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March 24, 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 50-388/2021-003-01
UNIT 2 LICENSE NO. NPF-22
PLA-7993**

Docket No. 50-388

Attached is Licensee Event Report (LER) 50-388/2021-003-01. The LER reports an event involving an automatic scram due to a main turbine trip. The condition is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in an automatic actuation of the Reactor Protection System (including a reactor scram).

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 50-388/2021-003-01

Copy: NRC Region I
Ms. A. Klett, NRC Project Manager
Mr. C. Highley, NRC Senior Resident Inspector
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 Infocollections.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. 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.

1. Facility Name Susquehanna Steam Electric Station Unit 2	2. Docket Number 05000388	3. Page 1 of 3
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4. Title
Automatic Reactor Scram Due to Main Turbine Trip Caused by Inadvertent Trip of the Main Generator Output Breakers

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
10	11	2021	2021	- 003 -	01	03	24	2022	Facility Name	Docket Number 05000

9. Operating Mode 1 **10. Power Level** 095

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

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)	10 CFR Part 73
<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)	10 CFR Part 21	<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)	10 CFR Part 50	<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

Licensee Contact D. R. Smith, Senior Engineer – Nuclear Regulatory Affairs	Phone Number (Include Area Code) 570-542-1377
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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	FK	RLY	See below (SEL)	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)

On October 11, 2021, at approximately 13:21, Susquehanna Steam Electric Station Unit 2 reactor automatically scrambled due to a main turbine trip. Both divisions of the Reactor Protection System (RPS) actuated and all control rods inserted. This event was reported by Event Notification 55514 in accordance with 10 CFR 50.72(b)(2)(iv)(A), (b)(2)(iv)(B) and (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).

The event was caused by the 500kV switchyard primary plant interface relay inadvertently tripping open the main generator output breakers due to a transient voltage resulting from a ground applied on the primary switchyard battery system. This led to a load reject trip of the main turbine that resulted in an automatic scram.

Key corrective actions included removing the ground from the 125 VDC primary switchyard battery system, implementing an increased time delay for trip signals to the primary plant interface relay, and lifting redundant shield grounds on the station side of the relay. Additionally, primary plant interface inputs will be hardened, as appropriate.

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**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Susquehanna Steam Electric Station Unit 2	05000-388	2021	- 003 -	01

NARRATIVE

CONDITIONS PRIOR TO EVENT

Unit 1 – Mode 1, approximately 100 percent Rated Thermal Power

Unit 2 – Mode 1, approximately 95 percent Rated Thermal Power

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

EVENT DESCRIPTION

On October 11, 2021, at approximately 13:21, Susquehanna Steam Electric Station Unit 2 reactor automatically scrammed due to a main turbine [EIS System/Component Code: TA/TRB] trip. The Unit 2 Control Room received indication of a main turbine trip with both divisions of the Reactor Protection System (RPS) [EIS System Code: JC] actuated and all control rods inserted. The turbine bypass valves [EIS System/Component Code: JI/PCV] opened automatically to control reactor pressure and subsequently remained open causing the reactor to depressurize; this event is reported in Licensee Event Report 50-388/2021-004. Operations manually closed the Main Steam Isolation Valves (MSIVs) [EIS System/Component: SB/ISV] to stop reactor depressurization. The High Pressure Coolant Injection (HPCI) [EIS System Code: BJ] and Reactor Core Isolation Cooling (RCIC) [EIS System Code: BN] systems were manually initiated to control reactor water level. Operations subsequently maintained reactor water at the normal operating band using RCIC and reactor pressure was controlled with HPCI in pressure control mode and the main steam line drains. The Reactor Recirculation Pumps [EIS System/Component Code: AD/P] tripped on End of Cycle Recirculation Pump Trip.

This event was reported by Event Notification 55514 in accordance with 10 CFR 50.72(b)(2)(iv)(A), (b)(2)(iv)(B) and (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

The direct cause of the event was an applied ground by the switchyard [EIS System: FK] owner contractor on the primary switchyard battery system which caused transient voltage at the relay [EIS Component: RLY] input. The apparent cause was the switchyard owner interface relay design and settings were not in alignment with the vendor / original equipment manufacturer best practices leading to inadequate margin to prevent transient voltages from unintentionally causing a trip signal.

ANALYSIS/SAFETY SIGNIFICANCE

During the reactor scram off-site power remained available to power all safety related shutdown equipment. All control rods inserted as designed and all safety related equipment operated as designed. There was no loss of function that prevented the safe shutdown of the reactor and to maintain it in a safe shutdown condition. All safety systems were available to mitigate the consequences of an accident. The condition described herein did not result in a safety system functional failure. Accordingly, this 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.



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

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Susquehanna Steam Electric Station Unit 2	05000-388	YEAR 2021	SEQUENTIAL NUMBER - 003 -	REV NO. 01

NARRATIVE

CORRECTIVE ACTIONS

Key corrective actions included the following:

1. Removed the ground from the positive terminal of the 125 VDC primary switchyard battery system.
2. Implemented an increased time delay for trip signals to the primary plant interface relay to provide additional protection from inadvertent actuation due to electrical noise.
3. Lifted redundant shield grounds on the station side of the primary plant interface relay for the Unit 2 automatic and manual lockout devices.
4. Harden the inputs, as deemed appropriate, to the primary plant interface relay against electrical noise and/or capacitive coupling onto cables.

COMPONENT FAILURE INFORMATION

Component Identification – 94-U2P Relay
 Component Name – SEL-2411 Programmable Module
 Manufacturer – Schweitzer Engineering Laboratories (SEL)

PREVIOUS OCCURRENCES

None.