

Exelon Generation Company, LLC
Dresden Nuclear Power Station
6500 North Dresden Road
Morris, IL 60450-9765

www.exeloncorp.com

Nuclear

10 CFR 50.73

SVPLTR # 07-0042

September 24, 2007

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Dresden Nuclear Power Station, Unit 2
Renewed Facility Operating License No. DPR-19
NRC Docket No. 50-237

Subject: Licensee Event Report 237/2007-003-00, "Unit 2 High Pressure Coolant Injection System Declared Inoperable"

Enclosed is Licensee Event Report 237/2007-003-00, "Unit 2 High Pressure Coolant Injection System Declared Inoperable," for Dresden Nuclear Power Station, Unit 2. This event is being reported in accordance with 10 CFR 50.73(a)(2)(v)(D), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident."

Should you have any questions concerning this report, please contact Mr. James Ellis, Regulatory Assurance Manager, at (815) 416-2800.

Respectfully,



Danny G. Bost
Site Vice President
Dresden Nuclear Power Station

Enclosure

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

IE22

NRR

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.

1. FACILITY NAME

Dresden Nuclear Power Station, Unit 2

2. DOCKET NUMBER

05000237

3. PAGE

1 OF 4

4. TITLE

Unit 2 High Pressure Coolant Injection System Declared 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	DOCKET NUMBER
07	26	2007	2007	- 003 -	00	09	24	2007	N/A	N/A
									N/A	N/A

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)(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)(iii)(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) |
| <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"/> OTHER |
| <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)(v)(D) | Specify in Abstract below
or in NRC Form 366A |

10. POWER LEVEL

098

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

Dresden Nuclear Power Station – George Papanic Jr.

TELEPHONE NUMBER (Include Area Code)

(815) 416-2815

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
NA					NA				

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)☒ NO15. EXPECTED
SUBMISSION
DATE

MONTH	DAY	YEAR

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

On July 26, 2007, at 1706 hours (CDT), with Unit 2 at approximately 98 percent power, Dresden Nuclear Power Station control room personnel were notified of a very small through-wall leak on a Unit 2 High Pressure Coolant Injection System Inlet Drain Pot line elbow. To repair the leaking location, the associated piping was required to be isolated which resulted in the isolation of the Unit 2 High Pressure Coolant Injection System. The Unit 2 High Pressure Coolant Injection System was declared inoperable and Technical Specification 3.5.1, "ECCS Operating," was entered. The elbow was replaced and the Unit 2 High Pressure Coolant Injection System was declared operable on July 27, 2007, at 1809 hours (CDT).

The apparent cause of the through wall leak was liquid impingement erosion of the exterior curve of the 90 degree elbow. Corrective actions include the performance of non-destructive testing inspections of piping components in the Unit 2 and 3 High Pressure Coolant Injection System Inlet Drain Pot drain lines, and evaluation of modifying the material or design of the line to reduce the susceptibility to liquid impingement erosion.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISIO N NUMBE	
Dresden Nuclear Power Station Unit 2	05000237	2007	-- 003 --	00	2 OF 4

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

Dresden Nuclear Power Station (DNPS) Unit 2 is a General Electric Company Boiling Water Reactor with a licensed maximum power level of 2957 megawatts thermal. The Energy Industry Identification System codes used in the text are identified as [XX].

A. Plant Conditions Prior to Event:

Unit: 02 Event Date: 7-26-2007
Reactor Mode: 1 Mode Name: Power Operation Power Level: 98 percent
Reactor Coolant System Pressure: 1000 psig

B. Description of Event:

On July 26, 2007, at 1706 hours (CDT), with Unit 2 at approximately 98 percent power, DNPS control room personnel were notified of a very small through-wall leak on the Unit 2 High Pressure Coolant Injection System (HPCI) [BG] Inlet Drain Pot drain [DRN] line 2-2323-1, 90-degree elbow upstream of valve 2-2301-29. This line is the drain from the Unit 2 HPCI Drain Pot to the main condenser. To repair the leaking location, the piping was isolated which resulted in the isolation of the Unit 2 HPCI. The Unit 2 HPCI was declared inoperable and Technical Specification (TS) 3.5.1, "ECCS Operating," was entered. The elbow was replaced.

