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10 CFR 50.73

July 20, 2016

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 2016-004, Revision 00
High Energy Line Break Barrier Breached Due to Human Performance Error
Causing Both Service Water Trains to be Inoperable

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. Larry D. Smith at (410) 495-5219.

Respectfully,

Mark D. Flaherty
Plant Manager

MDF/PSF/bjm

Attachment: As stated

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

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

IF 22
NRR

LICENSEE EVENT REPORT (LER)

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

(See NUREG-1022, R.3 for instruction and guidance for completing this form <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/re3/>)

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 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.

1. FACILITY NAME Calvert Cliffs Nuclear Power Plant, Unit 1	2. DOCKET NUMBER 05000317	3. PAGE 1 OF 6
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4. TITLE
High Energy Line Break Barrier Breached Due to Human Performance Error Causing Both Service Water Trains to be Inoperable

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	
11	13	2015	2016	- 004	000	07	20	2016	FACILITY NAME	

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)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(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)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
10. POWER LEVEL	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input checked="" type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT Patricia Furio, Principal Engineer	TELEPHONE NUMBER (Include Area Code) 410-495-4374
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	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)

The Unit 1 Service Water (SRW) Room high energy line break (HELB) door was opened on 10/19/2015 and 10/21/2015 to conduct a maintenance activity. The door was opened twice for approximately three and a half minutes each time. With the HELB door blocked open, the affected equipment located behind the barrier door should have been considered inoperable. Affected equipment included the 13 motor driven auxiliary feedwater pump, both trains of saltwater air compressors and both trains of SRW. Since both SRW trains were inoperable, a loss of safety function occurred, an unanalyzed condition existed and a common cause failure of independent trains existed for the time that the HELB door was opened. The HELB door was blocked opened because Maintenance Planners did not include the proper barrier controls in the work order that opened the HELB door, because they were unaware of the barrier control procedure requirements. The apparent cause of the event was that the assigned change management agent (an Engineer) failed to inform Maintenance Planners of the implementation of the barrier procedure. Affected groups were briefed about the barrier control procedure. Corrective action for the human performance issue was handled through the performance management system.

NRC FORM 366A (06-2016)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB: NO. 3150-0104		EXPIRES: 10/31/2018	
LICENSEE EVENT REPORT (LER) CONTINUATION SHEET				<small>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 e-mail to Infocollects.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.</small>			
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I. DESCRIPTION OF EVENT:

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

A. INITIAL CONDITIONS:

Unit 1 was operating at 100 percent power in Mode 1 prior to the event.

B. EVENT:

On October 19 and 21, 2015, the No. 11 Service Water (SRW) [BI] pump [P] motor [MO] was replaced, which required opening of a high energy line break (HELB) barrier, specifically Door 214 [DR]. This door separates the turbine building [NM] from the SRW pump room. During the SRW motor replacement activity, a new SRW motor was moved into the SRW room and the old SRW motor was moved out. The movement of the motor involved using a chain fall to move the motor from a cart stationed on one side of the door to a cart stationed on the other side of the door. The barrier was opened for approximately three and a half minutes for each movement. Compensatory measures were taken to station dedicated personnel at the barrier to restore the barrier to its design basis configuration during any plant transient or event. The HELB barrier was restored to its design configuration following each motor move. The work order which controlled the open barrier did not consider the barrier blocked during motor movement based on an existing station procedure (EN-1-135, Control of Barriers).

This HELB barrier breach should have been evaluated in accordance with procedure CC-AA-201, Plant Barrier Control Program. This procedural process provides for an evaluation of a barrier breach and provides compensatory actions. The barrier control actions developed per this procedure should have been part of the work orders for the SRW pump motor replacement, but were not included because the procedure was not followed. This procedure provides more comprehensive guidance than the station procedure for this situation. The procedure was not followed because the Maintenance Planners were not aware of the procedure's implementation because they were unaware of the barrier control procedure requirements. The apparent cause of the event was that the assigned change management agent (an Engineer) failed to inform Maintenance Planners of the implementation of the barrier procedure.

As a result of not following the barrier control program, the risk associated with opening the barrier was not sufficiently understood and the impact to equipment operability for equipment protected by the barrier was not understood. Additionally, appropriate compensatory measures were not properly evaluated. If the barrier control program had been correctly utilized, Technical Specification (TS) Conditions should have been entered for affected equipment. This would have required both trains of SRW to be declared inoperable because they are not

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qualified for the steam environment that is postulated to exist following a HELB. Declaring both trains of SRW inoperable results in a loss of safety function for a system needed to respond to a HELB to provide safe shutdown of the reactor, remove residual heat and mitigate the consequence of an accident. In addition, this condition also results in an unanalyzed condition that significantly degrades plant safety and a common cause inoperability of independent trains. A single train of Auxiliary Feedwater (AFW) [BA] was also affected, as were support equipment for other TS components.

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:

October 19, 2015 – SRW HELB barrier is opened for approximately three and a half minutes to move SRW pump motor into the SRW pump room. The SRW HELB barrier closed following the move of the SRW pump into the SRW pump room.

October 21, 2015 – SRW HELB barrier is opened for approximately three and a half minutes to move old SRW pump motor out of the SRW pump room. The SRW HELB barrier closed following the move of the old SRW pump out of the SRW pump room.

