



April 6, 2015

10 CFR 50.73

SVP-15-023

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

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket No. 50-254 and 50-265

Subject: Licensee Event Report 254/2015-002-00, 'HPCI Interlock Doors Opened Simultaneously Cause Loss of Secondary Containment'

Enclosed is Licensee Event Report (LER) 254/2015-002-00, 'HPCI Interlock Doors Opened Simultaneously Cause Loss of Secondary Containment,' for Quad Cities Nuclear Power Station, Unit 1.

This report is submitted in accordance with 10 CFR 50.73 (a)(2)(v)(C) which requires the reporting of any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to control the release of radioactive material.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this report, please contact Mr. W. J. Beck at (309) 227-2800.

Respectfully,

A handwritten signature in cursive script that reads "Scott Darin".

Scott Darin
Site Vice President
Quad Cities Nuclear Power Station

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

LE22
MRR



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.

1. FACILITY NAME Quad Cities Nuclear Power Station Unit 1	2. DOCKET NUMBER 05000254	3. PAGE 1 OF 5
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4. TITLE
HPCI Interlock Doors Opened Simultaneously Cause Loss of Secondary Containment

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	10	2015	2015	002	00	04	06	2015	Quad Cities Nuclear Power Station Unit 2	05000265
									FACILITY NAME	DOCKET NUMBER
									N/A	N/A

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 checked="" type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input 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

LICENSEE CONTACT Tom Petersen – Regulatory Assurance	TELEPHONE NUMBER (Include Area Code) (309) 227-2825
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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
B	NG	DR	N/A	Y					

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
		N/A	N/A	N/A

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

On February 10, 2015, at 1055 hours, a maintenance individual notified the control room that both doors in the secondary containment interlock between the Reactor Building (RB) Unit 1 High Pressure Coolant Injection (HPCI) room and the Unit 1 Turbine Building (TB) were opened simultaneously. The failure of this interlock caused a loss of secondary containment (inoperable) per Technical Specification (TS) 3.6.4.1, Condition A. The RB-side door was immediately reclosed, and the secondary containment boundary was reestablished. Operators verified the RB (secondary containment) differential pressure remained negative during this event.

Secondary containment remained available and functional during the event since the secondary containment interlock was immediately restored by closing the RB-side door and the RB differential pressure was maintained during the event. No RB low differential pressure alarms were received during this event. The RB is a common volume to both Units 1 and 2, and an interlock failure can impact the secondary containment for both units.

The cause of the interlock failure was due to a bent locking bolt with insufficient strength to withstand the standard practice of challenging that fire doors are locked closed after passing through them. The bent locking bolt caused its door plungers to not engage allowing its door to open while the opposite door in the interlock was being opened.

Corrective actions included repairing the bent locking bolt on the TB-side passive door and realigning the TB-side doors to ensure the plungers would be functional. The locking bolt will be replaced with a higher strength assembly.

The safety significance of this event was minimal. Given the impact on the secondary containment, this report is submitted (for Units 1 and 2) in accordance with the requirements of 10 CFR 50.73 (a)(2)(v)(C), which requires the reporting of any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to control the release of radioactive material.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER				3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.		
Quad Cities Nuclear Power Station Unit 1	05000254	2015	- 002	- 00		2 OF 5

NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor, 2957 Megawatts Thermal Rated Core Power

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

EVENT IDENTIFICATION

Both doors in the secondary containment interlock between the RB Unit 1 HPCI room and the Unit 1 TB were opened simultaneously and caused a loss of secondary containment (inoperable) per Technical Specification (TS) 3.6.4.1, Condition A.

A. CONDITION PRIOR TO EVENT

Unit: 1 / 2 Event Date: February 10, 2015 Event Time: 1055 hours
 Reactor Mode: 1 / 1 Mode Name: Power Operation / Power Operation Power Level: 100% / 100%

B. DESCRIPTION OF EVENT

On February 10, 2015, at 1055 hours, a maintenance individual notified the control room [NA] that both doors [DR] in the Unit 1 HPCI [BJ] secondary containment [NG] interlock [IEL] on the 554 foot elevation between the Unit 1 RB [NG] (door 1-0030-191) and the Unit 1 TB [NM] (door 1-0030-190) were opened simultaneously for a brief time. The Unit 1 RB-side door (1-0030-191) was opened and then closed immediately while the Unit 1 TB-side door (1-0030-190) was observed to be open, and the secondary containment boundary was immediately reestablished. The failure of this interlock caused a temporary loss of secondary containment (inoperable) per Technical Specification (TS) 3.6.4.1, Condition A. Operators verified the RB (secondary containment) differential pressure remained negative during this event.

