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March 30, 2022

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

10 CFR 50.73

**SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 50-387/2021-005-01  
UNIT 1 LICENSE NO. NPF-14  
PLA-7992**

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**Docket No. 50-387**

Attached is Licensee Event Report (LER) 50-387/2021-005-01. The LER supplement reports an event involving an automatic scram due to a Reactor Protection System actuation as a result of Turbine Valve fast closure and subsequent Electro-hydraulic Control Fluid pressure perturbation. The condition is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in automatic actuation of a system listed in 10 CFR 50.73(a)(2)(iv)(B).

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

This letter contains no new or revised regulatory commitments.

A handwritten signature in black ink, appearing to read "K. Cimorelli".

K. Cimorelli

Attachment: LER 50-387/2021-005-01

Copy: NRC Region I  
Mr. C. Highley, NRC Senior Resident Inspector  
Ms. A. Klett, NRC Project Manager  
Mr. M. Shields, PA DEP/BRP



**LICENSEE EVENT REPORT (LER)**  
(See Page 3 for required number of digits/characters for each block)  
(See NUREG-1022, R.3 for instruction and guidance for completing this form <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

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, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk all: [oir\\_submission@omb.eop.gov](mailto:oir_submission@omb.eop.gov). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

<b>1. Facility Name</b> Susquehanna Steam Electric Station, Unit 1	<b>2. Docket Number</b> 05000387	<b>3. Page</b> 1 of 3
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**4. Title**  
Automatic Reactor Scram due to Turbine Control Valve Fast Closure

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
11	30	2021	2021	- 005 -	01	03	30	2022	Facility Name	05000
									Facility Name	05000

**9. Operating Mode** 1      **10. Power Level** 080

**11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)**

<input type="checkbox"/> 10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<b>10 CFR Part 73</b>
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	<b>10 CFR Part 21</b>	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<b>10 CFR Part 50</b>	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<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)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	

Other (Specify here, in Abstract, or in NRC 366A).

**12. Licensee Contact for this LER**

<b>Licensee Contact</b> Peggy Kramer, Regulatory Affairs Engineer	<b>Phone Number (Include Area Code)</b> (570) 542-3131
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**13. Complete One Line for each Component Failure Described in this Report**

Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
B	TA	FCV	P070	Y					

**14. Supplemental Report Expected**      **15. Expected Submission Date**

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)	Month	Day	Year
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**16. Abstract** (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

At approximately 12:54 on November 30, 2021, Susquehanna Steam Electric Station, Unit 1, experienced an automatic reactor scram during Turbine Valve Cycling surveillance testing. During the fast closure portion of the surveillance test on Main Stop Valve 4 (MSV-4), a closure of Turbine Control Valve 4 (CV-4) occurred, resulting in a Division II Reactor Protection System (RPS) actuation. While the Division II half scram signal was actuated, a Division I RPS actuation occurred, resulting in a full reactor scram. All control rods inserted and operators placed mode switch to shut down.

Event Notification 55616 reported this event in accordance with 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A). This event is also reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in automatic actuation of a system in 10 CFR 50.73(a)(2)(iv)(B).

The CV-4 fast closed due to transient voltage from a ground fault on the CV-4 Fast Acting Solenoid (FASV) field wiring. The previous single point vulnerability review for the system failed to identify and mitigate this failure mechanism. The Electro-hydraulic Control fluid pressure perturbation from the simultaneous closure of MSV-4 and CV-4 resulted in the Division II RPS actuation. Further review identified a recommended modification to dampen pressure in the system was never installed based on vendor recommendation. Key corrective actions include, in part, replacement of the CV-4 FASV wire and installation of orifices in accordance with the General Electric Technical Information Letter 1212-2 guidance.

