Calvert Cliffs Nuclear Power Plant

1650 Calvert Cliffs Parkway
Lusby, Maryland 20657

CENG
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CALVERT CLIFFS
NUCLEAR POWER PLANT

May 7, 2010

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 2010-002, Revision 00
Pressurizer Safety Valves As-Found Settings Outside Technical Specification Limits

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,

Thomas E. Trepanier
Plant General Manager

TET/ALS/bjd

Attachment: As stated

cc: D. V. Pickett, NRC
S. J. Collins, NRC
Resident Inspector, NRC
S. Gray, DNR

IE22
NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 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.

# LICENSEE EVENT REPORT (LER)

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

| 1. FACILITY NAME | 2. DOCKET NUMBER | 3. PAGE |
|---|---|---|
| Calvert Cliffs Nuclear Power Plant, Unit 1 | 05000 317 | 1 OF 006 |

**4. TITLE**

Pressurizer Safety Valves As-Found Settings Outside Technical Specification Limits

| 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 |
| | | | | | | | | | | 05000 |
| 03 | 08 | 2010 | 2010 | - 002 - | 00 | 05 | 07 | 2010 | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |

**9. OPERATING MODE**

6

**10. POWER LEVEL**

0

**11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:** *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

**12. LICENSEE CONTACT FOR THIS LER**

| FACILITY NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| A. L. Simpson, Principal Engineer | 410-495-6913 |

**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 |
|---|---|---|---|---|---|---|---|---|---|
| X | AB | RV | D243 | Y | | | | | |

**14. SUPPLEMENTAL REPORT EXPECTED**

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

**15. EXPECTED SUBMISSION DATE**

| MONTH | DAY | YEAR |
|---|---|---|
| | | |


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

During scheduled testing at the offsite testing facility, the as-found lift settings for the pressurizer safety valves (PSVs) previously installed at 1RV200 and 1RV201 locations were measured outside the Technical Specification allowable values (On March 8, 2010, 1RV200 lifted low and on March 9, 2010, 1RV201 lifted high). The valves had been installed during the 2008 Unit 1 refueling outage and were removed during the 2010 Unit 1 refueling outage for scheduled testing and maintenance. Spare valves were installed during the 2010 refueling outage. The failed valves were tested at the offsite facility. After resetting the compression screw, both valves were as-left certified satisfactorily. The post-test leak check was performed satisfactorily for 1RV200, but it was not satisfactory for 1RV201 (most likely due to main disc seat damage). The apparent cause of the as-found lift failures is normal setpoint variation. The valves will be refurbished later in 2010 to verify the cause. The testing records and maintenance history for the PSVs currently installed in the plant were reviewed. Based on that review, a reasonable expectation for continued operability was satisfied for those PSVs. A similar event is documented in Licensee Event Report 317/2008-002-01. The cause for that event was excessive drift which resulted from degradation in internal components.

I. DESCRIPTION OF EVENT

A. PRE-EVENT PLANT CONDITIONS

Unit 1 was in Mode 6 (Refueling) when the condition was discovered. The valves were not installed in the system when the condition was discovered.

B. EVENT

In March 2010, Calvert Cliffs discovered that during scheduled testing at the offsite testing facility, the as-found lift settings for the pressurizer safety valves (PSVs) previously installed in Unit 1 were measured outside the limits specified in Technical Specification Surveillance Requirement (SR) 3.4.10.1. The valves had been installed at the 1RV200 and the 1RV201 locations and were removed during the 2010 Unit 1 refueling outage for scheduled testing and maintenance. On March 8, 2010, during as-found testing for PSV Serial Number BN04373 (previously installed at 1RV200 location) the valve opened at 2442 psia. The low end Technical Specification SR limit is 2475 psia. On March 9, 2010, during as-found testing for PSV Serial Number BM07948 (previously installed at 1RV201 location), the valve opened at 2632 psia. The high end Technical Specification SR limit for 1RV201 is 2616 psia.

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

Unit 1 PSVs 1RV200 (BN04373) and 1RV201 (BM07948) were both determined to be inoperable. The inoperable condition for either valve provides the bases for this report. The extent of condition review determined that the condition applied to BN04373 and BM07948 only.

D. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES

| | |
|---|---|
| March 2008 | BN04373 (1RV200) and BM07948 (1RV201) installed during the 2008 Unit 1 refueling outage. |
| February 2010 | BN04373 (1RV200) and BM07948 (1RV201) removed during the 2010 Unit 1 refueling outage. |
| March 8, 2010 | BN04373 (1RV200) as-found lift tested at offsite vendor facility. As-found lift setting measured lower than Technical Specification allowable value. Compression screw adjusted successfully. Valve was as-left certified with three successful lifts. The post-test leak check was performed satisfactorily. |
| March 9, 2010 | BM07948 (1RV201) as-found lift tested at offsite vendor facility. As-found lift setting measured higher than Technical Specification allowable value. Compression screw adjusted and as-left certified with three successful lifts. The post-test leak check was not satisfactory (most likely due to main disc seat damage). |

E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED

There were no other systems or secondary functions affected. This event is applicable to Calvert Cliffs Nuclear Power Plant (Calvert Cliffs), Unit 1 only.

F. METHOD OF DISCOVERY

The condition was self-identified during scheduled testing at the offsite testing facility.

G. MAJOR OPERATOR ACTION

No operator action required for the subject valves. The valves were not installed in the plant when the condition was identified. A reasonable expectation of continued operability was completed for the valves currently installed in Unit 2 and the valves installed in Unit 1 during the Unit 1 2010 refueling outage.

