



CHARLES CENTER • P.O. BOX 1475 • BALTIMORE, MARYLAND 21203-1475

R. E. DENTON
MANAGER
CALVERT CLIFFS NUCLEAR
POWER PLANT DEPARTMENT

May 14, 1990

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Docket No. 50-317
License No. DPR 53

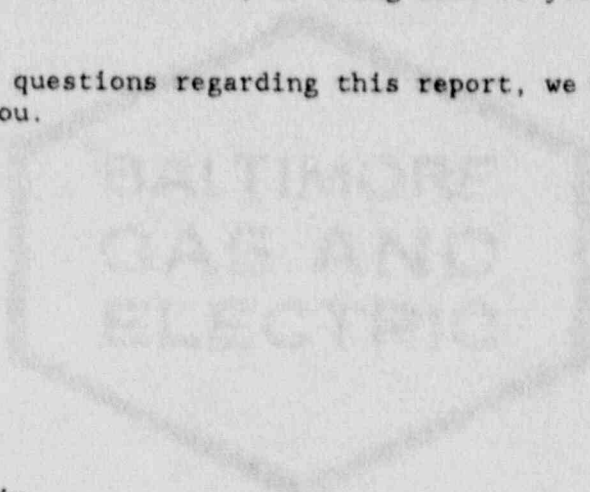
Dear Sirs:

The attached LER 90-14, Revision 0, is being sent to you as required under 10 CFR 50.73.

Should you have any questions regarding this report, we would be pleased to discuss them with you.

Very truly yours,

R. E. Denton
Fr R. E. Denton



MDM/lr

cc: Thomas T. Martin
Director, Office of Management Information
and Program Control
Messrs: G. C. Creel
C. H. Cruse
J. R. Lemons
L. B. Russell
R. P. Heibel

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PDR ADOCK 05000317
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Cont No 1395987494
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LICENSEE EVENT REPORT (LER)

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-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) Calvert Cliffs, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 1 7 1	PAGE (3) 1 OF 0 6
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TITLE (4)
Delta T Channels Out of Specification Caused by Lack of Procedural Guidance Results in Entering T.S. L.C.O. 3.0.3

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)																																			
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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">OPERATING MODE (9) 1</td> <td colspan="11">THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11)</td> </tr> <tr> <td rowspan="5">POWER LEVEL (10) 0 3 0</td> <td>20.402(b)</td> <td>20.406(c)</td> <td>50.73(a)(2)(iv)</td> <td>73.71(b)</td> </tr> <tr> <td>20.406(a)(1)(i)</td> <td>50.36(e)(1)</td> <td>50.73(a)(2)(v)</td> <td>73.71(c)</td> </tr> <tr> <td>20.406(a)(1)(ii)</td> <td>50.36(e)(2)</td> <td>50.73(a)(2)(vii)</td> <td rowspan="3">OTHER (Specify in Abstract below and in Text, NRC Form 366A)</td> </tr> <tr> <td>20.406(a)(1)(iii)</td> <td>X 50.73(a)(2)(i)</td> <td>50.73(a)(2)(viii)(A)</td> </tr> <tr> <td>20.406(a)(1)(iv)</td> <td>50.73(a)(2)(ii)</td> <td>50.73(a)(2)(viii)(B)</td> </tr> <tr> <td>20.406(a)(1)(v)</td> <td>50.73(a)(2)(iii)</td> <td>50.73(a)(2)(ix)</td> <td></td> </tr> </table>												OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11)											POWER LEVEL (10) 0 3 0	20.402(b)	20.406(c)	50.73(a)(2)(iv)	73.71(b)	20.406(a)(1)(i)	50.36(e)(1)	50.73(a)(2)(v)	73.71(c)	20.406(a)(1)(ii)	50.36(e)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)	20.406(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	
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LICENSEE CONTACT FOR THIS LER (12)

NAME M. D. Milbradt- Compliance	TELEPHONE NUMBER 3 0 1 2 6 0 - 4 3 1 5 2
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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

SUPPLEMENTAL REPORT EXPECTED (14)

<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines) (16)

On April 13, 1990, with Unit 1 in MODE 1 at 30% and again on April 19, 1990, with Unit 1 in MODE 1 at 65%, Calvert Cliffs Unit 1 entered Technical Specification (TS) Limiting Condition of Operation (LCO) 3.0.3. This LCO was entered due to the potential inoperability of three out of four Reactor Protective System (RPS) Delta T Power Channels.

The Delta T Power Channels were declared inoperable after they were adjusted to match Secondary Calorimetric power. The amount the Channels were adjusted exceeded the amount allowed in the Calvert Cliffs Setpoint File.

Although the Delta T Channels were adjusted outside allowable tolerances they were not inoperable. The root cause of this event was a lack of procedural guidance. In the absence of procedural guidance concerning channel operability, the operators conservatively declared the channels inoperable.

