Exelon Generation®

Dresden Nuclear Power Station
6500 North Dresden Road
Morris, IL 60450

SVPLTR # 17-0048

10 CFR 50.73

December 27, 2017

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

Dresden Nuclear Power Station, Unit 3
Renewed Facility Operating License Nos. DPR-25
NRC Docket No. 50-249

Subject: Licensee Event Report 249/2017-001-01, Unit 3 Standby Liquid Control System Inoperable Due to a Manufacturing Defect Causing a Piping Leak

Enclosed is Licensee Event Report 249/2017-001-01, "Unit 3 Standby Liquid Control System Inoperable Due to a Manufacturing Defect Causing a Piping Leak." This report describes events which are being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications." This is a supplement to Revision 0 of LER 249/2017-001.

There are no regulatory commitments contained in this submittal.

Should you have any questions concerning this letter, please contact Mr. Bruce Franzen at (815) 416-2800.

Respectfully,

J. Wesko for P. Karaba

Peter J Karaba
Site Vice President
Dresden Nuclear Power Station

Enclosure Licensee Event Report 249/2017-001-01

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

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NRR

NRC FORM 366 (04-2017) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

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/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Dresden Nuclear Power Station, Unit 3	05000249	1 OF 4

4. TITLE

Unit 3 Standby Liquid Control System Inoperable Due to a Manufacturing Defect Causing a Piping Leak

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
									N/A	N/A
09	12	2017	2017	- 001	- 01	12	27	2017	FACILITY NAME N/A	DOCKET NUMBER N/A

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
100	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
Bruce Franzen, Regulatory Assurance Manager	815-416-2800

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	BR	PSF	Ladish Co	Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

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

On September 12, 2017 at 1131 hours (CDT), at Dresden Nuclear Power Station (DNPS), both Unit 3 Standby Liquid Control system subsystems were declared inoperable when control room personnel were notified of a through wall leak on the common discharge piping. Technical Specification (TS) 3.1.7, "Standby Liquid Control System," Condition B was entered. The pipe repair schedule projected that the work could not be completed within the allowed Completion Time of TS 3.1.7 and DNPS requested a Notice of Enforcement Discretion (NOED) to allow Unit 3 to remain at power during the repair. The NRC granted the NOED on September 12, 2017, at 1746 hours. The system was restored to operable status by replacing the piping on September 12, 2017, at 2035 hours within the time allowed by the NOED. This event is reportable under 10 CFR 50.73(a)(2)(i)(B), as a condition prohibited by TS. The cause of the event was a manufacturing defect. Corrective actions include replacing the failed piping (completed) and performing extent of condition pipe inspections.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Dresden Nuclear Power Station, Unit 3	05000249	17	- 001	- 01

NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

Dresden Nuclear Power Station (DNPS), Unit 3, 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: 03 Event Date: 09/12/17 Event Time: 1131 CDT
Reactor Mode: 1 Mode Name: Power Operation Power Level: 100 percent

B. Description of Event:

On September 10, 2017, during Equipment Operator (EO) rounds, the EO found crystalized boron on Dresden, Unit 3 Standby Liquid Control System (SLC) [BR] discharge piping [PSF]. There was no active leak at the time of discovery and the source of the boron crystals was unknown. Work activities began to determine the source of the boron deposits.

On September 12, 2017, the Division 1 SLC pump [P] was started to pressurize the system to the normal In-Service Testing test pressure as directed by station procedures. With the system pressurized, a leak of approximately one drop per minute was identified on the common discharge line of the SLC pumps. The leak was characterized as a through wall leak from an American Society of Mechanical Engineers (ASME), Class 2 pressure boundary of the SLC system. This leak was treated as a structural integrity issue; therefore, the affected piping was isolated in accordance with station procedures. Isolating the failed piping resulted in both divisions of SLC being declared Inoperable. This action led to entering Technical Specification (TS) Limiting Condition for Operation (LCO) 3.1.7, "Standby Liquid Control (SLC) System," Condition B, "Two SLC subsystems inoperable," and Required Action B.1, "Restore one SLC subsystem to OPERABLE status," with a Completion Time of eight hours.

