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TALEN ENERGY

AUG 0 5 2016

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

10 CFR 50.73

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 50-387/2015-013-01
UNIT 1 LICENSE NO. NPF-14 **Docket No. 50-387**
PLA-7512

Attached is Licensee Event Report (LER) 50-387/2015-013-01. This LER reports an event involving Secondary Containment being declared inoperable due to loss of differential pressure. This event was determined to be reportable in accordance with 10 CFR 50.73(a)(2)(v)(C) as a condition which could have prevented fulfilment of a safety function.

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.

Robert A. Ransom for J. A. Franke

J. A. Franke

Attachment: LER 50-387/2015-013-01

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 (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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.

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Susquehanna Steam Electric Station Unit 1	05000387	1 of 4

4. TITLE

Loss of Differential Pressure in Zone I of Secondary Containment Due to Solenoid Valve Failure

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
12	06	2015	2015	- 013	- 01	08	05	2016	FACILITY NAME	DOCKET NUMBER

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)
	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
10. POWER LEVEL	☐ 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 NUMER *(Include Area Code)*
Brittany Sprung, Nuclear Regulatory Affairs Engineer	(570) 542-3407

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
X	VA	SOL	A499	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 December 6, 2015 at 0546 hours, operations personnel received alarms in the control room indicating the loss of Zone 1 differential pressure (dP). The dP fell below the Technical Specification required limit of 0.25 inches water column (in. w.c.) when the running Reactor Building Zone 1 Exhaust Fan tripped. This required entry into Condition A of TS 3.6.4.1 for failure to meet SR 3.6.4.1.1 on Unit 1. After restoring dP at 0553 hours, Condition A of TS 3.6.4.1 was exited.

This event was reported to the NRC on December 6, 2015 at 0958 hours in accordance with 10 CFR 50.72(b)(3)(v)(c) under Emergency Notification (EN) 51588. This Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73(a)(2)(v)(C).

The direct cause of the event was determined to be failure of a solenoid valve in the Zone I exhaust fan subsystem. The apparent cause was determined to be vendor parts quality. Completed corrective actions include replacement of the failed solenoid, component and system monitoring for degradation contributors, failure analysis of the failed component by an independent testing laboratory, review of vendor technical information, and identification of a suitable replacement for this model solenoid. Planned corrective actions include replacing similar solenoids in the Reactor Building HVAC system in an expedited manner.

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

NRC FORM 366A (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Susquehanna Steam Electric Station, Unit 1	05000387	2015	- 013	- 01

NARRATIVE

CONDITIONS PRIOR TO EVENT

Unit 1 – Mode 1, 100 percent Rated Thermal Power

Unit 2 – Mode 1, 100 percent Rated Thermal Power

On December 6, 2015 at 0107 hrs, the control room received an alarm which indicated possible icing of the inlet air dampers (DMP). Shortly after the Zone I supply fans (FAN) tripped on low flow, which tripped the Zone I filtered and non-filtered exhaust fans (FAN). At 0350, operations entered Condition A of LCO 3.6.4.1 for failure to meet SR 3.6.4.1.1 on Unit 1. After removing ice accumulated on the inlet air dampers, dP was restored. LCO 3.6.4.1 was cleared at 0434 hrs. This event immediately preceded the event subject of this LER and was reported to the NRC on February 2, 2016, under LER-2015-012-00.

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

EVENT DESCRIPTION

On December 6, 2015 at 0546 hours, LCO 3.6.4.1 was entered after operations personnel received alarms in the control room indicating the loss of Zone 1 differential pressure (dP). Operations personnel in the field reported the Zone 1 Division 1 Filtered Exhaust Fan (1V206A)(FAN) had failed and the other division fan (1V206B) had auto-started. 1V206B was able to maintain differential pressure in Zone I and at 0745 on December 6, 2015, operations exited LCO 3.6.4.1.

This event was reported to the NRC on December 6, 2015 at 0958 hours in accordance with 10 CFR 50.72(b)(3)(v)(c) under Emergency Notification (EN) 51588. This Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73(a)(2)(v)(c).

CAUSE OF EVENT

Further investigation revealed the solenoid valve responsible for providing air to the 1V206A fan logic had failed. As a result, the fan was unable to exhaust enough air from Zone I which led to the degradation of Zone I dP. The direct cause of the event was determined to be solenoid valve failure.

The failed solenoid was sent to an independent testing laboratory for failure analysis. Possible causes of the solenoid valve failure as determined by an internal technical evaluation in addition to the laboratory analysis included contamination or debris within the device, poor surface finish on the core / core tube surface, low voltage supply, a damaged or broken spring, and excessive system pressure.

A systematic investigation was conducted to determine which of the possible causes most likely occurred in this failure. The instrument Air lines from the damper actuator to the solenoid valve were blown out and no debris was observed in the line; contamination or debris within the device was ruled out as a contributor.

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NARRATIVE

Supply voltage to the solenoid was monitored. The solenoid is designed to accept a constant 120VAC and the coil voltage measured in the field was 119VAC. Supply air pressure to the valve was expected to be 20 psig; the measured pressure was 19.3 psig with infrequent peturbations of 1 to 2 psig.

Upon internal examination of the valve, the core spring was intact and not damaged, but was pinched in the core as a result of the core being mushroomed.

Based on the completed troubleshooting plan, engineering was able to refute all but one of the possible causes from Exelon PowerLabs Report. Poor surface area finish on the plug can cause the plug to chatter on the top of the core tube, and cause damage similar to what was observed on the failed solenoid valves.

ANALYSIS/SAFETY SIGNIFICANCE

Actual consequences included a brief entry into LCO 3.6.4.1 and an eight hour notification of the event to the Nuclear Regulatory Commission (NRC).

Losses of Reactor Building dP are considered indicative of a loss of the Secondary Containment boundary until investigation proves otherwise. Therefore, a potential outcome was the actual loss of the Secondary Containment boundary, an event which could have prevented a safety function intended to control the release of radioactive material.

An engineering evaluation was performed and concluded that secondary containment could have performed its safety function of isolating and remaining leak tight as assumed in the accident analysis. Therefore, this event did not result in a loss of safety function. This event will not be counted as a safety system functional failure (SSFF) for the NRC performance indicator based on the engineering analysis that shows there was no loss of ability to fulfill the safety function.

CORRECTIVE ACTIONS

Completed corrective actions include replacement of the failed solenoid, component and system monitoring for degradation contributors, failure analysis of the failed component by an independent testing laboratory, review of vendor technical information, and identification of a suitable replacement for this model solenoid. Planned corrective actions include replacing similar solenoids in the Reactor Building HVAC system in an expedited manner.

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NARRATIVE

COMPONENT INFORMATION

The failed solenoid is internally referenced as SV17521A, Reactor Building Zone I Equipment Compartment Exhaust Solenoid (SOL). The device properties are listed in the table below.

Property	Value
Manufacturer Name	ASCO Valve Co.
Model No.	8320G003
Ports	3
Operating Voltage	120 VAC
Max Fluid dP	30 psid
Max Fluid Temp	180 F
Procured on	06/19/2014
Installed on	10/14/2015

PREVIOUS SIMILAR EVENTS

The following are recent LERs involving a loss of secondary containment dP due to solenoid valve failures:

- 2015-002-00, Loss of Secondary Containment due to failure of running fans (PLA-7329)
- 2015-013-00, Loss of Secondary Containment due to Solenoid Valve Failure (PLA-7437)
- 2016-012-00, Secondary Containment declared inoperable due to loss of differential pressure as a result of a solenoid failure (PLA-7478)