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March 21, 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 50-388/2021-001-01  
UNIT 2 LICENSE NO. NPF-22  
PLA-7988**

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**Docket No. 50-388**

Attached is Licensee Event Report (LER) 50-388/2021-001-01. This LER reports an event involving drifting of a Reactor Pressure Steam Dome – Low permissive switch (Microswitch 2). This event was determined to be reportable as a condition prohibited by Technical Specifications in accordance with 10 CFR 50.73(a)(2)(i)(B), a condition that could have prevented fulfillment of a safety function in accordance with 10 CFR 50.73(a)(2)(v)(D), and a common cause inoperability of independent trains or channels in accordance with 10 CFR 50.73(a)(2)(vii).

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 50-388/2021-001-01

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](mailto:Infocollections.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk ail: [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 2	<b>2. Docket Number</b> 05000388	<b>3. Page</b> 1 of 3
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**4. Title**  
Condition Prohibited by Technical Specifications Due to Drift of Reactor Pressure Switch

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
07	06	2021	2021	- 001 -	01	03	21	2022	Facility Name	05000
									Facility Name	05000

<b>9. Operating Mode</b> 1	<b>10. Power Level</b> 100
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**11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)**

<b>10 CFR Part 20</b>	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input 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 checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input checked="" 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 checked="" 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> Shane Jurek, Principal Licensing Engineer	<b>Phone Number (Include Area Code)</b> 570-542-1695
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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	JE	PS	GE/Cameron	Y					

<b>14. Supplemental Report Expected</b>				<b>15. Expected Submission Date</b>		
<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)			Month	Day	Year

**16. Abstract** (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On July 6, 2021, the Unit 2 "D" Reactor Steam Dome Pressure – Low permissive pressure switch, Microswitch 2, was found outside of the Technical Specification (TS) 3.3.5.1 allowable value. The switch drifted outside of the lower allowable value which is intended to ensure that the Emergency Core Cooling System (ECCS) injection prevents the fuel peak cladding temperature from exceeding the limits of 10 CFR 50.46.

Based on the information available, the condition likely existed for longer than allowed by TS 3.3.5.1, TS 3.5.1, and TS 3.0.3. As such, this is a condition prohibited by TS and is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B). In addition, since the "C" channel (PIS-B21-2N021C) was surveillance tested just prior to identification of the drift of the "D" channel (PS-B21-2N021D), redundant channels were inoperable at the same time impacting both Core Spray and LPCI functions; therefore, this is also considered a condition that could have prevented fulfillment of a safety function (10 CFR 50.73(a)(2)(v)(D)) and a common cause inoperability of independent trains or channels (10 CFR 50.73(a)(2)(vii)).

The cause of the event was determined to be instrument setpoint drift due to temperature/humidity changes and mechanical hysteresis as a result of the original design inputs not accounting for temperature and humidity effects on the switch. The switch was replaced with an unmodified pressure indicating switch. Final corrective action will revise the allowable value for TS 3.3.5.1, Functions 1.c, 1.d, 2.c, and 2.d.

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		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Susquehanna Steam Electric Station Unit 2	05000-388	2021	- 001 -	01

**NARRATIVE**

**CONDITIONS PRIOR TO EVENT**

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

Unit 2 – Mode 1, approximately 100 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**

Prior to September 2017, Susquehanna Steam Electric Station (SSES) had been utilizing International Telephone and Telegraph (ITT)-Barton 288A pressure switches in the Reactor Steam Dome Pressure – Low channels [EIS System/Component Identifier: JE/PS] that provide the injection permissive for the Core Spray system [EIS System Identifier: BM] (Technical Specification (TS) 3.3.5.1, Function 1d) and the Residual Heat Removal (RHR)/Low Pressure Coolant Injection system (LPCI) [EIS System Identifier: BO] (TS 3.3.5.1, Function 2d). Due to instrument drift concerns, all eight obsolete ITT-Barton 288A pressure switches were replaced with General Electric (GE) recommended Cameron-Barton 288A pressure switches between September 6, 2017 and November 15, 2017. Following replacement, instrument drift continued to be an issue, and additional corrective action was determined necessary to resolve the drift concerns. The additional corrective action included procuring and installing Cameron-Barton 288A instruments that had been modified to remove an over-range condition and the movement assembly/associated linkages that were determined to be affecting instrument drift. The first of these modified instruments was installed and calibrated on July 8, 2020 in the Unit 2 “D” channel (pressure switch for PS-B21-2N021D).

