



January 15, 2007

U.S. Nuclear Regulatory Commission
Washington, DC 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 2006-001
Reactor Trip During Performance of Maintenance Clearance Order

The attached report is being sent to you as required by 10 CFR 50.73. Should you have questions regarding this report, please contact Mr. Jay S. Gaines at (410) 495-5219.

Very truly yours,

A handwritten signature in black ink, appearing to read "Joseph E. Pollock".

Joseph E. Pollock
Plant General Manager

JEP/ALS/bjd

Attachment: As stated

cc: D. V. Pickett, NRC
S. J. Collins, NRC

Resident Inspector, NRC
R. I. McLean, DNR

IE22

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

1. FACILITY NAME Calvert Cliffs Nuclear Power Plant, Unit 2	2. DOCKET NUMBER 05000 318	3. PAGE 1 OF 004
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4. TITLE
Reactor Trip During Performance of Maintenance Clearance Order

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	16	2006	2006	- 001 -	00	01	15	2007		05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)									
10. POWER LEVEL 100	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)							
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER							
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME A. L. Simpson, Principal Engineer	TELEPHONE NUMBER (Include Area Code) 410-495-6913
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	AB	20	0243	Y					

14. SUPPLEMENTAL REPORT EXPECTED <input checked="" type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	MONTH 02	DAY 12	YEAR 2007
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On November 16, 2006, the Unit 2 Reactor automatically tripped due to a pressurizer pressure high signal from the Reactor Protective System, during the performance of a clearance order to support scheduled maintenance. The clearance order required opening an electrical disconnect for personnel safety. However, the personnel involved with developing and reviewing the clearance order were unaware that opening this disconnect would result in a reactor trip. As a result of the trip, Reactor Coolant System pressure increased causing the two power-operated relief valves (PORVs) to open as designed. One PORV remained open longer than expected resulting in a valid safety injection actuation signal. The PORV was replaced prior to returning Unit 2 to power. The root causes for this event were in the area of human performance. A supplement to this licensee event report will be submitted after the root cause analysis report has been completed. Immediate corrective actions require clearance orders to be completed and second-reviewed at least three weeks prior to performance of maintenance and, controls were established to ensure loss of power/power restoration effects are clearly understood when electrical isolation devices support clearance orders. Unit 2 was returned to 100 percent power on November 21, 2006. Unit 1 was not affected by this event.

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

I. DESCRIPTION OF EVENT

On November 16, 2006 at 0018 Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 2 experienced an automatic reactor trip. Unit 2 was operating at 100 percent power prior to the event. There were no structures, systems, or components that were inoperable at the start of the event that contributed to the event. At the time of the trip, a clearance order was being performed in support of scheduled maintenance. As a result of the trip, Reactor Coolant System (RCS) pressure rose to approximately 2420 psia causing the two power-operated relief valves (PORVs) to open. Both PORVs opened as designed. One PORV (2ERV- 402) remained open approximately 90 seconds causing RCS pressure to reduce to 1500 psia. The PORV should have closed slightly below the 2400 psia reset value. As a result of the pressure decrease, a safety injection actuation signal occurred. Although a safety injection actuation signal occurred, this event did not result in a discharge into the RCS because RCS pressure remained above high pressure safety injection pump shut-off head. Once the PORV re-closed, RCS pressure began to rise to the normal values. The PORV (2ERV-402) was replaced prior to returning the Unit 2 reactor to power.

The PORVs are electronic, solenoid-operated valves manufactured by Dresser Industries. The PORV main disc, guide bushing and cage are designed with close tolerances that provide a non interference fit between the individual parts. An inspection of the PORV removed from the system indicated that the tolerances had decreased slightly (cage extruded inward) which prevented the main disc from moving freely within the guide bushing. This is the most likely reason why the PORV did not re-close at the expected pressure.