DNPS requested a Notice of Enforcement Discretion (NOED) to exceed the TS 8 hours Completion Time to complete the pipe repair and replace the pipe. The NRC verbally granted the NOED on September 12, 2017 at 1746 hours. At 2035 hours, the failed piping was replaced in accordance with station work instructions, thereby restoring the Unit 3 SLC system to Operable status within the time allowed by the NOED.

The piping through-wall flaw did not meet ASME Code structural integrity requirements. Therefore, Dresden determined that since there was boron buildup identified on September 10 and later confirmed leakage on September 12, the system was inoperable for longer than allowed by TS and is reportable under 10 CFR 50.73(a)(2)(i)(B) for a condition prohibited by TS.

NARRATIVE

Subsequently, the pipe flaw was analyzed and an evaluation concluded that the leak flaw met the ASME Code, Section XI structural margin, considering Service Level D structural factor in the evaluation, as required by the NRC Inspection Manual. Even though the flaw was through-wall, which exceeded the ASME Code, Section XI allowable flaw depth of 75% of wall thickness, the safety function of the component was not compromised when the leak was identified. Based on meeting structural integrity criteria this condition is not reportable under 10 CFR 50.73(a)(2)(v)(A) and 10 CFR 50.73(a)(2)(v)(D) for an event or condition that could have prevented the fulfillment of a safety function.

C. Cause of Event:

The determined root cause is a manufacturing defect which evolved into a through wall leak.

Metallurgical evaluations show that the leak area coincided with a cluster of large, closely spaced inclusions from the manufacturing process. The through wall leakage occurred when the closely spaced inclusions connected due to service induced stresses to form a through wall leak path. There was no evidence that corrosion or stress corrosion cracking contributed to defect growth in the evaluated sample. Based on the qualitative chemistry evaluations of the inclusions, the defects were characterized as oxide inclusions with elevated levels of silicon, manganese and aluminum in comparison to the base metal composition.

D. Safety Analysis:

The SLC System is designed to provide the capability of bringing the reactor, at any time in a fuel cycle, from full power and minimum control rod inventory, which is at the peak of the xenon transient, to a subcritical condition with the reactor in the most reactive, xenon free state without taking credit for control rod movement. The SLC System is also used to maintain suppression pool pH at or above 7 following a Loss of Coolant Accident (LOCA) involving significant fission product releases. Maintaining suppression pool pH levels at or above 7 following an accident ensures that iodine will be retained in the suppression pool water.

The SLC System consists of a boron solution storage tank, two positive displacement pumps, two explosive valves that are provided in parallel for redundancy, and associated piping and valves used to transfer borated water from the storage tank to the reactor pressure vessel. The borated solution is discharged near the bottom of the core shroud, where it then mixes with the cooling water rising through the core.

NARRATIVE

An engineering evaluation was performed on the pipe flaw. The evaluation determined that the safety function of the component was not compromised when the leak was identified. The pipe flaw would not have grown beyond the allowable flaw size during SLC System operation. The required flow rate for SLC System to inject into the Reactor Pressure Vessel is 40 gallons per minute minimum. The leakage through the flaw is relatively small (i.e., approximately 1 drop per minute) and would not jeopardize the SLC system from performing its safety function. Therefore, the leaking component had adequate structural margin when the leak was identified and the resulting leakage would not have prevented the SLC system from performing its intended safety function.

Since the SLC subsystems were available to perform their safety functions, the overall safety significance of this event was minimal. Normal means of reactivity control were maintained during this event.

The engineering analysis demonstrates this event did not constitute a Safety System Functional Failure (SSFF) (Reference NEI 99-02, 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 SSFF since an engineering analysis was performed which determined that the system could perform its safety function during this event.

E. Corrective Actions:

The failed piping was replaced in accordance with station procedures and work instructions on September 12, 2017. Additionally, corrective actions include performing extent of condition piping inspections with piping insulation removed.

F. Previous Occurrences:

A search of similar events from the past 15 years was performed. One event was identified:

On January 18, 2007, Dresden, Unit 2 identified a through wall linear crack at the SLC Tank temperature switch well. However, the degradation mechanism (i.e., transgranular stress corrosion cracking) is not the same as this event (i.e., latent forging defect).

G. Component Failure Data:

The piping with the leak was a 1-1/2 inch pipe tee, ASME A/SA-182-Grade stainless steel. The pipe was in service for over 50 years.