



October 26, 2006

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318;
License Nos. DPR 53 and DPR 69
Licensee Event Report 2006-003
Impact on Safety-Related Equipment not Considered When High Energy Line
Break Barrier Removed

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. Jay S. Gaines at (410) 495-4922.

Very truly yours,

A handwritten signature in black ink that reads "Joseph E. Pollock". The signature is written in a cursive style with a large, looped initial "J".

Joseph E. Pollock
Plant General Manager

JEP/ALS/bjd

Attachment: As stated

cc: P. D. Milano, NRC
S. J. Collins, NRC

Resident Inspector, NRC
R. I. McLean, DNR

JE22

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 50 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.

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4. TITLE
Impact on Safety-Related Equipment not Considered When High Energy Line Break Barrier Removed

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
08	30	2006	2006	- 03 -	00	10	26	2006	Calvert Cliffs, Unit 2	05000 318
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)																																
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(B)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(C)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input checked="" type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 73.71(a)(4)	<input type="checkbox"/> 73.71(a)(5)	<input type="checkbox"/> OTHER
10. POWER LEVEL 100	Specify in Abstract below or in NRC Form 366A																																

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME A. L. Simpson, Principal Engineer	TELEPHONE NUMBER (Include Area Code) 410-495-6913
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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
D	BA	DR		N	D	CC	DR		N

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE MONTH: DAY: YEAR:
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On August 30, 2006 during performance of a surveillance test, the Unit 2 auxiliary feedwater pump room double doors were open per plant procedure. However, the procedure did not consider the high energy line break design support function of the doors. As a result, the safety-related equipment in the pump room was not considered inoperable. Upon discovery of this condition, Operations declared the affected equipment inoperable while the doors were open. A subsequent review determined that all doors between the Turbine Building and the Auxiliary Building (Units 1 and 2) were credited as barriers for high energy line break events. As a result, Operations issued night orders to keep all affected doors closed, except during normal ingress and egress. A review of the control room logs over the last three years yielded several events where these barriers were defeated and the associated Technical Specification for the affected equipment was not entered. The cause of this event was determined to be inadequate barrier control procedures due to failure to incorporate corrective actions recommended from review of a regulatory issue summary. Corrective actions include changes to the barrier control procedures.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

I. DESCRIPTION OF EVENT

On August 30, 2006 during performance of an Auxiliary Feedwater (AFW) System surveillance test, the Unit 2 AFW pump room double doors were open for personnel safety reasons, as allowed by the procedure. However, the procedure did not consider the high energy line break (HELB) design support function of the doors. As a result, the equipment in the pump room was not considered inoperable when it should have been. Upon discovery of this condition, Operations immediately declared the affected equipment inoperable while the doors were open. An engineering review confirmed that the equipment in the room had not been environmentally qualified for the environmental conditions which could exist during a HELB event. An extent of condition review determined that all doors between the Turbine Building and the Auxiliary Building (Units 1 and 2) were credited as barriers for HELB events. Operations issued night orders to keep all doors closed between the Turbine Building and the Auxiliary Building except for normal ingress and egress.

A review of the control room logs over the last three years yielded several events where HELB barriers (i.e., doors) were defeated for a period of time longer than the allowed completion time of the associated Technical Specification Limiting Condition of Operation. Therefore, this event is reportable pursuant to the reporting criteria specified in 10 CFR 50.73.

II. CAUSE OF EVENT

In 2004, an engineering review of Regulatory Issue Summary 2001-09 "Control of Hazard Barriers" was completed. The engineering review identified a number of vulnerabilities in Calvert Cliffs' barrier control process. A Condition Report was written to address the vulnerabilities, but not all of the recommended actions were implemented. The failure to incorporate all recommended actions from the engineering review into the corrective action program went undetected. The failure to adequately implement recommendations from the engineering review of Regulatory Issue Summary 2001-09 led to an inadequate control of HELB barriers and is the apparent cause of this event. This issue is documented in Condition Report numbers IRE-016-870 and IRE-016-911.