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



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

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1. FACILITY NAME Susquehanna Steam Electric Station, Unit 1	2. DOCKET NUMBER 05000-387	3. LER NUMBER		
		YEAR 2021	SEQUENTIAL NUMBER - 005 -	REV NO. 01

**NARRATIVE**

**CONDITIONS PRIOR TO EVENT**

Unit 1 – Mode 1, approximately 80 percent Rated Thermal Power (RTP)  
Unit 2 – Mode 1, approximately 100 percent RTP

Unit 1 Turbine Valve Cycling surveillance testing was in progress at the time of the event.

**EVENT DESCRIPTION**

At approximately 12:54 on November 30, 2021, Susquehanna Steam Electric Station, Unit 1, experienced an automatic scram due to a Reactor Protection System (RPS) [EIIIS System Code: JC] actuation during Turbine Valve Cycling surveillance testing. During the fast closure portion of the surveillance test on Main Stop Valve 4 (MSV-4) [EIIIS System/Component Codes: TA/SHV], Control Valve 4 (CV-4) [TA/FCV] unexpectedly fast closed, thereby generating a Turbine Control Valve fast closure on Division II RPS. Fast closure of CV-4 and MSV-4 caused an Emergency Trip System (ETS) pressure perturbation in the Electro-hydraulic Control (EHC) [TG] system which actuated one of the two Division I RPS low pressure switches. The Division I signal combined with the Division II signal resulted in a full scram. All control rods inserted, and operators placed mode switch to shut down. Reactor water level was maintained at the normal operating band using the Reactor Feed Water system [SJ]. All safety systems responded properly during the event.

Event Notification 55616 reported this event in accordance with 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A). This event is also reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in automatic actuation of a system listed in 10 CFR 50.73(a)(2)(iv)(B).

**CAUSE OF EVENT**

Transient voltage from a ground fault on the CV-4 Fast Acting Solenoid, SV10150D, field wiring energized the solenoid causing CV-4 to unexpectedly fast close. The EHC Single Point Vulnerability Assessment did not identify failure modes necessary to develop bridging and mitigation strategies on a passive component (i.e., wiring) located in a severe service environment and ultimately contributed to a reactor scram.

ETS header pressure drop from simultaneous fast closure of CV-4 and MSV-4 actuated one of the two Division I RPS control valve ETS low pressure switches (PSLC721N005A/C) [JJ/PS]. Operating Experience General Electric Technical Information Letter (TIL) 1212-2, which provided recommendations for controlling ETS pressure/flow via installation of orifices [OR], was previously evaluated with an inadequate conclusion resulting in the orifices not being installed as recommended.

**ANALYSIS/SAFETY SIGNIFICANCE**

The actual consequence of this event was a Unit 1 Reactor scram. The scram did not require or result in the actuation of Emergency Core Cooling System and no main steam relief valves [SB/RV] opened. Reactor Core Isolation Cooling system [BN] initiated as designed. All safety systems responded properly during the event. The condition described herein did not result in a safety system functional failure. Accordingly, this



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CONTINUATION SHEET**

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Susquehanna Steam Electric Station, Unit 1	05000-387	YEAR 2021	SEQUENTIAL NUMBER - 005 -	REV NO. 01

**NARRATIVE**

event will not be counted as a safety system functional failure in the Reactor Oversight Process Performance Indicators. There were no actual consequences to the health and safety of the public as a result of this event.

**CORRECTIVE ACTIONS**

Key Corrective Actions Included:

1. Replace damaged wiring for CV-4.
2. Install orifices in accordance with General Electric TIL 1212-2 guidance.
3. Perform Extent of Condition, as required, for Unit 1 and 2 main turbine steam valves.
4. Develop preventative maintenance tasks for critical wiring on main turbine steam valves.
5. Revise, as required, the EHC Single Point Vulnerability Mitigation Plan to address any vulnerabilities and associated mitigation strategies on passive components (e.g. wiring).

**COMPONENT FAILURE INFORMATION**

Component Identification – SV10150D Wiring  
 Component Name – Control Valve 4 Fasting Acting Solenoid  
 Component Model Number – D3W4BVY13X1555  
 Manufacturer – Parker Hannifin

**PREVIOUS OCCURRENCES**

None.