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April 3, 2014

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  
Licensee Event Report 2014-002, Revision 00  
Condition Prohibited by Technical Specifications Due to Auxiliary Feedwater Train  
Inoperable Due to Human Performance Error

The attached report is being sent to you as required by 10 CFR 50.73.

There are no regulatory commitments contained in this correspondence.

Should you have questions regarding this report, please contact Mr. Douglas E. Lauver at (410) 495-5219.

Very truly yours,

A handwritten signature in black ink, appearing to read "Mark D. Flaherty".

Mark D. Flaherty  
Plant General Manager

MDF/PSF/bjd

Attachment: As stated

cc: N. S. Morgan, NRC  
W. M. Dean, NRC

Resident Inspector, NRC  
S. Gray, DNR

FE22  
NRR

## LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of  
digits/characters for each block)

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollections.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-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 1

## 2. DOCKET NUMBER

05000 317

## 3. PAGE

1 OF 5

## 4. TITLE

Condition Prohibited by Technical Specifications Due to Auxiliary Feedwater Train Inoperable Due to Human Performance Error

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
02	07	2014	2014	- 002 -	00	04	03	2014	FACILITY NAME	DOCKET NUMBER
										05000
										05000

9. OPERATING MODE

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

1	<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)
100	<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"/> 50.73(a)(2)(vii)
	<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

## 12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

Patricia Furio, Principal Engineer

TELEPHONE NUMBER (Include Area Code)

410-495-4374

## 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

## 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)

The event was mis-positioning of the Auxiliary Feedwater (AFW) mud leg drain isolation valve (1-MS-225) and the mud leg steam trap bypass valve (1-MS-228) on 2/7/2014. During operator rounds these valves were cycled but were not returned to their closed position. During the performance of a scheduled surveillance test (STP-O-9-1), steam entered the AFW room through the open valves. The affected AFW pumps were determined to be inoperable with steam entering the room. The apparent cause of the event was that the Turbine Building Operators failed to apply human performance tools (procedure use and adherence, and placekeeping) to maintain proper configuration control. Corrective actions were handled through the performance management system and are complete. The AFW train was determined to have been inoperable for 12 hours, 50 minutes. Technical Specification (TS) 3.7.3.C requires 1 hour Actions with both AFW pumps inoperable. Since the 1 hour Actions were not performed within 1 hour, TS 3.7.3.E should have been entered. It requires that the Unit be placed in Mode 3 in 6 hours, and Mode 4 in 12 hours from entry into the Condition. Unit 1 was not placed in Mode 3 within 7 hours from the time the steam-driven AFW pumps were made inoperable. Therefore, the condition existed for a time longer than allowed by TSs. No similar Licensee Event Reports were found.

<b>NRC FORM 366</b> (01-2014)		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		APPROVED BY OMB: NO. 3150-0104		EXPIRES: 01/31/20		
<b>LICENSEE EVENT REPORT (LER)</b> <b>CONTINUATION SHEET</b>				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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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.				
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**NARRATIVE**

**I. DESCRIPTION OF EVENT:**

**A. PRE-EVENT PLANT CONDITIONS:**

Unit 1 was in Mode 1 when the event occurred.

**B. EVENT:**

The subject event involved the mis-positioning of the Auxiliary Feedwater (AFW) mud leg drain isolation valve (1-MS-225) and the mud leg steam trap bypass valve (1-MS-228) on 2/7/2014. During routine operator rounds, these valves were cycled as required by operating logs, but were not returned to their closed position. During the performance of a scheduled surveillance test (STP-O-9-1, AFAS Logic Test), steam entered the AFW room through the open mud leg drain isolation valves. The affected steam-driven AFW pumps were determined to be inoperable with the mud leg drain isolation valves open. The inoperability lasted for approximately 13 hours (from the time the mud leg drain isolation valves were left open until they were closed following the surveillance test).

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

There were no inoperable structures, components, or systems that contributed to the event.

**D. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:**

2/7/14 – 1025 Completed draining the Unit 1 AFW mud legs per the applicable procedure. Isolation drain valves on the mud legs were inadvertently left open.

2/7/14 – 2205 Unit 1 steam-driven AFW train is declared out-of-service under administrative control for performance of a periodic test in accordance with Technical Specification 3.7.3 Note.

2/7/14 – 2237 During scheduled performance of the surveillance test, when the Auxiliary Feedwater Actuation System signal initiated the steam-driven pumps, steam entered the mud leg drains and exited into the room sump, causing the contents of the sump and steam to be discharged into the AFW pump room.

2/7/14 – 2315 The isolation valves on the mud leg drains were closed and verified at the completion of the scheduled surveillance test. The steam-driven AFW pumps and associated equipment was walked-down and determined to be Operable.

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**NARRATIVE****E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:**

When steam exhausted into the AFW pump room, the fire alarm was activated. The alarm was reset subsequent to isolating steam to the room. There were no other systems or secondary functions affected. This event is applicable to Calvert Cliffs Nuclear Power Plant, Unit 1 only.

**F. METHOD OF DISCOVERY:**

The event was self-revealing. When the steam-driven AFW pumps were started for testing, steam was discharged and exited into the room sump, causing the contents of the sump and steam to be discharged into the AFW pump room.