November 13, 2015 – Issue Report (IR) 2586773 was written to document that the work order (WO 120070650) did not contain a barrier impairment permit as required by procedure CC-AA-201.

February 9, 2016 – Inspection Report 05000317/2015004 and 05000318/2015004 was issued from the NRC describing the green Non-Cited Violation (NCV) of Technical Specification 5.4.1 for failure to implement procedures as required by Regulatory Guide 1.33, Appendix A.

February 14, 2016 – IR 2625943 was written to require appropriate evaluation of the green NCV. An evaluation was completed and corrective actions developed.

July 1, 2016 – Regulatory Assurance personnel were contacted by the NRC Resident Inspector requesting information related to a Licensee Event Report (LER) for the above described issue. No LER was located. IR 2688409 was written.

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E. FAILURE MODES:

There are no equipment failure modes.

F. METHOD OF DISCOVERY:

The event should have been determined to be a reportable event following determination that the correct barrier control procedure was not followed on November 13, 2015. However, at that time, the conduct of maintenance for this work order was believed to be acceptable. Receipt of NRC Inspection Report 05000317/2015004 and 05000318/2015004 was an additional opportunity to address the reportable aspect of this event. This event is documented in the site's Corrective Action Program under IRs 2586773 and 2625943.

II. CAUSE OF EVENT

The cause of the event was human performance related. The work order that provided direction for the movement of the SRW motor into and out of the SRW pump room did not contain the required barrier impairment permit as required by procedure CC-AA-201. The reason the work order did not contain the barrier impairment permit is that the implementation of the procedure was not effectively communicated to Maintenance Planners by the Engineer responsible for the procedure implementation. Therefore, the Maintenance Planners were not aware that a barrier impairment permit was needed for the work order. Use of the barrier impairment permit process would have resulted in different actions being taken to perform this maintenance task.

The apparent cause of the event was that an Engineer failed to provide adequate change management for the implementation of the barrier procedure. Therefore, Maintenance Planners did not include the proper barrier controls in the work order that opened the HELB barrier. Corrective actions were to brief affected groups about the barrier control procedure. Corrective action for the human performance issue was handled through the performance management system.

A. SAFETY CONSEQUENCES:

The safety consequence of this event was that equipment required to respond to a HELB event in the turbine building was not protected from the HELB event itself. Equipment required to respond to a HELB event is listed in UFSAR Table 10A-6, "Mechanical and Electrical Equipment Required to Place the Plant in a Safe Shutdown Condition." The table lists the SRW pump, the motor-driven AFW pump [P] and components that rely on the safety related saltwater air compressors (SWACs) [LE] [CMP] as equipment that is located outside a steam environment during a turbine building HELB. With the SRW pump room door open, this equipment would have been exposed to a steam environment that it was not analyzed for. Therefore, the

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equipment would be assumed unavailable to respond to a HELB event to bring the plant to a safe shutdown condition. A loss of SRW would result in the loss of one of two emergency diesel generators [DG], which would leave one emergency diesel generator to respond to the event and bring the plant to a safe shutdown condition. The loss of the motor driven AFW train would leave two steam driven AFW pumps to respond to the event and bring the plant to a safe shutdown condition. The loss of the SWACs would require operator action during the course of an event to mitigate that loss.

When the HELB barrier was opened, the SRW systems behind the barrier should have been declared inoperable per the TSs. For the SRW system, TS LCO 3.0.3 should have been entered. For the auxiliary feedwater system, TS LCO 3.0.9 should have been entered for one train out of service. There is no TS for the SWACs. These TSs have Actions that are longer than the approximately three and a half minutes that the SRW pump room door was opened. Therefore, no TSs were violated during this event.

The subject condition satisfies the criteria in NUREG-1022, Revision 3, for an event or condition that could have prevented the fulfillment of a safety function for a system needed to respond to a HELB to provide safe shutdown of the reactor, remove residual heat and mitigate the consequence of an accident, due to the loss of both trains of SRW. Therefore, this event is reportable pursuant to 10 CFR 50.73(a)(2)(v)(A) and (B) and (D). In addition, this condition also results in an unanalyzed condition that significantly degrades plant safety based on the loss of safety function and is reportable pursuant to 10 CFR 50.73(a)(2)(ii)(B). This condition also caused a common cause inoperability of independent trains, since the open barrier (common cause) affected both (independent) trains of SRW. This is reportable pursuant to 10 CFR 50.73(a)(2)(vii).

B. CORRECTIVE ACTIONS:

IR 2625943 was written to require appropriate evaluation of the green NCV received from the NRC in Inspection Report 05000317/2015004 and 05000318/2015004. The work group evaluation determined that the apparent cause of the event was that an Engineer failed to provide adequate change management for the implementation of the barrier control procedure by not briefing all affected organizations. Action was taken to provide a briefing to all potentially affected work groups on site. Corrective action for the human performance issue was handled through the performance management system.

III. PREVIOUS SIMILAR EVENTS:

A review of Calvert Cliffs' events over the past several years was performed and no similar instances were found.

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A. COMPONENT INFORMATION:

COMPONENT

IEEE 803
FUNCTION ID

IEEE 805
SYSTEM ID

None