An ENS call was made on July 26, 2007, at 2011 hours (CDT) for the above-described event. The assigned ENS event number was 43526.

The Unit 2 HPCI was declared operable on July 27, 2007, at 1809 hours (CDT).

This event is being reported in accordance with 10 CFR 50.73(a)(2)(v)(D), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident." HPCI is a single train system and is credited in mitigating the consequences of an accident.

C. Cause of Event:

The apparent cause of the through-wall leak was liquid impingement erosion of the exterior curve of the 90-degree elbow. DNPS had replaced this elbow during a HPCI line upgrade in 1997 with A335 P11 Chrome Moly alloy steel to reduce the lines susceptibility to flow accelerated corrosion (FAC). Although chromium alloy steels are immune to FAC, they are still susceptible to wall loss from mechanical thinning mechanisms such as cavitation, liquid impingement, flashing, and solid particle erosion.

The leaking 90-degree elbow was sent to a vendor for analysis. The vendor verified the elbow's chemistry was consistent with A335 P11 Chrome Moly alloy steel. The vendor's evaluation concluded that the elbow leak was the result of internal liquid impingement erosion thinning. Liquid impingement erosion is caused by the impacts of high-velocity water droplets on the component's inner surface. The through wall leak occurred toward the downstream side of the elbow, where the

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISIO N NUMBE	
Dresden Nuclear Power Station Unit 2	05000237	2007	-- 003 --	00	3 OF 4

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

droplet impact angle was the highest. This HPCI line carries a steam/condensate mixture from the approximately 400°F/1000 psig conditions in the drain pot to the vacuum conditions in the condenser. Due to the pressure drop, the two-phase mixture accelerates as the condenser is approached. Liquid impingement erosion occurs when the impacts from the high velocity water droplets are high enough to damage the pipe surface. Velocity and impact angle are two factors that can affect the erosion.

DNPS has scheduled non-destructive testing inspections on the piping components in the Unit 2 and 3 HPCI Drain Pot drain lines that have the highest susceptibility to impingement erosion (i.e., elbows, valves, orifices and piping immediately downstream of these components). DNPS will upgrade the A335 P11 Chrome Moly alloy steel elbow to Inconel material and modify the design of the line to reduce susceptibility to liquid impingement erosion or initiate preventive maintenance monitoring. Additionally, DNPS will evaluate other high-pressure safety piping which is not included in the FAC Program for susceptible areas for impingement erosion.

D. Safety Analysis:

The safety significance of the event is minimal. TS 3.5.1 allows Unit 2 to remain at power for 14 days with an inoperable HPCI if the Isolation Condenser System (IC) is operable. Unit 2 was in compliance with TS 3.5.1 during this event as the IC was operable and HPCI was inoperable for approximately 1 day. Therefore, the consequences of this event had minimal impact on the health and safety of the public and reactor safety.

E. Corrective Actions:

Unit 2 HPCI Inlet Drain Pot drain line elbow with the leak was replaced.

Non-destructive testing inspections will be performed on the piping components in the Unit 2 and 3 HPCI Drain Pot drain lines that have the highest susceptibility to impingement erosion.

DNPS will upgrade the A335 P11 Chrome Moly alloy steel elbow to Inconel material and modify the design of the line to reduce susceptibility to liquid impingement erosion or initiate preventive maintenance monitoring.

DNPS will evaluate other high-pressure safety piping which is not included in the FAC Program for susceptible areas for impingement erosion.

F. Previous Occurrences:

A review of DNPS Licensee Event Reports (LERs) for the last three years did not identified any LERs addressing piping leaks caused by liquid impingement erosion.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISIO N NUMBE		
		2007	-- 003	-- 00		
Dresden Nuclear Power Station Unit 2	05000237	2007	-- 003	-- 00	4	OF 4

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

G. Component Failure Data:

NA