Also during the event, plant data indicated that one of the two pressurizer safety valves (PSVs) momentarily "simmered," allowing a slight discharge below the level of accumulation necessary to fully open the valve. The impact of the PSV on the event was bounded by the impact from the open PORV. The PSV (2RV200) was replaced prior to returning the Unit 2 reactor to power. The spring loaded PSVs provide RCS overpressure protection. They are manufactured by Dresser Industries. An inspection of the PSV removed from the system indicated that the design thread fit between the valve bonnet and the spring compression screw had been lost, as evidenced by the amount of "play" observed when the compression screw was reinstalled into the bonnet. The as-found lift setting was 2414 psia, which is lower than the 2475 psia as-found lift setting specified in the Technical Specifications. This is the most likely reason why the PSV "simmered" during the event.

This event met the emergency action level criteria for an Unusual Event due to identified RCS leakage greater than 25 gpm. These criteria were met for the duration that the PORV remained open (approximately 90 seconds). The resultant RCS flow discharged to the Unit 2 quench tank. This flow resulted in a rupture, as designed, of the Unit 2 quench tank rupture disc. The quench tank rupture disc was replaced prior to returning the Unit 2 reactor to power. The Unit 2 reactor was returned to 100 percent power on November 21, 2006. Unit 1 was not affected by this event.

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II. CAUSE OF EVENT

The scheduled maintenance that was being performed on November 16, 2006 included an activity to replace service transformer relays to prevent age-related failures. The clearance order for this maintenance activity required opening electrical disconnect 2DISC2D1502 (control power source for P-13000-2 service transformer protection and controls) to provide personnel safety protection during performance of the maintenance. Opening the electrical disconnect provided adequate personnel safety, however, opening the disconnect also affected the main turbine electro hydraulic control (EHC) system. Specifically, opening the disconnect activated the "Load Drop Anticipator" function from the Unit 2 turbine controls. As a result, with the Unit operating at power, the main turbine governor and intercept valves closed resulting in a load rejection and the subsequent automatic reactor trip on high RCS pressure. Personnel involved in establishing the clearance order were unaware of the effect on the EHC system and the fact that a plant trip would occur when the electrical disconnect was opened.

The root cause analysis report (RCAR) developed to address this event (reference condition report number IRE-018-341) is not complete at this time. The scope of the RCAR was recently expanded to address an event involving a manual trip of the Unit 1 reactor that occurred on December 12, 2006, during performance of turbine control maintenance (reference event notification number 43046). When completed, the RCAR will establish corrective actions to address the underlying causes common to both events. A supplement to this licensee event report (LER) will be submitted after the RCAR is completed. Also, a separate LER will be submitted to address the Unit 1 event.

III. ANALYSIS OF EVENT

The automatic trip of the Unit 2 reactor was initiated due to a valid actuation of the Reactor Protective System. The actuation was not part of a pre-planned sequence during testing or reactor operation. Also, a valid actuation of the safety injection actuation system occurred due to the low pressurizer pressure condition realized when the PORV (2ERV-402) remained open longer than expected. Therefore, this event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A). Immediate notification of this event (Event Number 42995) was made on November 16, 2006 in accordance with 10 CFR 50.72(a)(1)(i), 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A).

There were no actual nuclear safety consequences incurred from this event. An estimated conditional core damage probability of 8.5E-06 and an estimated conditional large early release probability of 3E-07 were calculated for this event.

IV. CORRECTIVE ACTIONS

A. Interim compensatory actions were established requiring all scheduled clearances to be complete and second-reviewed at least three weeks prior to the scheduled maintenance.

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- B. Interim compensatory actions were established to require additional controls whenever an electrical isolation device is used in support of any clearance order.
- C. The PORV (2ERV-402), PSV (2RV200), and Quench Tank #21 Rupture Disc, were replaced prior to returning Unit 2 to power.

V. ADDITIONAL INFORMATION

A. Component Identification

Component	IEEE 803 EIS Function	IEEE 805 System ID
Main Turbine Governor Valves	V	TA
Main Turbine Intercept Valves	V	TA
Power Operated Relief Valves	20	AB
Disconnect 2DISC2D1502	DISC	EJ
Quench Tank #21 Rupture Disc	RPD	AB
Pressurizer Safety Valves	RV	AB

B. Previous Occurrences

A review of Calvert Cliffs' events over the past several years was performed. No previous occurrences were identified involving a reactor trip due to inadequate tagging clearances.