**G. MAJOR OPERATOR ACTION:**

Following the release of water and steam into the AFW pump room, the affected equipment in the AFW pump room was walked down by a Principal Plant Operator and a Shift Manager. Only minor wetting of the equipment was found. No other deficiencies were noted. No electrical ground alarms were received in the Control Room. The mud leg isolation drain valves were closed and verified to be closed.

**H. SAFETY SYSTEM RESPONSES:**

No safety system responses were expected. None occurred.

**II. CAUSE OF EVENT:**

The cause of the event was human performance related. During normal plant rounds on 2/7/14, the Turbine Building Operator for Unit 1 performed the routine mud leg draining. This task is performed on every shift and requires the Operator to open the mud leg isolation valves and close them at the end of the draining. The evolution typically only takes a few minutes. The Turbine Building Operator is dedicated to the task the entire time. There is a procedure for performing this task, however, in this case, the procedure was not used. An independent verification of the closed position of the valves was supposed to be performed by the Unit 2 Turbine Building Operator. Again, the procedure was not used for this task. The Turbine Building Operators are non-licensed personnel in the Operations Department.

Several human performance error prevention tools were not used during this evolution, including proper use of the procedure and complete three-way communication.

The apparent cause of the event was that the Turbine Building Operators failed to apply human performance tools (procedure use and adherence, and placekeeping) to maintain proper configuration control. Corrective actions were handled through the performance management system and are complete.

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**NARRATIVE**

A contributing cause was that operations management did not frequently perform observations of routine tasks or conduct unannounced observations. Observation expectations have been established.

The event is documented in station condition report CR-2014-001244.

### **III. ANALYSIS OF EVENT:**

The steam-driven AFW pumps have air cooled bearings, and are in an enclosed, water tight room. If steam is introduced into the room (more than normal leakage) when the steam-driven pump(s) are running, the room temperature would exceed 130 degrees F, the operable limit of the air cooled bearings. Therefore, the steam-driven pumps (and, hence, the steam-driven train) were inoperable during the time the mud leg drain isolation valves were open, since they admitted steam into the AFW pump room.

The Nuclear Regulatory Commission Performance Indicators were not affected by this event.

This event did not result in any actual nuclear safety consequences. The actual consequences of the event were to introduce steam into the AFW pump room. The potential consequence was to introduce steam into the AFW pump room when the steam-driven pumps were needed to respond to an event and the steam-driven AFW pumps would have failed after a period of time. A risk assessment of the event was performed which resulted in a change in core damage frequency of 3.3E-7 and large early release frequency of 5.1E-8. These changes in risk are well below the threshold for a very low safety significant issue (core damage frequency less than 1E-6 and large early release frequency less than 1E-7).

If an event had occurred for which the AFW pumps would have been required, the safety function of the AFW system would have been performed. In addition to the steam-driven train, there is a 100 percent motor-driven train in a separate location. This train of AFW remained Operable during the time the steam-driven train was rendered inoperable.

Both of the steam-driven AFW pumps were determined to have been inoperable from the time the mud leg drain isolation valves were left open until the time of discovery during the scheduled surveillance test (12 hours, 50 minutes).

Technical Specification Condition 3.7.3.C applies for two AFW pumps inoperable. Technical Specification Condition 3.7.3.C has several Actions. There are three Actions that have to be performed within an hour. Then one of the AFW pumps has to be restored within 72 hours of entry into Condition 3.7.3.C. Unit 1 was in the Condition for 12 hours, 50 minutes. The one hour Actions were not performed. Since the one hour Actions were not performed, Technical Specification Condition 3.7.3.E should have been entered. It requires that the Unit be placed in Mode 3 in 6 hours, and Mode 4 in 12 hours from entry into the Condition. Unit 1 was not placed in Mode 3 within 7 hours from the time the steam-driven AFW pumps were made inoperable. Therefore, the condition existed for a time longer than allowed by Technical Specifications.

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**NARRATIVE**

Per NUREG-1022, Revision 3, a licensee event report is required if a condition existed for a time longer than permitted by the Technical Specifications, even if the condition was not discovered until after the allowable time had elapsed and the condition was immediately rectified upon discovery.

Therefore, the event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B).

**IV. CORRECTIVE ACTIONS:****A. ACTION TO RETURN AFFECTED SYSTEMS TO PRE-EVENT NORMAL STATUS:**

1. The mud leg drain isolation valves were closed and verified to be closed.

**B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:**

1. A Standing Order has been established outlining observation expectations for paired and unannounced observations, as well as expectations for observations of routine evolutions.
2. The human performance errors were handled in accordance with the performance management system and are complete.

**V. ADDITIONAL INFORMATION:****A. FAILED COMPONENTS:**

None.

**B. PREVIOUS LERS ON SIMILAR EVENTS:**

A review of Calvert Cliffs events over the past several years was performed. No similar events were found.

**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 FUNCTION ID	IEEE 805 SYSTEM ID
AFW mud leg drain valves	ISV	BA

**D. SPECIAL COMMENTS:**

None.