On August 10, 2020, the new, modified PS-B21-2N021D switch, Microswitch 2, was tested for its first surveillance interval and found to be outside of TS acceptance criteria. The switch drifted 1.2 psig outside of the upper allowable value which is intended to ensure that the reactor dome pressure has fallen to a value below the Core Spray and RHR/LPCI maximum design pressures to preclude over-pressurization of the low pressure systems prior to low pressure injection initiation. This event was reported in LER 50-388/2020-002-01, dated July 1, 2021.

On July 6, 2021, the Unit 2 “D” Reactor Steam Dome Pressure – Low permissive pressure switch, Microswitch 2, was found outside of the TS 3.3.5.1 allowable value. The switch drifted outside of the lower allowable value which is intended to ensure that the Emergency Core Cooling System (ECCS) injection prevents the fuel peak cladding temperature from exceeding the limits of 10 CFR 50.46.

Based on the information available, the condition likely existed for longer than allowed by TS 3.3.5.1, “Emergency Core Cooling System (ECCS) Instrumentation,” TS 3.5.1, “ECCS-Operating,” and TS 3.0.3. As such, this is a condition prohibited by TS and is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B). In addition, since the “C” channel (PIS-B21-2N021C) was surveillance tested just prior to identification of the drift of the “D” channel (PS-B21-2N021D), redundant channels were inoperable at the same time impacting both Core Spray and LPCI functions; therefore, this is also considered a condition that could have prevented fulfillment of a safety function (10 CFR 50.73(a)(2)(v)(D)) and a common cause inoperability of independent trains or channels (10 CFR 50.73(a)(2)(vii)).



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Susquehanna Steam Electric Station Unit 2	05000-388	2021	- 001 -	01

**NARRATIVE**

**CAUSE OF EVENT**

The direct cause was determined to be instrument setpoint drift due to temperature/humidity changes and mechanical hysteresis. The apparent cause involved the original design inputs not accounting for temperature and humidity effects on the switch.

**ANALYSIS/SAFETY SIGNIFICANCE**

Although outside of the TS 3.3.5.1 allowable value, the as-found setpoint remained above the analytical limit assumed in the accident analysis. Therefore, Core Spray and RHR would have been able to perform their safety functions and 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.

**CORRECTIVE ACTIONS**

The switch was returned to within TS allowable values. Key corrective actions include the following:

1. The switch was subsequently replaced with an unmodified pressure indicating switch.
2. Final corrective action will revise the allowable value for TS 3.3.5.1, Functions 1.c, 1.d, 2.c, and 2.d.

**COMPONENT FAILURE INFORMATION**

The switches installed in the application affected by this condition are Cameron-Barton 288A pressure indicating switches manufactured by Cameron. The switch that drifted in the event described in this LER had been modified to remove an over-range condition and the movement assembly/associated linkages; with the indication function removed, this switch was a pressure switch.

**PREVIOUS OCCURRENCES**

As indicated by the previous occurrences listed below, the condition of drifting pressure indicating switches is a known issue at SSES. Previously reported Corrective Actions are in progress; additional corrective actions will be dictated by the Susquehanna Corrective Action Program.

LER 50-388/2020-002-01, "Condition Prohibited by Technical Specifications Due to Drift of Reactor Pressure Switch Caused by Lack of Requirements for Acclimation of the Instrument to the Operating Environment", dated July 1, 2021.

LER 50-387(388)/2018-005-02, "Condition Prohibited by Technical Specifications Due to Drift of Reactor Pressure Switches", dated July 1, 2021.

LER 50-388/2017-010-02, "Condition Prohibited by Technical Specifications Due to Drift of Reactor Pressure Switches", dated July 1, 2021.

LER 50-388(387)/2015-001-01, "Condition Prohibited by Technical Specifications Due to Drift of Reactor Pressure Steam Dome-Low Switches", dated February 10, 2016.