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CALVERT CLIFFS NUCLEAR POWER PLANT

September 2, 2011

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 2011-002, Revision 00
Pressurizer Safety Valve Setpoint High Due to Increased Internal Friction

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. Douglas E. Lauver at (410) 495-5219.

Very truly yours,

Christopher R. Costanzo
Plant General Manager

CRC/CAN/bjd

Attachment: As stated

cc: D. V. Pickett, NRC
W. M. Dean, NRC

Resident Inspector, NRC
S. Gray, DNR

IE22
NRK

NRC FORM 366 (10-2010)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB: NO. 3150-0104		EXPIRES: 10/31/2013																																						
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)																																												
1. FACILITY NAME Calvert Cliffs Nuclear Power Plant, Unit 2					2. DOCKET NUMBER 05000 318		3. PAGE 1 OF 05																																					
4. TITLE Pressurizer Safety Valve Setpoint High Due to Increased Internal Friction																																												
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE																																						
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9. OPERATING MODE <div style="text-align: center; font-size: 24px;">1</div>						11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)																																						
10. POWER LEVEL <div style="text-align: center; font-size: 24px;">99.5</div>						<table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td style="text-align: right;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>			<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 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 checked="" 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
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12. LICENSEE CONTACT FOR THIS LER																																												
FACILITY NAME C.A. Neyman, Senior Engineering Analyst						TELEPHONE NUMBER (Include Area Code) 410-495-3507																																						
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																																				
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) <p>On July 7, 2011, Calvert Cliffs Nuclear Power Plant discovered that a reportable condition existed. On March 11, 2009, during scheduled testing at an offsite testing facility, the as-found lift setting for pressurizer safety valve serial number BS03213 was measured higher than the Technical Specification allowable value. The inspector who witnessed the test believed that the valve had passed based on a setpoint tolerance that is typical for other nuclear plants. Test results were submitted to the licensee stating that the as-found test was successful. The valve had been installed in Unit 2 at the 2RV201 location (Unit 2 pressurizer safety valve) and was removed during the 2009 Unit 2 refueling outage for scheduled testing and maintenance. The apparent cause is evaporation of liquid within the valve caused the internal friction to increase because the water is no longer present within the valve to lubricate the bearing surfaces. This effect was compounded by conducting the as-found valve testing at a lower valve body temperature than was done at the valve's previous as-left testing. The currently installed valves have been determined to be operable. Corrective actions include refurbishing and retesting the valve, increasing the setpoint tolerance, and increasing the consistency of temperatures during testing.</p>																																												

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I. DESCRIPTION OF EVENT

A. PRE-EVENT PLANT CONDITIONS

Unit 2 was operating at 99.5 percent of rated thermal power on July 7, 2011.

B. EVENT

On July 7, 2011, a condition was discovered that was determined to be reportable. On March 11, 2009, during scheduled testing at the offsite testing facility, the as-found lift setting for pressurizer safety valve (PSV) Serial Number BS03213 was measured higher than the Technical Specification allowable value. The valve had been installed in Unit 2 at the 2RV201 location (Unit 2 PSV) and was removed during the 2009 Unit 2 refueling outage for scheduled testing and maintenance. The valve was subsequently disassembled and inspected by the vendor. The valve was refurbished, reassembled, and as-left testing was performed on the valve with no issues noted. However, a subsequent Apparent Cause Evaluation (ACE) determined that the apparent cause of BS03213 lifting high was increased friction.

Calvert Cliffs owns eight PSVs, four sets of two that are rotated between a specific location. All valves currently installed in Units 1 and 2 were verified to be set properly. The ACE determined that the apparent cause of BS03213 lifting high was increased internal friction due to a decrease in wetted surface during as-found testing. This effect was compounded by conducting the as-found valve testing at a lower valve body temperature than was done at the valve's previous as-left testing. It is assumed that the high setpoint condition existed while the valve was installed in the plant and it is likely that this degraded condition existed for a time longer than the Technical Specification allowed completion time. Therefore, this condition is reportable pursuant to the reporting criteria specified in 10 CFR 50.73(a)(2)(i)(B).

Because this condition is isolated to one serial number for a Unit 2 PSV, this licensee event report (LER) is applicable to Calvert Cliffs Nuclear Power Plant Unit 2 only.

C. INOPERABLE STRUCTURES, COMPONENTS, OR SYSTEMS THAT CONTRIBUTED TO THE EVENT

Unit 2 PSV BS03213 was determined to be inoperable. That inoperable condition is the basis for this report. The extent of condition review determined that the condition applied to BS03213 (2RV201) only.

D. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:

March 2007	BS03213 installed during the 2007 Unit 2 refueling outage.
March 2009	BS03213 removed during the 2009 Unit 2 refueling outage.
March 11, 2009	BS03213 as-found lift tested at offsite vendor facility. As-found lift setting measured higher than Technical Specification allowable value.

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March 2010 BS03213 disassembled, inspected, and refurbished at offsite vendor facility.
As-left testing was performed with no issues noted.

July 2011 The apparent cause of BS03213 lifting high was determined to be increased
internal friction.

E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED

No other systems or secondary functions were affected.

F. METHOD OF DISCOVERY

Following as-found lift testing at an offsite facility, a report, prepared by the inspector who witnessed the test, indicated that BS03213 lifted within an assumed requirement of 2550 psig +/- 3 percent, which is a typical industry tolerance. However, the acceptable range in accordance with Technical Specifications was actually 2550 psig +/- 2 percent. When identified, this condition was evaluated under apparent cause evaluation CR-2011-001263.

