cursive script.

**LICENSEE EVENT REPORT (LER)**

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

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

**FACILITY NAME (1)**

Calvert Cliffs Nuclear Power Plant, Unit 1

**DOCKET NUMBER (2)**

050000 317

**PAGE (3)**

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**TITLE (4)**

Incomplete Channel Calibration Procedure Leads to Missed Surveillance

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
02	29	2000	2000	003	00	3	30	2000	Calvert Cliffs, U-2	050000 318
									FACILITY NAME	DOCKET NUMBER

  

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
1	100	20.2201(b)	20.2203(a)(2)(v)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)			
		20.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(ix)			
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71			
		20.2203(a)(2)(ii)	20.2203(a)(4)		50.73(a)(2)(iv)		OTHER			
		20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A			
		20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)					

**LICENSEE CONTACT FOR THIS LER (12)**

**NAME**

T. W. Grover

**TELEPHONE NUMBER (Include Area Code)**

410-495-2064

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

**SUPPLEMENTAL REPORT EXPECTED (14)**

YES

(If yes, complete EXPECTED SUBMISSION DATE).

X NO

**EXPECTED SUBMISSION DATE (16)**

MONTH	DAY	YEAR

**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)**

On February 29, 2000, the reactor coolant system manager determined that a discrepancy in the scope of a surveillance test procedure (STP) led to a failure to properly complete channel calibration of the pressurizer power-operated relief valve (PORV) actuation circuitry in accordance with Technical Specification (TS) Surveillance Requirement (SR) 3.4.12.6. The STP did not include the sensor portion of the PORV actuation channel, consisting of four temperature elements (TEs). Each TE is a resistance temperature detector (RTD). After discovering the discrepancy, we determined that the PORV actuation channel RTDs had not been tested since 1991. The balance of the channel was properly tested. The cause of this event was personnel error in failing to maintain the RTDs in a testing procedure. The RTDs were improperly deleted from the scope of an STP in 1992. The Calvert Cliffs Unit 1 PORV actuation channels were recently tested and verified operable before we entered low temperature overpressure protection (LTOP) conditions during the 2000 refueling outage. The Unit 2 PORV actuation channels will be tested prior to the next planned entry into LTOP conditions. Corrective actions include correcting the procedure and matrixing the RTDs to the TS SRs they implement. All TS surveillance channel calibrations of channels with RTDs or thermocouples will be reviewed to ensure TS SRs are being consistently implemented properly.

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

I. DESCRIPTION OF EVENT

On February 29, 2000, the reactor coolant system (RCS) manager discovered that the sensor portion of the power-operated relief valve (PORV) actuation circuitry was not included in the channel calibration of the PORV actuation circuitry as required by Technical Specification (TS) Surveillance Requirement (SR) 3.4.12.6. The surveillance states, "Perform CHANNEL CALIBRATION on each required PORV actuation channel" every 24 months. The TS definition of channel calibration states, "The CHANNEL CALIBRATION shall encompass the entire channel including the sensor . . . ." The sensor portion of the PORV actuation channel consists of four temperature elements (TEs). Each TE is a resistance temperature detector (RTD) installed on the cold legs of the RCS. It was discovered that the RTDs were not included in the scope of the Surveillance Test Procedure (STP) during a review of a revision to the procedure. The discrepancy in the scope of the STP led to a failure to properly complete channel calibration of the PORV actuation circuitry in accordance with TS SR 3.4.12.6 since 1991. When the discrepancy was discovered, Calvert Cliffs Unit 1 and Unit 2 were in Mode 1, operating at 100 percent power.

II. CAUSE OF EVENT

The root cause of this event was personnel error. In 1991, the primary reactor coolant RTDs were replaced with a new make and model RTD. After their replacement, the STPs for replacing the RTDs and the instrument shop testing procedure for performing the channel calibration of the RTDs were deleted. In 1992, these procedures were replaced with new STPs for completing in-situ cross-calibration of the new primary reactor coolant RTDs. The personnel who were involved in the development of the new STPs reviewed the PORV actuation channel calibration requirement in TS SR 3.4.12.6. However, they incorrectly concluded that the TS SR did not encompass channel calibration of the RTDs. Their conclusion was based on three factors:

- (1) Other channel calibration TS SRs provided a list of instruments or functional units (i.e., the temperature sensors in the channel) with an associated testing frequency. Technical Specification SR 3.4.12.6 did not include such a listing.
- (2) The TS definition of channel calibration states, "channel calibration shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors . . . ." Resistance temperature detectors cannot be adjusted. With respect to performing the channel calibration encompassing the RTDs, the channel output can only be adjusted by replacing the RTDs. Replacement of the RTDs was not considered an adjustment of the channel output.
- (3) It appears that personnel overlooked the part of the TS definition of channel calibration that states: "The channel calibration shall encompass the entire channel including the sensor . . . ."