H. SAFETY SYSTEM RESPONSES

No safety system responses were expected. None occurred.

II. CAUSE OF EVENT

The event is documented in station condition report numbers CR-2010-002789 (1RV200) and CR-2010-002791 (1RV201). Following the as-found lift failures, the valves were adjusted to determine if as-left certification could be established. After adjusting the compression screw, both valves were as-left certified at their respective setpoints. The post-test leak check was performed satisfactorily for 1RV200. The post-test leak check was not satisfactory for 1RV201. This was most likely due to main disc seat damage. Since testing performed subsequent to the failures showed that each valve was now functioning properly, the apparent cause of the PSVs lifting outside the Technical Specification limits was attributed to normal setpoint variation. Therefore, cause code "X" (Other) is assigned to the subject failures.

The apparent cause will be verified when the valves are refurbished later in 2010. Although not anticipated, should the refurbishment result in a change to the apparent cause, a supplemental LER will be submitted.

III. ANALYSIS OF EVENT

Each unit at Calvert Cliffs has two PSVs (1/2RV200 and 1/2RV201) designed to limit Reactor Coolant System (RCS) pressure to a maximum of 110 percent of design pressure (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 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 1RV200 (BN04373) measured on March 8, 2010 was 2442 psia, which is lower than the Technical Specification SR allowed value of 2475 psia. The as-found lift setting for 1RV201 (BM07948) measured on March 9, 2010 was 2632 psia, which is higher than the Technical Specification SR allowed value of 2616 psia. The Apparent Cause for the valves lifting outside the Technical Specification limits was determined to be normal setpoint variation.

Both valves were refurbished at the offsite facility in 2006 and subsequently passed as-left acceptance testing prior to being installed during the 2008 refueling outage. While installed in the plant (March 2008-February 2010), there were no leakage or setpoint events associated with either valve. The valves were removed from their respective locations for scheduled testing and refurbishment in February 2010 during the Unit 1 refueling outage. Although an exact duration cannot be determined, it is reasonable to conclude that for some period of time while the valves were installed in the plant, most likely their lift settings were not within the Technical Specification SR defined setpoint limit. 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, or if two PSVs are inoperable, Technical Specification LCO 3.4.10.B requires the plant to be placed in Mode 3 within 6 hours and to reduce all RCS cold leg temperatures to </= 365 F (Unit 1) 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. We believe that the subject condition (for one or both of the PSVs) 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. All four PSVs currently installed in the plant remain operable. Two PSVs (1RV200 and 1RV201) are located on the Unit 1 pressurizer to provide overpressure protection of the RCS. Based on the as-found lift settings, both of the subject PSVs should have been considered inoperable, for some duration, while installed in the plant during applicable modes. For some time, while installed, 1RV200 was susceptible to an early lift and 1RV201 was susceptible to a late lift. Realizing that

if challenged, the valves could have lifted at a time different than assumed in the applicable safety analyses, the Calvert Cliffs Updated Final Safety Analysis Report (UFSAR) was reviewed and a probabilistic risk assessment analysis was performed.

The probabilistic risk assessment analysis determined that the estimated increase in core damage frequency was less than 1E-07 and the estimated increase in large early release frequency was less than 1E-08 per year for the subject condition. The deviations in relief valve setpoints would have no significant impact as they would still perform the function modeled in the probabilistic risk assessment.

The Calvert Cliffs UFSAR was reviewed to evaluate the design basis events impacted by a decreased lift setting for 1RV200 and an increased lift setting for 1RV201. The evaluation determined that the results presented in the UFSAR were bounding for all impacted design basis events. In all cases, overpressure protection of the RCS was maintained. Therefore, the condition of 1RV200 and 1RV201 would not have prevented the system from fulfilling its safety function.

IV. CORRECTIVE ACTIONS

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

Following the as-found lift failures, the valves were adjusted to determine if as-left certification could be established. Both valves were as-left certified at their respective setpoints. The valves will be refurbished and tested prior to reinstallation in the plant. Spare valves were installed during the 2010 Unit 1 refueling outage.

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE

1. The apparent cause will be verified when the valves are refurbished later in 2010.

V. ADDITIONAL INFORMATION

A. FAILED COMPONENTS

The subject valves are American Society of Mechanical Engineers Boiler and Pressure Code approved PSVs designed to limit RCS pressure to a maximum of 110 percent of design pressure. The safety valves are totally enclosed, back pressure compensatory, spring-loaded valves. The valves are manufactured by Dresser Consolidated, Inc. (EPIX Identification number D243). The valves affected by the subject condition are 1RV200 (BN04373) and 1RV201 (BM07948).

B. PREVIOUS LERs ON SIMILAR EVENTS

A review of Calvert Cliffs' events over the past several years was performed. No previous

due to normal test variation. Licensee Event Report 317/2008-002-01 documents the condition involving the as-found lift setting for PSV Serial Number BM07952 being measured higher than the technical allowable value (report date September 19, 2008). The cause for that event was determined to be excessive drift which resulted from degradation in the components that move when the spring is actuated. The degradation was most likely caused by misalignment of the valve internals. There is no repetitive history at Calvert Cliffs' of internal misalignment so it is unlikely this condition exists on any of the other PSVs. The valves discussed in this report (BN04373 and BM07948) will be refurbished later in 2010. The valve internals will be inspected at that time. However, as stated earlier, testing performed subsequent to the as-found lift failures, represents proper functioning valves (e.g., valves responded properly to compression screw adjustments and the setpoint was consistent). Therefore we do not expect to find any internal valve degradation when the valves are refurbished.

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 |