III. ANALYSIS OF EVENT

An extent of condition review determined that all doors between the Turbine Building and the Auxiliary Building (for Units 1 and 2) were credited as barriers for HELB events. An engineering review confirmed that the equipment in the rooms had not been environmentally qualified for the environmental conditions which could exist during a HELB event. Prior to August 30, 2006, Calvert Cliffs controlled operation of watertight doors [including the AFW pump room doors and the service water (SRW) pump room doors] per the Technical Requirements Manual. The Technical Requirements Manual allows the doors to be open for normal entry and exit, with contingency measures requiring the doors to be closed within a 24 hour restoration time when

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opened for reasons other than normal entry and exit (e.g., testing or maintenance). A review of the Unit 1 and Unit 2 control room log entries within three years of the date of discovery (August 30, 2003 through August 30, 2006) was performed to identify those occurrences that potentially met the reporting requirements for this event. The review focused on entries when the watertight doors for the most risk significant rooms, the AFW pump room and the SRW pump room, were opened for maintenance or testing. Other rooms (for example the switchgear rooms) were not considered risk significant because of the low hours they are opened each year and the relatively low frequency of HELBs.

There were no actual nuclear safety consequences incurred from this event. A probabilistic risk assessment was performed to evaluate the increased risk associated with having the AFW and SRW pump room watertight doors open for testing or maintenance during the period from August 30, 2005 to August 30, 2006. After August 30, 2006, opening a watertight door for an extended period is considered to make equipment within the room inoperable. A conservative estimate of the Incremental Conditional Core Damage Probability (ICCDP) risk impact to Unit 1 and Unit 2 from operating with the SRW and AFW pump room doors open is approximately 3E-08 for Unit 1 and 1.7E-07 for Unit 2. This is considered a small impact (less than 5E-07 ICCDP) per Nuclear Regulatory Commission Regulatory Guide 1.177 and per the Significance Determination Process would be considered very low safety significance (<1E-06). The Large Early Release Frequency was not explicitly evaluated but would be at least a factor of ten less.

A licensee event report (LER) is required per 10 CFR 50.73(a)(2)(i)(B) for any operation or condition which was prohibited by the plant's Technical Specifications, subject to the exceptions stated in the rule, if the condition existed for a time longer than permitted by the Technical Specification required completion time. To determine reportability under this criterion, control room logs within three years of the discovery date (August 30, 2003 through August 30, 2006) were reviewed to identify events when the HELB barriers (i.e., doors) were defeated and when the associated Technical Specification Limiting Condition for Operation for the associated equipment (i.e., AFW System or SRW System) was not entered. Several events were identified including the March 23, 2004 event when the Unit 2 AFW and Unit 2 SRW pump room doors were open from 10:02 until 13:55, duration of approximately four hours. The Unit 1 AFW normal access door was also open on that day from 07:25 until 15:10. Both Units were operating in Mode 1 at 100 percent power on March 23, 2004. Details of each of the other individual occurrences identified are not discussed in this LER because they all resulted from the same cause and the consequences are bounded by the March 23, 2004 occurrence discussed above. Further, the ICCDP risk impact to Unit 1 and Unit 2 discussed above includes the cumulative impact of all occurrences for the most recent 12 months (August 30, 2005 through August 30, 2006).

The AFW System automatically supplies feedwater to the steam generators to remove decay heat from the Reactor Coolant System upon the loss of normal feedwater supply. The AFW System consists of one motor-driven AFW pump (located in the SRW pump room) and two steam turbine-driven pumps (located in the AFW pump room) configured into two trains. The motor-driven

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pump provides 100 percent of the AFW flow capacity; each turbine-driven pump can provide 100 percent of the required capacity to the steam generators as assumed in the accident analysis, but only one turbine-driven pump is lined up to auto start. The other turbine-driven pump is placed in standby and requires a manual start when it is needed. On March 23, 2004, with the Unit 2 AFW pump room doors open, the two turbine-driven AFW pumps should have been declared inoperable. With two AFW pumps inoperable, Technical Specification 3.7.3 "Auxiliary Feedwater System" Condition C "two AFW pumps inoperable" requires actions with a one hour completion time. Required actions include aligning the remaining Operable pump to automatic initiating status and verifying the other unit's motor-driven AFW pump is operable. Verification (by administrative means) of an operable cross-tie valve to the opposite unit is also required to be completed within one hour. If any of the required actions are not met, the affected Unit must be in Mode 3 within six hours as required by Technical Specification Condition E. On March 23, 2004, with two Unit 2 AFW pumps inoperable due to removal of the AFW pump room HELB barrier (i.e., door open), the required actions were not performed. The remaining Unit 2 AFW pump was not operable because the SRW pump room doors were open at the same time as the AFW pump room doors. The Unit 1 motor-driven AFW pump was not verified operable because the Unit 1 SRW pump room doors were also open at that time. The condition existed for a time longer than allowed by the Technical Specification required completion time (i.e., greater than one hour), therefore, this event is reportable pursuant to the reporting criterion specified in 10 CFR 50.73(a)(2)(i)(B).

