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10 CFR 50.73

September 19, 2014

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

Calvert Cliffs Nuclear Power Plant, Unit No. 1  
Renewed Facility Operating License No. DPR-53  
NRC Docket No. 50-317

Subject: Licensee Event Report 2014-007, Revision 00  
Reactor Coolant System Pressure Boundary Leakage in Reactor Coolant Pump  
Differential Pressure Transmitter Tubing

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.

Respectfully,

A handwritten signature in cursive script, appearing to read "George H. Gellrich".

George H. Gellrich  
Site Vice President

GHG/SMR/bjd

Attachment: As stated

cc: NRC Project Manager, Calvert Cliffs  
NRC Regional Administrator, Region I

NRC Resident Inspector, Calvert Cliffs  
S. Gray, MD-DNR

IE22  
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 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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**4. TITLE**  
Reactor Coolant System Pressure Boundary Leakage in Reactor Coolant Pump Differential Pressure Transmitter Tubing

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	
07	24	2014	14	- 007	00	09	19	2014	FACILITY NAME	05000
									FACILITY NAME	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 checked="" 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 S. M. Reichard, Regulatory Assurance Specialist	TELEPHONE NUMBER (Include Area Code) 410-495-3648
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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
X	AB	TBG		Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO			

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

On July 24, 2014, a Unit 1 reactor coolant pressure boundary leak was identified on the high pressure sensing line tubing for the 11A Reactor Coolant Pump differential pressure transmitter. Technical Specification 3.4.13, Action B was entered requiring that the Unit be placed in Mode 3 within 6 hours and Mode 5 within 36 hours. As a result, operators commenced a plant shutdown at 2321 on July 24, 2014. The leak was isolated by shutting root isolation valves 1HVRC-141 and 1HVRC-142 and the condition was exited at 0250 on July 25, 2014.

The most probable root cause for the tubing leak is a missing support that allowed the tubing to fret on a piece of retired-in-place packing leak off line. Corrective actions include repairing the tubing and replacing the missing support no later than the 2016 Unit 1 refueling outage.

**LICENSEE EVENT REPORT (LER)  
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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](mailto: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. INITIAL CONDITIONS:**

Unit 1 was operating in Mode 1 on July 24, 2014 prior to the event.

**B. EVENT:**

On July 20, 2014, the Unit 1 containment radiation particulate monitor 1-RI-5280 was indicating increased counts. Additionally, the containment sump drain frequency had increased. Although the Reactor Coolant System (RCS) leak rate was within expected values, a focus team was assembled to investigate the cause of the abnormal indications. After three containment walk downs and with the assistance of a contractor with a specialized camera, on July 24, 2014 at 2315, the leak was determined to be from the high pressure sensing line tubing for 1PDT123A, 11A Reactor Coolant Pump (RCP) differential pressure transmitter.

Technical Specification (TS) Condition 3.4.13.B for RCS pressure boundary leakage was entered. Required Actions 3.4.13.B.1 and B.2 require the Unit to be in Mode 3 within 6 hours and Mode 5 within 36 hours.

At 0230 on July 25, 2014, another containment entry was made to isolate the leak by shutting the root isolation valves 1HVRC-141 and 1HVRC-142. Shutting these valves stopped the leak, which was verified by a qualified inservice inspection examiner. Condition 3.4.13.B was exited at 0250 as the leakage no longer existed. Power was restored to 100 percent.

The most probable root cause for the tubing leak is a missing support that allowed the tubing to fret on a piece of retired-in-place packing leak off line. The section of tubing containing the leak was left in Containment and will be removed no later than the 2016 refueling outage.

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

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

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

July 20, 2014, 1830 - Unit 1 containment particulate radiation monitor shows a noticeable rise in counts per minute (cpm) from previous shifts, trending between 169-232 cpm. Normal cpm ranges from 95-110.

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**NARRATIVE**

July 22, 2014, 0444 – Unit 1 containment sump requires draining 23 hours and 45 minutes since the last drain. Normal drain frequency is approximately 40 hours. The change in sump frequency is the equivalent of 0.0163 gallons per minute more leakage.

July 23, 2014 - Several containment entries were made to determine the location of the potential RCS leak. Video was taken to determine the source of the leak.

July 24, 2014, 2315 - RCS pressure boundary leakage is identified from the instrument line tubing to the 11A RCP differential pressure transmitter. Technical Specification Action 3.4.13.B and Limiting Condition for Operation action statements for RCS pressure boundary leakage were entered due to the presence of RCS pressure boundary leakage.

July 24, 2014, 2321 – Unit 1 downpower to 12 percent commences to investigate steam leak.