Corrective actions included increasing the allowable tolerances between the Delta T Power Channels and Calorimetric power and changing Operations procedures to provide better guidance to the operators.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 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) Calvert Cliffs, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 1 7 9 0	LER NUMBER (6)			PAGE (3)	
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		0	1	4	0	2 OF 6

TEXT (If more space is required, use additional NRC Form 386A's) (17)

I. DESCRIPTION

On April 13, 1990, with Unit 1 in MODE 1 at 30% and again on April 19, 1990 with Unit 1 in MODE 1 at 65%, Calvert Cliffs Unit 1 entered Technical Specification (TS) Limiting Condition of Operation (LCO) 3.0.3. This LCO was entered due to the potential inoperability of three out of four Reactor Protective System (RPS) Delta T Power Channels. In accordance with 10 CFR 50.73 (a)(2)(i)(B), these events are being reported in an LER.

On April 13, 1990, during the 1600 - 2400 shift, licensed utility operators performed Operations Instruction (OI) -30. In this procedure a Secondary Calorimetric is performed and the Excore Nuclear Instrumentation (NI) is matched to equal the Calorimetric power. The operators then adjust Delta T Power to equal NI power.

Delta T Power is set for each channel by adjusting each channel's "Delta T Power Calibrate" potentiometer (pot), located on the front of the Reactor Protective System Calibration and Indication Panel. After adjusting each pot, the operators then compare the pot setting to an allowable value listed in the Calvert Cliffs Setpoint File.

While performing OI-30 on April 13, 1990, the operators could not adjust the Delta T Power Channels B and C within their allowable tolerances in the Setpoint File. The TSs were reviewed and at 2310 hours the Shift Supervisor determined LCO 3.0.3 should be entered. The following day, April 14, 1990, at 0200 hours, OI-30 was performed again. This time, Channels A, B, and C could not be adjusted within their allowable tolerances. The Shift Supervisor immediately declared an Unusual Event, based on general safety, and started an expeditious shutdown of Unit 1.

At 0420 hours the Plant Operations and Safety Review Committee (POSRC) recommended approval of changes to the allowable Delta T Power pot tolerances to the Plant Manager. POSRC recommended the approval of a wider tolerance band on the pot settings for below 50% power with the increase being on the positive side. This change was considered conservative since a larger tolerance could yield a larger pot setting. The larger pot setting translates into a larger Delta T Power and, potentially, a higher Q Power (Q Power is the higher of either NI power or Delta T power and is the input to various RPS trips). At 0425 hours LCO 3.0.3 was exited. Reactor power at the time was approximately 6%.

No additional procedure changes were considered at this time since POSRC and the supporting engineers believed the channels would be within the allowable tolerances as power was increased and the plant calorimetric became more

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 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) Calvert Cliffs, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 1 7 9 0	LER NUMBER (6)			PAGE (3)	
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TEXT (If more space is required, use additional NRC Form 386A's) (17)

accurate. At lower lower levels the calorimetric is less accurate due to variations in plant parameters, such as secondary feed flow and temperature. There was also a recommendation from Engineering to hold power slightly below 50% and perform another OI-30 to ensure key parameters were acceptable. Operations accepted the recommendation from Engineering.

On April 18, 1990, Reactor Power was held slightly below 50% and OI-30 was performed as scheduled. The Delta T Power pot settings were within the allowable tolerances for below 50%. But due to the tighter tolerances imposed at higher power levels the Delta T Power pot settings would not have been in tolerance above 50%. On April 19, 1990, while at 65% power, the NI-Delta T deviation alarm was received on Unit 1. In accordance with the Alarm Manual, OI-30 was performed. Once again, Delta T Power Channels A, B, and C could not be adjusted to within their allowable tolerances. The Shift Supervisor then performed the same actions that were taken on April 14, 1990. He declared an Unusual Event at 1045 hours and entered LCO 3.0.3. By 1208 hours Unit 1 power was reduced to less than 50%. With power less than 50%, all three channels were in specification and the LCO was exited.

II. CAUSE OF EVENTS

The root cause of both events was a lack of procedural guidance. OI-30 directed the operators to compare the Delta T Power pot settings with the Setpoint File. If the settings are outside the tolerances in the Setpoint File, there are words in the File to alert the operators of a potential problem with the calorimetric and to inform the Shift Supervisor. Yet, neither the Setpoint File or OI-30 provided guidance to the operators, concerning operability, if the setpoints were outside the allowable tolerances. Operators are expected to follow procedures but without specific guidance in the procedures the operators made a conservative decision to declare the channels inoperable and to enter LCO 3.0.3.

