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AUG 0 3 2016

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

SUSQUEHANNA STEAM ELECTRIC STATION LICENSEE EVENT REPORT 50-387/2016-020-00 UNIT 1 LICENSE NO. NPF-14 PLA-7508 10 CFR 50.73

Docket No. 50-387

Attached is Licensee Event Report (LER) 50-387/2016-020-00. This LER reports a degraded condition concerning a leak in the Reactor Coolant Pressure Boundary. This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(ii)(A) as a condition prohibited by Technical Specifications and as degradation of a principal safety barrier.

There were no actual consequences to the health and safety of the public as a result of this event.

This letter contains no new regulatory commitments.

Transen For J.A. Franke

J. A. Franke

Attachment: LER 50-387/2016-020-00

Copy: NRC Region I Mr. J. E. Greives, NRC Sr. Resident Inspector Ms. T. E. Hood, NRC Project Manager Mr. M. Shields, PA DEP/BRP

NRC FORM 366 U.S. NUCLEAR REGULATORY COM						MMISSIC	DN	APF	PROVE	D BY OMB: NO	. 3150-0104		EXPIF	RES: 10/31/2018		
(11-2015) 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 response to, the information collection.								
1. FACILITY NAME								2. DOCKET NUMBER 3. PAGE								
Susquehanna Steam Electric Station Unit 1								05000387				1	of 3			
4. TITLE Reactor Coolant Pressure Boundary Leakage at LPRM Housing as a result of IGSCC																
5. E	VENT	DATE	6. LER NUMBER			7	7. REPORT DA		TE	E 8. OTHER FACILITIES INVOLVED)			
MONTH	DAY	YEAR	YEAR	SEQUEN NUMB	ITIAL RE ER NO	MONTH	DAY	YE	AR	FACILITY NAME DOCKET NUME 05000				(ET NUMBER 00		
06	08	2016	2016	- 020) - 00	08	03	20	16	FACILITY NAME DOCKET NUMBER 05000					ET NUMBER	
9. OPE	9. OPERATING MODE 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)															
			20.22	201(b)		20	20.2203(a)(3)(i)			🛛 50.73(a)(2)	□ 50.	☐ 50.73(a)(2)(viii)(A)				
	4		20.22	20	20.2203(a)(3)(ii)				50.73(a)(2)	☐ 50.73(a)(2)(viii)(B)						
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			20.22	50	50.36(c)(1)(i)(A)				50.73(a)(2)	50.1	□ 50.73(a)(2)(x)					
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			20.22	□ 50.	☐ 50.46(a)(3)(ii)				🗌 50.73(a)(2)	□ 73.77(a)(1)						
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						□ 50.	50.73(a)(2)(i)(C)				OTHER Specify in Abstract below or in NRC Form 366A				366A	
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LICENSEE C	CENSEE CONTACT									TELEPHONE NUMER (Include Area Code)						
M. Kri	ck, S	enior Eng	lineer - N	Vuclear	Regulat	ory Affaii	S		(570) 542-1818							
			13.0	COMPLE	TE ONE LIN	EFOREAC	HCOMP		TFA	LURE	DESCRIBED IN	THIS REPORT	T	- 1		
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14. SUPPLEMENTAL REPORT EXPECTED										15. EXPECTED M			DAY	YEAR		
YES (If yes, complete 15. EXPECTED SUBMISSION DATE)							NC)	SUB	MISSION ATE						
ABSTRACT (I imit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)																

On June 8, 2016 at approximately 02:26, while performing under vessel inspections, a Reactor Coolant Pressure Boundary (RCPB) leak was found at the Local Power Range Monitor (LPRM) 24-09 housing above the housing flange, on the LPRM housing tube. The leakage was determined to be non-isolable from the reactor vessel.

The cause of the RCPB leakage was determined to be Intergranular Stress Corrosion Cracking (IGSCC). Corrective actions to repair the leak have been completed. In addition, a visual inspection was performed on all the Unit 1 LPRM, Intermediate Range Monitor (IRM), and Source Range Monitor (SRM) In-core monitor housings and no further issues were identified.

There was no operational impact as a result of this event due to the plant being in Mode 4 at the time of discovery. This event resulted in an eight (8) hour Emergency Notification System (ENS) communication pursuant to 10 CFR 50.72(b)(3)(ii)(A). This Licensee Event Report (LER) is being communicated pursuant to 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(ii)(A) as a condition prohibited by Technical Specifications and as degradation of a principal safety barrier.

NRC FORM 366A	U.S. NUCLEAR REGULATORY COMM	ISSION	APPROVED BY OMB: NO. 3150-0104 EXPIRES:					
(11-2015)	LICENSEE EVENT REPORT (L 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 NUMBER	3. LER NUMBER				
Susquebanna Steam Electric Station Init 1			0500007	YEAR	SEQUENTIAL NUMBER	REV NO.		
Susquenanna Steam Electric Station, Onit T		05000387		2016	- 020	- 00		
	ONS PRIOR TO EVENT							

Unit 1 - Mode 4, 0 percent Rated Thermal Power

Unit 2- Mode 1, 100 percent Rated Thermal Power

There were no systems, structures or components that were inoperable at the start of the event that contributed to the event.