July 25, 2014, 0230 – Unit 1 Containment entry made. Pressure boundary leak is isolated by shutting root isolation valves, 1HVRC-141 and 1HVRC-142.

July 25, 2014, 0250 - Unit 1 identified RCS pressure boundary leak is verified isolated and TS action statements are exited.

July 26, 2014, 0430 - Unit 1 returns to 100 percent reactor power.

**E. FAILURE MODES:**

The most probable root cause for the tubing leak is a missing support that allowed the tubing to fret on a piece of retired-in-place packing leak off line. The section of tubing containing the leak was left in Containment and will be removed no later than the 2016 refueling outage.

No additional systems or secondary functions were affected.

The RCS pressure boundary leakage was identified at 2315 on July 24, 2014. The pressure boundary leakage was isolated by shutting root isolation valves, 1HVRC-141 and 1HVRC-142 at 0230 on July 25, 2014. The pressure boundary leakage was verified to be isolated by qualified visual inspection at 0250 on July 25, 2014.

**F. METHOD OF DISCOVERY:**

On July 20, 2014, at 0800 the containment particulate radiation monitor was reading 169 cpm. A review of logs for several previous days revealed that trends were averaging between 95 to 110 cpm. At 1400 on July 20 the reading increased to 232 cpm. The containment sump drain frequency had increased as well. Through investigation by a focus team, a pressure boundary leak was found on the high pressure sensing line tubing for 1PDT123A, 11A RCP differential pressure transmitter.

This event is documented in the site's Corrective Action Program under CR-2014-006488.

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## NARRATIVE

## II. CAUSE OF EVENT

The most probable root cause for the tubing leak is a missing support that allowed the tubing to fret on a piece of retired-in-place packing leak off line.

### A. SAFETY CONSEQUENCES:

There were no automatic or manually initiated safety system responses.

The safety consequence of this event was that RCS pressure boundary leakage occurred. No pressure boundary leakage is allowed since it is indicative of material degradation. Leakage of this type is unacceptable since the leak itself could cause further deterioration, resulting in higher leakage. Therefore the pressure boundary leakage must be completely stopped or the Unit must be shut down.

This event was reviewed for potential probabilistic risk assessment impact. The Nuclear Regulatory Commission (NRC) Inspection Manual 0609 identifies that a GREEN (very low safety significance) is quantitatively less than 1E-6 change in core damage frequency or 1E-7 change in large early release frequency. This issue would be GREEN using the NRC's Significance Determination Process.

Calvert Cliffs Nuclear Power Plant TS 3.4.13, RCS Operational LEAKAGE allows no pressure boundary leakage while in Modes 1 through 4 and is reportable in accordance with NUREG-1022, Revision 3, for two criteria; 10 CFR 50.73(a)(2)(ii)(A), principal safety barriers of the nuclear power plant being seriously degraded, and 50.73(a)(2)(i)(B), operation or condition prohibited by Technical Specifications. An immediate event notification report (50307) was made pursuant to 10 CFR 50.72(b)(3)(ii)(A) in association with principle safety barriers being seriously degraded. Additionally, the event notification report was made pursuant to 10 CFR 50.72(b)(2)(i) because Calvert Cliffs initiated a Technical Specification required plant shutdown.

### B. CORRECTIVE ACTIONS:

1. Repair the tubing and replace the missing support no later than the 2016 refueling outage.
2. Confirm cause of leaking tubing following the 2016 refueling outage.
3. Perform extent of condition walkdowns for fretting tubing and missing supports no later than the 2016 refueling outage.

A supplemental licensee event report will be submitted if additional information is subsequently developed that would significantly change the corrective actions for this event.

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**NARRATIVE**

**III. PREVIOUS SIMILAR EVENTS:**

A review of Calvert Cliffs' reportable events during the last three years was performed. There were two licensee event reports (LERs) during that time period that involved RCS pressure boundary leakage:

1. LER 318/2013-005, Reactor Coolant System Pressure Boundary Leakage in Valve Leakoff Line Weld – During the 2013 Refueling Outage, while in Mode 3 a pinhole leak was identified at the upper packing leak off line cap seal weld of a pressurizer spray valve. The most likely cause was a latent weld defect created during the installation of the cap seal weld.
2. LER 317/2012-002, Reactor Coolant Pressure Boundary Leakage Due to Tubing High Cyclic Fatigue – This event involved a cracked weld on an instrument sensing line. The crack was due to a missing support that had not been installed for many years.

**A. COMPONENT INFORMATION:**

COMPONENT	IEEE 803 FUNCTION ID	IEEE 805 SYSTEM ID
11A RCP differential pressure transmitter tubing	TBG	AB