At the time of this event, a mechanic planned to transverse through the Unit 1 HPCI interlock from the Unit 1 RB to the Unit 1 TB. The mechanic paused and waited as another mechanic traversed through the interlock. The mechanic in the RB began to open the HPCI RB-side door and immediately noticed the TB-side door was open. The mechanic stopped, closed the RB-side door, and contacted the nearest supervisor. The event was then reported to Operations.

An Operations Field Supervisor was dispatched to investigate the interlock issue and found that the issue was intermittent. Operations staged a laborer to administratively control the interlock until repairs were performed.

Secondary containment remained available and functional during the event since the secondary containment interlock was immediately restored by closing the RB-side door, and since the RB differential pressure was maintained during the event. A review of the Station Event Recorder verified the RB low differential pressure alarms [PDA] were not received during this event. The RB is a common volume to both Units 1 and 2, and an interlock failure can impact the secondary containment for both units.

On February 10, 2015, at 1309 hours, ENS #50803 was made to the NRC under 10 CFR 50.72(b)(3)(v)(C), to report this event as an event or condition that could have prevented the fulfillment of a safety function.

**LICENSEE EVENT REPORT
(LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Quad Cities Nuclear Power Station Unit 1	05000254	YEAR	SEQUENTIAL NUMBER	REV NO.	3 OF 5		
		2015	- 002	- 00			

NARRATIVE

Given the impact on the secondary containment, this report is submitted (for Units 1 and 2) in accordance with the requirements of 10 CFR 50.73 (a)(2)(v)(C), which requires the reporting of any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to control the release of radioactive material.

C. CAUSE OF EVENT

The apparent cause of the interlock failure on February 10, 2015, was determined to be a bent locking bolt with insufficient strength to withstand the standard practice of challenging that fire doors are locked closed after passing through them. The bent locking bolt is on the passive TB-side door (1-0030-190). Since the bolt was not effectively holding the passive door, and subsequently the active door, the doors were not closed tightly to the threshold, and the plungers were not aligned with the slots on the door. Since the plungers were not aligned, they did not lock into the slots when the logic was activated by the other door. Without the plungers locking the doors closed, the maintenance individual was able to open the RB-side door while the TB-side door was already open.

D. SAFETY ANALYSIS

System Design

The function of the secondary containment is to contain, dilute, and hold up fission products that may leak from primary containment following a Design Basis Accident (DBA). In conjunction with operation of the Standby Gas Treatment System (SBGTS) [BH] and closure of certain valves [V] whose lines penetrate the secondary containment, the secondary containment is designed to reduce the activity level of the fission products prior to release to the environment, and to isolate and contain fission products that are released during certain operations that take place inside primary containment, when primary containment is not required to be operable, or that take place outside primary containment.

Updated Final Safety Analysis Report (UFSAR) Section 6.2.3.1 provides that the safety objective of the secondary containment system, in conjunction with other engineered safeguards and nuclear safety systems, is to limit the release of radioactive materials so that offsite doses resulting from a postulated DBA will remain below 10 CFR 100 guideline values.

The secondary containment interlocks are designed to provide personnel access to the RB from the TB while maintaining a negative differential pressure in the RB. The Unit 1 HPCI interlock doors are normally secured closed by mechanical latches. Each door is operated manually with a door knob, and interlock logic is activated to actuate plungers that lock closed the opposite door in the interlock. The doors are designed with relay logic so that only one door can be opened at a time. A red light near each door illuminates when one of the doors is open.

Safety Impact

Both Units 1 and 2 share a common RB (secondary containment). When both HPCI interlock doors were opened simultaneously, this caused a momentary loss of secondary containment.

TS 3.6.4.1, Action A.1, requires restoration of secondary containment to operable status within four hours. This four hour Completion Time provides a period of time to correct the problem that is commensurate with the importance of maintaining secondary containment during Modes 1, 2, and 3, since the probability of an accident occurring during this short period where secondary containment is inoperable is minimal.

The primary purpose of the secondary containment is to minimize the ground level release of airborne radioactive materials and to provide a controlled, elevated release of the building atmosphere under accident conditions. An engineering analysis was performed to demonstrate that during the short (momentary) time that both doors of the corresponding interlock were simultaneously opened, the doors were not open sufficiently long enough to cause a RB

**LICENSEE EVENT REPORT
(LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
Quad Cities Nuclear Power Station Unit 1	05000254	YEAR	SEQUENTIAL NUMBER	REV NO.	4	OF 5
		2015	-	002		

NARRATIVE

low differential pressure alarm, hence no loss of secondary containment differential pressure occurred. Secondary containment would have sufficiently contained radioactive materials during a LOCA such that all current dose limits would remain to be met. As a result, the system safety function of secondary containment would have been maintained throughout the event. Therefore, the dose consequence from postulated releases from the RB during this short duration would remain to be bounded by the existing design basis LOCA dose analysis. The safety significance of this event was minimal.