G. MAJOR OPERATOR ACTION

No major operator actions were taken as a result of this condition.

H. SAFETY SYSTEM RESPONSES

Condition discovered after component removed from the system.

II. CAUSE OF EVENT:

The apparent cause of BS03213 lifting high was increased internal friction due to a decrease in wetted surface during as-found testing. A contributing cause was that the valve body temperature was lower for the as-found test than during the as-left test. This caused the as-found test result to be higher than the as-left test.

Detailed analysis and cause determination are still in progress. A complete description will be included in a supplemental LER.

III. ANALYSIS OF THE EVENT:

Each Unit at Calvert Cliffs Nuclear Power Plant has two PSVs (1/2RV200 and 1/2RV201) designed to limit Reactor Coolant System (RCS) pressure to a maximum of 110 percent of

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design pressure (2500 psia). The Technical Specification defined setpoints for these valves are as follows:

Valve	As-Found Lift Setting (psia)	As-Left Lift Setting (psia)
1/2RV200	≥ 2475 and ≤ 2550	≥ 2475 and ≤ 2525
1/2RV201	≥ 2514 and ≤ 2616	≥ 2540 and ≤ 2590

The Technical Specification Bases state that the as-found setpoints are the limits for operability, i.e., if a valve lifts outside of those setpoints it is inoperable. Calvert Cliffs owns eight PSVs, four sets of two that are rotated between a specific location. The as-found lift setting for BS03213 measured on March 11, 2009 was 2617 psia. This is higher than the Technical Specification Surveillance Requirement (SR) allowed value of 2616 psia. Results of the ACE documented in Condition Report Number CR-2011-006240 determined that the apparent cause of BS03213 lifting high was increased internal friction due to a decrease in wetted surface during as-found testing which was compounded by a lower valve body temperature during as-found testing than as-left testing. Friction is an inherent property of the valve. A change in as-found tolerances is believed to improve the ability of the valve to lift within Technical Specification limits. The valve was disassembled and repaired. The valve subsequently passed the as-left testing and was returned to the facility for installation in 2011.

BS03213 was installed at 2RV201 location in March 2007 and removed from the plant in March 2009. Based on the results of the ACE, it is reasonable to conclude that for some period of time while the valve was installed in the plant, most likely the lift setting was not within the Technical Specification SR defined setpoint limit. Per 10 CFR 50.73(a), unless otherwise specified, events shall be reported if they occurred within three years prior to the date of discovery. With one PSV inoperable, the Technical Specification Limiting Condition for Operation (LCO) 3.4.10.A required action is to restore the valve to operable status within a 15 minute completion time. If this required action cannot be met, Technical Specification LCO 3.4.10.B requires the plant to be placed in Mode 3 within 6 hours and to reduce all Reactor Coolant System cold leg temperatures to ≤ 365 F (Unit 1) or ≤ 301 F (Unit 2) within 12 hours. The failure to recognize and meet the requirements of Technical Specification LCO 3.4.10 also should have required entry into Technical Specification LCO 3.0.3. The subject condition existed longer than the Technical Specification completion times for the associated required actions. Therefore, this event is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B).

There were no actual nuclear safety consequences incurred from this event. Two PSVs (2RV200 and 2RV201) are located on the Unit 2 pressurizer to provide overpressure protection of the RCS. Only one of the PSVs was affected by the subject condition. BS03213 should have been considered inoperable while installed during applicable modes. While installed (2007-2009), the valve was susceptible to a late lift. Realizing that the valve could have lifted late if challenged, a probabilistic risk assessment analysis was performed. The risk assessment demonstrated the estimated increase in core damage frequency and the estimated increase in large early release frequency are negligible for the subject condition.

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IV. CORRECTIVE ACTIONS:

A. ACTION TAKEN TO RETURN AFFECTED SYSTEMS TO PRE-EVENT NORMAL STATUS:

1. BS03213 internal components were inspected and refurbished.

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE

1. As-left testing of refurbished valve was performed.
2. Revise PSVs as-found setpoint tolerance to +/-3 percent.
3. Revise the PSV specification documents to specify that the valve body temperature used during as-found testing is within +/-5 degrees Fahrenheit as the average valve body temperature during as-left testing.

V. ADDITIONAL INFORMATION

A. FAILED COMPONENTS:

The subject valve is an American Society of Mechanical Engineers Boiler and Pressure Vessel Code approved PSV designed to limit RCS pressure to a maximum of 110 percent of design pressure. The PSV is a totally enclosed, back pressure compensatory, spring-loaded valve. The valve is manufactured by Dresser Consolidated, Inc. (component manufacturer number D243). The valve affected by the subject condition is BS03213.

B. PREVIOUS LERs ON SIMILAR EVENTS

A review of Calvert Cliffs' events over the past several years was performed. No previous LERs on similar events (high PSV setpoint due to increased internal friction) were identified.

C. THE ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) COMPONENT FUNCTION IDENTIFIER AND SYSTEM NAME OF EACH COMPONENT OR SYSTEM REFERRED TO IN THIS LER:

Component	IEEE 803 EIIS Function	IEEE 805 System ID
Pressurizer Safety Valves	RV	AB
Pressurizer	PZR	AB

D. SPECIAL COMMENTS

None