EVENT DESCRIPTION

On June 8, 2016 at approximately 02:26, while performing under vessel inspections during a plant maintenance outage, a Reactor Coolant Pressure Boundary (RCPB) leak was found at the Local Power Range Monitor (LPRM) 24-09 housing [EIIS Code: PEN] above the housing flange, on the LPRM stub housing. The leakage was determined to be about 2 drops per minute (DPM) with the reactor [EIIS Code: RPV] de-pressurized and non-isolable from the reactor vessel. Further investigation, including Non-Destructive Examination (NDE) was performed. The through-wall crack was characterized as tight, linear and approximately 1" in length, running parallel with the adjacent weld. The location of the crack was about 0.25 inches from the LPRM housing to flange weld in the heat affected zone (HAZ). This location is also considered not fully mitigated by Hydrogen Water Chemistry (HWC) due to configuration allowing the presence of stagnant water.

Although formal laboratory analysis could not be performed on the crack, the cause of the RCPB leakage was determined to be Intergranular Stress Corrosion Cracking (IGSCC). The LPRM housing is fabricated of SA182- 304 Stainless Steel, which is susceptible to IGSCC. Additionally, this location is subject to reactor pressures, resulting in tensile stresses on the LPRM housing.

There was no operational impact as a result of this event due to the plant being in Mode 4 at the time of discovery. This event resulted in an eight (8) hour Emergency Notification System (ENS) communication pursuant to 10 CFR 50.72(b)(3)(ii)(A). This Licensee Event Report (LER) is being communicated pursuant to 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(ii)(A) as a condition prohibited by Technical Specifications and as degradation of a principal safety barrier.

CAUSE OF EVENT

The cause of the RCPB leakage was the determined to be Intergranular Stress Corrosion Cracking (IGSCC).

					Page	3 of 3		
NRC FORM 366A	U.S. NUCLEAR REGULATORY COMMIS	SSION	APPROVED BY OMB: NO. 3150-01	EXPIRES: 1	EXPIRES: 10/31/2018			
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Susquehanna Steam Electric Station, Unit 1			0500007	YEAR	SEQUENTIAL NUMBER	REV NO.		
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NARRATIVE

ANALYSIS/SAFETY SIGNIFICANCE

Technical Specification Limiting Condition for Operation (LCO) 3.4.4, RCS Operational Leakage, requires no pressure boundary leakage and less than or equal to 5 gallons per minute (GPM) unidentified leakage when operating in Modes 1, 2 and 3. At the time of discovery, Unit 1 was in Mode 4.

The 5 GPM Technical Specification limit for unidentified leakage is a small fraction of the calculated flow from a critical crack in the primary system piping. Crack behavior from experimental programs show that leakage rates of hundreds of gallon per minute will precede crack instability. As such, the Technical Specification limit allows time for corrective action to be taken before the RCPB could be significantly compromised. The RCPB leak identified during this event was about 2 drops per minute (DPM) with the reactor in depressurized conditions. It is estimated that during rated plant operations, the leakage would have been about 68 DPM or about 0.0009 GPM. Using the crack length identified by Ultrasonic Testing, the point at which the crack became through-wall is estimated to have occurred about 10 months prior to discovery. Based on the information above, including the size of the crack, and the estimated maximum leakage rate, this leak was a small contributor to the actual drywell unidentified leakage of about 0.53 GPM prior to plant shutdown and resulted in no actual consequence to public health or safety.

CORRECTIVE ACTIONS

The corrective action to address this event was to repair the through wall leak on the LPRM 24-09 housing using an ASME Section XI weld repair. In addition, a visual inspection was performed on all the Unit 1 LPRM, IRM, and SRM In-core monitor housings and no further issues were identified. Lastly, an extent of condition review will be performed through visual inspections of the Unit 2 LPRM, IRM and SRM in-core housings during the next refueling outage.

No other corrective actions are required for this event.

COMPONENT FAILURE INFORMATION:

Vendor Component: General Electric In-core Housing Material: SA182-304

PREVIOUS SIMILAR EVENTS

LER 50-388/ 2015-004-00, PLA-7337, "Degraded Condition Due to Reactor Coolant Pressure Boundary Leakage Caused by Vibration and Stiff Pipe Connection." June 10, 2015.

LER 50-387/ 2015-009-00, PLA-7419, "Pressure Boundary Leakage from an Inadequate Weld Repair in Small Bore Pump Seal Vent Piping." January 11, 2016.

LER 50-387/2014-011-00, PLA-7286, "Degraded Condition Due to Reactor Coolant Pressure Boundary Leakage Caused by an Inadequate Weld." February 11, 2015.