An LER is required per 10 CFR 50.73(a)(2)(ii)(B) for any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety. The level of significance of these cases generally corresponds to the inability to perform a specified safety function. On March 23, 2004, the Unit 2 AFW System was not protected from the effects of a HELB during the period of time when the AFW pump room watertight doors and the SRW pump room watertight doors were open. During that time, components in both trains of AFW, required for the system to perform its specified safety function, were vulnerable to environmental conditions that they had not been environmentally qualified for. Therefore, this event is reportable pursuant to the reporting criterion specified in 10 CFR 50.73(a)(2)(ii)(B).

An LER is required per 10 CFR 50.73(a)(2)(vii) for any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system. On March 23, 2004, the Unit 2 SRW pump room doors were open for approximately four hours. The SRW System provides a heat sink for the removal of process and operating heat from safety-related components during a design basis accident or transient. The SRW System consists of two separate, 100 percent capacity safety-related cooling water subsystems. Each subsystem consists of a 100 percent capacity pump, head tank, two SRW heat exchangers, piping, valves, and instrumentation. The pumps, heat exchangers, piping, valves and instrumentation for both subsystems are located in the SRW pump room. Therefore, in the event of a HELB, the resulting environmental conditions introduced in the Unit 2 SRW pump room could result in a common

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cause failure of the two separate safety-related cooling water subsystems. Therefore, this event is reportable pursuant to the reporting criterion contained in 10 CFR 50.73 (a)(2)(vii).

An LER is required per 10 CFR 50.73(a)(2)(v) for any event or condition that could have prevented the fulfillment of the specified safety function of systems that are needed to be operable to perform one of the four functions specified in the rules including (B) remove residual heat and (D) mitigate the consequences of an accident. The level of judgment for reporting an event or condition under this criterion is a reasonable expectation of preventing fulfillment of a specified safety function. The intent is to capture those events where there would have been a failure of a specified safety system to properly complete a safety function regardless of whether there was an actual demand. As discussed above, on March 23, 2004 a condition existed that could have prevented the Unit 2 AFW System from performing its specified safety function (remove residual heat) following a HELB event. Therefore, this event is reportable pursuant to the reporting criterion specified in 10 CFR 50.73(a)(2)(v)(B). Also, as discussed above, on March 23, 2004, a condition existed that could have prevented the Unit 2 SRW System from performing its specified safety function (mitigate the consequences of an accident) following a HELB event. Therefore, this event is reportable pursuant to the reporting criterion specified in 10 CFR 50.73(a)(2)(v)(D).

IV. CORRECTIVE ACTIONS

- A. Established actions to prohibit opening of HELB barriers between the Turbine Building and the Auxiliary Building, except for normal ingress and egress.
- B. Identified easily opened HELB barriers between the Turbine Building and the Auxiliary Building.
- C. Benchmarked other utility barrier control programs.
- D. Perform a lessons-learned tailgate to selected supervisors that re-emphasizes the importance of an adequate review and follow-up for operating experience items.
- E. Establish a Hazard Barrier Control Program.
- F. Change procedure for processing regulatory information, to include a requirement to assign action item tracking milestones for the review of regulatory requirements.
- G. Revise procedures to add explicit guidance and requirements related to hazard barriers to ensure they are properly considered when planning and risk assessing maintenance.
- H. Review the procedures to determine if guidance is required for assessing the operability of hazard barriers when deficiencies are found.

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V. ADDITIONAL INFORMATION

A. Component Identification

Component	IEEE 803 EHS Function	IEEE 805 System ID
Auxiliary Pump Room Watertight Door	DR	BA
Service Water Pump Room Watertight Door	DR	CC

B. Previous Occurrences

A review of Calvert Cliffs' events over the past several years was performed.

No other previous similar events were identified.