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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 50-387/2021-004-01
UNIT 1 LICENSE NO. NPF-14
PLA-7989**

Docket No. 50-387

Attached is Licensee Event Report (LER) 50-387/2021-004-01. The LER reports an event in which the Unit 1 'B' Residual Heat Removal Service Water Pump was inoperable for longer than allowed by Technical Specifications (TS). The condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as condition prohibited by TS and 10 CFR 50.73(a)(2)(v)(B) as a condition that could have prevented fulfillment 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 or revised regulatory commitments.

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

K. Cimorelli

Attachment: LER 50-387/2021-004-01

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 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 1	2. Docket Number 05000387	3. Page 1 of 3
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4. Title
Loss of 1B RHRSW Pump due to Cable Damage During Excavation Activities

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	07	2021	2021	- 004 -	01	03	21	2022	Facility Name	Docket Number 05000
									Facility Name	Docket Number 05000

9. Operating Mode 1	10. Power Level 100
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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 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 checked="" 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 checked="" 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 Shane Jurek, Principal Licensing Engineer	Phone Number (Include Area Code) (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
D	BI	CBL	K080	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

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

At approximately 15:19 on October 7, 2021, operators at the Susquehanna Steam Electric Station, Unit 1 observed current oscillations during a run of the Unit 1 'B' Residual Heat Removal Service Water (RHRSW) Pump ("1B RHRSW Pump"). Following shutdown of the pump, operators entered Technical Specification (TS) 3.7.1, Condition B for an inoperable RHRSW subsystem. Troubleshooting identified the cause of the current oscillations to be a ground on the B-phase power cable for the pump, which was likely damaged on September 23, 2021 during excavation activities, thereby rendering the pump inoperable at the time. The power cable was replaced, and the RHRSW System was declared operable at 07:33 on October 11, 2021. Therefore, this event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by TS. The Unit 1, 'A' RHRSW subsystem was determined to be concurrently inoperable on September 29. Therefore, this event is also being reported in accordance with 10 CFR 50.73(a)(2)(v)(B) as a condition that could have prevented fulfillment of a safety function.

The event was caused by an inadvertent puncture of conduit during excavation activities and the use of a flawed damage assessment method. Corrective actions include repairing and replacing the cable and conduit and updating plant documents. There were no actual safety consequences associated with the described condition.



**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 Susquehanna Steam Electric Station, Unit 1	2. DOCKET NUMBER 05000-387	3. LER NUMBER		
		YEAR 2021	SEQUENTIAL NUMBER - 004 -	REV NO. 01

NARRATIVE

CONDITIONS PRIOR TO EVENT

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

On September 23, 2021, during excavation activities to support future unrelated piping replacement work, personnel at the Susquehanna Steam Electric Station (SSES) punctured a 4” conduit line. Work was immediately stopped, and an investigation commenced. On October 7, the damaged conduit was positively identified as F1F104 [EIS System/Component Code: BI/CND]. F1F104 contains cable FF1S0601A [BI/CBL], which is the power cable for Pump 1P506B [BI/P], the Unit 1, ‘B’, Residual Heat Removal Service Water (RHRSW) Pump (hereafter referred to as the “1B RHRSW Pump”).

EVENT DESCRIPTION

At approximately 15:19 on October 7, 2021, operators at the Susquehanna Steam Electric Station, Unit 1 observed current oscillations during a run of the 1B RHRSW Pump. The operators shut down the 1B RHRSW Pump entered Technical Specification (TS) 3.7.1, “Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS),” Condition B, for the inoperable Unit 1 ‘B’ RHRSW subsystem. Troubleshooting identified the cause of the current oscillations to be a ground on the B-phase of cable FF1S0601A. Troubleshooting also determined that the likely cause of the ground on cable FF1S0601A was damage to the cable when conduit F1F104 was punctured on September 23. Therefore, the 1B RHRSW Pump is considered to have been inoperable from the time of cable damage on September 23, 2021.

Cable FF1S0601A was replaced, conduit F1F104 was repaired, and the 1B RHRSW pump was returned to service at 07:33 on October 11. Therefore, this event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by TS. Further, on September 29, the Unit 1 ‘A’ RHRSW subsystem was declared inoperable due to UHS spray array and bypass valve alignments to support UHS nozzle cleaning. Thus, both subsystems of the Unit 1 RHRSW System were concurrently inoperable. Therefore, this event is also being reported in accordance with 10 CFR 50.73(a)(2)(v)(B) as condition that could have prevented the fulfillment of the safety function of structures, systems, or components that are needed to remove residual heat.

CAUSE OF EVENT

The direct cause of the event was determined to be that Cable FF1S0601A was struck through an inadvertent puncture of unidentified conduit F1F104 during excavation activities. The apparent cause of the failure was that methods for reviewing the condition of Cable FF1S0601A following damage were flawed, resulting in an inaccurate assessment and non-conservative decisions.

ANALYSIS/SAFETY SIGNIFICANCE

An Engineering Evaluation was performed for the time period for which the Unit 1 ‘B’ RHRSW subsystem was inoperable. On September 29, the Unit 1 ‘A’ RHRSW subsystem was declared inoperable due to spray array and bypass valve alignments to support spray array inspection and nozzle cleaning. The associated



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CONTINUATION SHEET**

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Susquehanna Steam Electric Station, Unit 1	05000-387	2021	- 004 -	01

NARRATIVE

RHRWS pump and motor could have started and provided flow to the RHR heat exchangers in case of an emergency with the flow path for RHRWS through the open bypass valve to the spray pond (i.e., bypassing the spray arrays). This has the potential to adversely impact the design basis spray pond temperature analysis due to the loss of evaporative and convective cooling of the water droplets when discharged through the spray arrays. However, the valves could be re-positioned under operator direction during a design basis accident. Such a manipulation within three hours from the onset of an accident is assumed in the SSES accident analyses, as approved by the NRC in ADAMS Accession No. ML081000255. Therefore, the Unit 1 'A' RHRWS subsystem would have been able to perform its safety functions during a postulated design basis accident despite the valve alignment which renders the RHRWS system inoperable. Further, the initial spray pond temperature assumed in the design basis analysis is 85°F; the pond temperature was below this value. The initial spray pond temperature would allow an even greater timeframe for operators to perform the required actions which assures the actions could be completed consistent with the design basis.

Based on the above discussion, only the Unit 1 'B' RHRWS subsystem was incapable of performing its design function during the subject timeframe. The SSES design basis analyses assume a single failure of an RHRWS subsystem which is consistent with the condition that existed. Since the remaining RHRWS subsystem could perform its design basis function, the event did not represent a safety system functional failure (SSFF). This will not be counted as an SSFF 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

Immediate corrective actions included repairing and replacing the damaged conduit and cable and updating controlled plant drawings to reflect the actual field measurements obtained during event investigation. Additional corrective actions will include revising station procedures to require reassessment of risk for changing field conditions and to describe the limitations associated with damage assessment methods.

COMPONENT FAILURE INFORMATION

Component Identifier: FF1S0601A

Description: 1/C AWG 4/0 5kV Cable

Manufacturer: Kerite

PREVIOUS OCCURRENCES

None