The engineering analysis that was performed demonstrated this event did not constitute a Safety System Functional Failure (SSFF). (Reference NEI 99-02, Revision 7, Regulatory Assessment Performance Indicator Guideline, Section 2.2, Mitigating Systems Cornerstone, Safety System Functional Failures, Clarifying Notes, Engineering analyses.) As such, this event will not be reported in the NRC Performance Indicator (PI) for safety system functional failures since an engineering analysis was performed which determined that the system was capable of performing its safety function during this event when both doors of the secondary containment interlock were momentarily simultaneously opened.

Risk Insights

The plant Probabilistic Risk Assessment (PRA) model gives no credit to the secondary containment and does not include it in the model, hence the as-found conditions did not contribute to an increase in risk. In addition, the physical integrity of the secondary containment structure was never compromised and the primary containment function was never lost.

Although secondary containment was momentarily inoperable per TS 3.6.4.1, Condition A, when the interlock doors were opened simultaneously due to a malfunctioning door, there was no DBA condition in progress, and secondary containment function was restored immediately when one of the doors was closed. RB differential pressure was maintained during the event.

In conclusion, the overall safety significance and impact on risk of this event were minimal.

E. CORRECTIVE ACTIONS

Immediate:

1. Operations staged a laborer to administratively control the interlock until repairs were performed.
2. Repaired the bent locking bolt on the TB-side passive door and realigned the TB-side doors to ensure the plungers would be functional.

Follow-up:

1. Replace the locking bolt with a higher strength assembly.

F. PREVIOUS OCCURRENCES

The station events database, LERs, and INPO Consolidated Event System ICES were reviewed for similar events at Quad Cities Nuclear Power Station. This event was a failure of a secondary containment interlock door caused by a bent locking bolt which allowed two interlock doors to be opened simultaneously. Based on the conditions of this event, causes, and associated corrective actions, the events listed below, although similar in topic, are not considered significant station experiences that would have directly contributed to preventing this event.

- LER 254/2012-004-00, 11/05/12, Breach in Secondary Containment (09/06/12) - Two doors in the Unit 2 RFP interlock had been opened simultaneously. The HRSS-side door opened unexpectedly while the RB-side door was open due to a malfunctioning door latch. The HRSS door was immediately shut. The apparent cause was the HRSS-side door latching mechanism was not fully engaged while coupled with its crash bar that may have

**LICENSEE EVENT REPORT
(LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Quad Cities Nuclear Power Station Unit 1	05000254	YEAR	SEQUENTIAL NUMBER	REV NO.	5 OF 5		
		2015	- 002	- 00			

NARRATIVE

been bumped. Since the HRSS door has a different style of latch than the interlock doors of the current LER, this previous event is not directly applicable to this current LER.

- LER 254/2014-002-00, 06/02/14, Reactor Building Interlock Doors Opened Simultaneously Cause Loss of Secondary Containment (04/1/14) - Both doors in the secondary containment interlock on the 595 foot elevation from the Unit 2 Reactor Feed Pump room to the Reactor Building were opened simultaneously. The cause of the interlock failure was due to a malfunctioning interlock door hydraulic actuator and time delay relays had allowed the second door to open before the first door was secured. Corrective actions included replacing the failed actuator, adjusting the limit switch, and a set point change to resolve relay time delay issues. Since the design of the interlock is different from the HPCI interlock, the previous interlock failure event is not directly applicable to the event of this current LER.
- LER 254/2014-003-00, 07/17/14, HPCI Interlock Doors Opened Simultaneously Cause Loss of Secondary Containment (05/22/14) - Both Unit 1 HPCI Secondary Containment interlock doors were found open at the same time. The apparent cause of the interlock failure was due to a bent locking bolt resulting in misalignment of the interlock plungers on the TB-side door. The mechanical interlock device could be defeated inadvertently in this condition. Corrective actions included replacing the bent locking bolt and realigning the TB-side doors. This is the same failure mechanism as identified in this current LER. However, prior to the event of 05/22/14 there had been no failures of the HPCI interlock doors that were attributed to a bent locking bolt for the past 21 years. With the limited information that was available at the time, replacing the bent locking bolt was deemed adequate. Due to lack of past failures of this locking bolt, it was not expected at the time that the strength of the replacement bolt installed would not be sufficient and failure would occur only 9 months later, hence this previous event is not directly applicable to this current LER.

G. COMPONENT FAILURE DATA

Failed Equipment: Surface Bolt
 Component Manufacturer: Architectural Builders Hardware Mfg., Inc.
 Component Model Number: N1805L
 Component Part Number: N/A

This event has been reported to ICES as Failure Report No. 315199.