Prior to the termination of the event on April 14, a special POSRC meeting was held to discuss the Delta T Power pot setting tolerances. The response to the first event was to widen the tolerance at low power levels. The decisions made were based on the belief that at higher power levels when certain plant parameters stabilized, the calorimetric would be more accurate. Therefore applicable procedures were not evaluated for proper operator guidance. This lack of evaluation led to the second event on April 19, 1990.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

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-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TEXT (If more space is required, use additional NRC Form 386A's) (17)

Additionally, although the operators were informed of the need to stop the power increase, prior to reaching 50% and perform OI-30, they were not given guidance or assistance to evaluate the results. If guidance had been provided to the operators, power would not have been raised above 50% and the pot settings would not have been outside the allowable tolerance.

Two factors which complicated this startup were also not fully evaluated. During the Unit 1 outage all of the Reactor Coolant System (RCS) loop Resistance Temperature Detectors (RTDs) were replaced. The RTDs provide the temperature input to the Delta T channels. In addition, Steam Generator feedwater temperature was lower than normal, raising questions about the calorimetric results. Both of these issues added confusion to the events. Overall, there was weak coordination, ownership, and support for the Operators during startup with regards to the Delta T instrumentation.

III. ANALYSIS OF EVENT

The RPS compares Delta T power and NI power, and selects the greater of the two as Q power. Three RPS functions use Q power as an input to determine when a trip setpoint is reached: Thermal Margin/Low Pressure Trip (TM/LP), Variable High Power Trip, and Axial Shape Index Trip (ASI).

Since the above RPS trip bistables use Q power to determine when power is high enough to trip the bistable, as long as Q power is equal to or greater than actual reactor power the plant will trip at a power level that is conservative when compared to the actual power.

In both of these events, actual power measured by the calorimetric was higher than Q power before the Delta T pots were adjusted. By procedure, the pots were adjusted up so that Q power equaled actual power. The amount of adjustment on the pots was not an indication of Delta T Channel inoperability, but an indication of a potentially inaccurate calorimetric that required further evaluation.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

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) Calvert Cliffs, Unit 1	DOCKET NUMBER (2) 05000317	LER NUMBER (6)			PAGE (3)	
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IV. CORRECTIVE ACTIONS

Upon discovering the Delta T Power pot settings were outside their allowable tolerances, the Shift Supervisor, without sufficient guidance, conservatively declared Channels A, B, and C inoperable. After declaring the channels inoperable, LCO 3.0.3 was entered, an Unusual Event was declared, and Unit 1 proceeded to MODE 3, until the point where they could exit LCO 3.0.3.

After finding the pot settings outside their tolerances on April 13, 1990, a special POSRC was held early in the morning on April 14, 1990. During this meeting it was determined the allowable tolerances in the Setpoint File were too restrictive. POSRC approved new tolerances that were less restrictive at lower power levels. At higher power levels, a calorimetric is accurate so the tolerances become more restrictive.

After the event on April 19, 1990, POSRC approved changes to operating procedures to provide additional guidance to the operators. The following changes were made:

1. OI-30: The same sequence of steps is still followed in this procedure. The operator is instructed to adjust the Delta T pots and compare the pot settings to the allowable settings in the Setpoint File. If the pots are within the allowable tolerances no further action is necessary.

If Delta T power is higher than calorimetric power and the pots are adjusted down enough to put them outside their tolerances, the pots will be returned to their original position, any power escalation will be stopped, and the problem will be investigated.

If Delta T power is lower than calorimetric power and the pots are adjusted up enough to put them outside their tolerances, the pots will be left at their new setting, any power escalation will be stopped, and the problem will be investigated.

2. Alarm Manual: The response in the Alarm Manual for the NI-Delta T Power Channel Deviation alarm, has been changed. The Manual now provides the operators with additional guidance on when to perform OI-30.

3. Operating Procedure (OP) - 3: This procedure is used to operate the plant under normal conditions above 15% power. OP-3 was changed to require the Delta T Power pot settings be within tolerance prior to exceeding the 50% and 90% power plateaus. If the settings are not within the allowable tolerances power may not be increased above 50% or 90% until the situation is evaluated by appropriate personnel.

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TEXT (If more space is required, use additional NRC Form 386A's) (17)

Training was provided to the Operations crews on each of the procedure changes.

To further investigate these events and develop additional corrective actions, if necessary, a Calvert Cliffs Significant Incident Finding Team (SIFT) has been formed. Significant information determined by the SIFT will be provided as necessary in a supplement to this LER.

V. ADDITIONAL INFORMATION

There was a similar event at Calvert Cliffs on July 5, 1988, (LER 88-007, Docket No. 50-317) involving the Delta T Power pot settings. In the 1988 event the Excore NIs were out of calibration and the Delta T Power channels were matched to the NIs.

<u>Component</u>	IEEE 803 <u>IIIS FUNCT</u>	IEEE 805 <u>System ID</u>
Reactor Coolant System Temperature Detectors	DET	AB
Excore Nuclear Instrumentation Detectors	DET	IG