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Contributing to the personnel error was that the old instrument shop testing procedure for performing the channel calibration of the old make and model RTDs was not credited for implementing TS SR 3.4.12.6 during the STP technical adequacy review project, completed in 1992. Three other STPs that tested the balance of the PORV actuation channel were credited for implementing TS SR 3.4.12.6. Had the old instrument shop testing procedure been credited and this credit been properly basis captured, the deletion of PORV actuation channel RTDs from plant procedures would have received further review.

Subsequent inadequate reviews of the STPs for performing the in-situ cross calibration test of the new primary reactor coolant RTDs was a secondary cause of the event. Prior to discovering the discrepancy, revisions of the STPs were last reviewed in 1996 and 1997.

III. ANALYSIS OF EVENT

The event involving the STP deficiency is reportable as a condition prohibited by the TSs in accordance with 10 CFR 50.73(a)(2)(i)(B).

The LTOP system controls RCS pressure at low temperatures so the integrity of the reactor coolant pressure boundary is not compromised. Technical Specification Limiting Condition for Operation (LCO) 3.4.12 provides RCS overpressure protection by having a minimum coolant input capability and having adequate pressure relief capacity. This LCO is required to ensure that the LTOP system is operable. The LTOP system is operable when the minimum coolant input and pressure relief capabilities are operable. Violation of this LCO could lead to the loss of low temperature overpressure mitigation. This LCO is applicable in Mode 3 when the temperature of any RCS cold leg is less than or equal to 365 degrees F (Unit 1), less than or equal to 301 degrees F (Unit 2), in Modes 4, 5, and 6, but not when the RCS is vented to greater than or equal to 8 square inches.

As designed for the LTOP system, each PORV is signaled to open if the RCS pressure approaches a limit determined by the LTOP actuation logic. The actuation logic monitors RCS temperature and pressure, and determines when the LTOP overpressure setting is approached. If the indicated pressure meets or exceeds the calculated value, a PORV is signaled to open.

Performance of a channel calibration on each required PORV actuation channel is required every 24 months to adjust the whole channel so that it responds and the valve opens within the required LTOP range and with accuracy to known input. The 24-month frequency considers operating experience with equipment reliability and matches the typical refueling outage schedule.

The LTOP actuation systems for Calvert Cliffs Unit 1 and Unit 2 were not adequately verified operable due to the missed surveillance. With the exception of the RTDs, the LTOP actuation channels have been and currently are calibrated. At the time this condition was discovered, the units were in a mode that did not require the PORV actuation channel to be operable. Since discovery of the procedure discrepancy, the Calvert Cliffs Unit 1 RTDs have

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been tested and verified operable. This means that the Unit 1 PORV actuation channel RTDs were capable of performing their safety function since their original installation in 1991 even though they were not verified operable. Therefore, this event did not result in a reduction in the protection provided by the Calvert Cliffs Unit 1 LTOP system to the health and safety of the public.

In addition, we believe this event did not result in a reduction in the protection provided by the Calvert Cliffs Unit 2 LTOP system to the health and safety of the public even though the RTDs in the PORV actuation channels were not verified operable. The basis for this is as follows. Resistance temperature detectors generally do not drift with service time, and RTD normal failure modes are to either go off scale high or low. All Calvert Cliffs Unit 2 RTDs are reading within two degrees of one another. The RTDs in other systems have not failed a channel calibration surveillance test since 1991. Based on the information above, it is believed that the RTDs on Unit 2 will satisfactorily complete their channel calibration and that the functional capability of the PORVs has not been affected by this procedure deficiency.

There were no actual safety consequences resulting from this event.

IV. CORRECTIVE ACTIONS

- A. An Issue Report was initiated to document the procedure discrepancy and missed surveillance test.
- B. Administrative controls were implemented to prevent entry into LTOP conditions until the channel calibration of the Unit 1 PORV actuation channel RTDs was performed.
- C. Unit 1 STP M-515B has been revised to include Unit 1 PORV actuation channel RTDs: TE-115, TE-125, TE-111Y, and TE-121Y.
- D. A channel calibration was performed on Unit 1 PORV actuation channel RTDs: TE-115 and TE-125, TE-111Y, and TE-121Y prior to entry into LTOP conditions during the 2000 refueling outage.
- E. Unit 2 STP M-515B will be revised to include Unit 2 PORV actuation channel RTDs: TE-115, TE-125, TE-111Y, and TE-121Y.
- F. A channel calibration will be performed on Unit 2 PORV actuation channel RTDs: TE-115, TE-125, TE-111Y, and TE-121Y prior to the next planned entry into LTOP conditions.
- G. The RTDs listed in channel calibrations STPs will be matrixed to the Technical Specification SRs they implement.
- H. All TS SR channel calibrations involving channels with RTDs or thermocouples will be reviewed to ensure TS SRs are consistently implemented properly.

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I. A root cause assessment is in progress to determine causal factors, evaluate generic implications, and establish additional corrective actions as required.

V. ADDITIONAL INFORMATION

A. Affected Component Identification:

Component or System	IEEE 803 EIIIS Funct	IEEE 805 System ID
RCS		AB
PORV	PSV	AB
Thermowell	TW	AB

B. Previous similar events:

A review of Calvert Cliffs' licensee event reports over the past five years was performed. The review did not identify any similar reportable events.