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ACCESSION NBR: 9205270003 DOC. DATE: 92/05/22 NOTARIZED: NO DOCKET #
 FACIL: 50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylv 05000388
 AUTH. NAME AUTHOR AFFILIATION
 RYDER, T.S. Pennsylvania Power & Light Co.
 STANLEY, H.G. Pennsylvania Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-002-00: on 920422, HPCI sys declared inoperable after turbine overspeed tappet assembly failed to automatically reset. Caused by swelling of polyurethane tappet head due to elevated temps. Modified assembly installed. W/920522 ltr.

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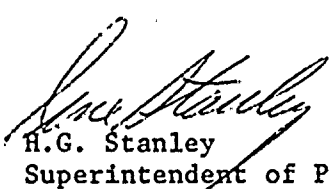
May 22, 1992 .

U.S. Nuclear Regulatory Commission
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SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 92-002-00
FILE R41-2
PLAS -526

Docket No. 50-388
License No. NPF-22

Attached is Licensee Event Report 92-002-00. This report is being made pursuant to 10CFR50.73(a)(2)(v), in that HPCI was determined to be inoperable resulting in the loss of a single train safety system.


H.G. Stanley
Superintendent of Plant - Susquehanna

TSR/mjm

cc: Mr. T. T. Martin
Regional Administrator, Region I
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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) **Susquehanna Steam Electric Station - Unit 2** DOCKET NUMBER (2) **0 5 0 0 0 3 8 8** PAGE (3) **1 OF 0 4**

HPCI System Declared Inoperable Due to Improper Functioning of Overspeed Reset Mechanism

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)
0 4	2 2	9 2	9 2	0 0 2	0 0	0 5	2 2	9 2			0 5 0 0 0
											0 5 0 0 0

OPERATING MODE (9) **1** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

POWER LEVEL (10) 1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
	20.406(a)(1)(i)	50.38(c)(1)	X 50.73(a)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	50.38(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 356A)
	20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
T.S. Ryder - Power Production Engineer	7 1 7 5 4 2 - 3 2 3 5
AREA CODE	
7 1 7	

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS
B	BIN	1 2	T 1 4 7	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On April 22, 1992 with Unit 2 operating in CONDITION 1 at 100% power, the HPCI System was declared INOPERABLE after the turbine overspeed reset mechanism did not function properly when exercised. The overspeed tappet assembly failed to automatically reset due to assembly binding. The cause of the binding was swelling of the polyurethane tappet head as a result of being subjected to an environment of oil, moisture and elevated temperatures. Higher than normal water content had been introduced to the HPCI lube oil system due to steam leakage past the HPCI Steam Admission Valve through the turbine seals and into the bearing housing. The event has been determined to be reportable per 10CFR50.73(a)(2)(v) in that HPCI was declared to be INOPERABLE resulting in the loss of a single train safety system. This determination is considered to be conservative because failure of the overspeed trip system to function properly would have no impact on HPCI's ability to initiate and inject if required. There were no safety consequences or compromise to the public health or safety due to this event. A modified mechanical overspeed trip tappet assembly was installed in the Unit 2 HPCI turbine. The new design has also been installed in the Unit 1 HPCI and RCIC turbines and will be installed in the Unit 2 RCIC turbine during the next Unit 2 refuel outage. The HPCI oil system has been flushed and the existing oil has been replaced. Weekly oil samples are being taken to confirm moisture levels are within acceptable limits until the HPCI Steam Admission valve is repaired. The valve repair will be accomplished during an appropriate work window.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Unit 2 Susquehanna Steam Electric Station	DOCKET NUMBER (2) 0 5 0 0 0 3 8 8	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9 2	- 0 0 2	- 0 0	0 2	OF	0 4

TEXT (If more space is required, use additional NRC Form 368A's) (17)

DESCRIPTION OF EVENT

On April 22, 1992 with Unit 2 operating in CONDITION 1 at 100% power, the High Pressure Coolant Injection (HPCI, EIIS Code: BJ) System was declared INOPERABLE after the turbine overspeed reset mechanism did not function properly following a system flow surveillance. The HPCI System was taken out of service to perform the quarterly flow performance test. The surveillance was successfully completed. Per a General Electric Service Information Letter (SIL), the turbine mechanical overspeed circuit was also exercised. The overspeed mechanism tripped properly; however, the overspeed tappet assembly failed to automatically reset due to assembly binding.

BACKGROUND INFORMATION

GE Services Information Letter (SIL) No. 392, issued April 1983, recommended installation of an improved mechanical overspeed trip assembly for HPCI turbines manufactured by Terry Corporation (now Dresser Rand). The assembly included a molded tappet head made out of polyurethane. As a result of initial trouble-free operation with that assembly, a similar design was developed for Terry Reactor Core Isolation Cooling (RCIC, EIIS Code: BN) turbine mechanical overspeed trip assemblies. Susquehanna utilizes Terry turbines in both the HPCI and RCIC systems. PP&L installed the redesigned trip assemblies on the HPCI and RCIC turbines on both units.

Subsequent to this, two utilities reported that HPCI turbine tappet assemblies of this design had become "frozen" in their valve bodies. Because of this development, GE Rapid Information Communication Services Information Letter (RICSIL) No. 004 was issued in May of 1986 to alert applicable BWR owners of the potential for locking-up of the HPCI turbine overspeed trip mechanism. Terry Corporation initiated a test program to define and solve this problem. Results indicated that the polyurethane tappet head is susceptible to swelling when subjected to an environment of oil, moisture, and elevated temperatures. The swelling can cause the tappet assembly to become seized in its valve body. This led to the issuance of SIL No. 392 Supplement 1 in February 1987. Supplement 1 recommended that HPCI mechanical overspeed trip tappet assemblies be replaced with a modified design in which the tappet diameter is reduced to increase the tappet-to-valve body clearance and thereby compensate for expected tappet head swelling. PP&L implemented the SIL No. 392 Supplement 1 recommendations for the HPCI turbines. RICSIL No. 037, issued January 1989, alerted applicable BWR Owners of the potential for tappet assembly binding problems on both HPCI and RCIC turbines.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

In November, 1990 SIL No. 392 Revision 1 and SIL No. 525 were issued. These SIL's recommended that an improved tappet assembly be installed on Terry HPCI and RCIC turbines. In the new design the tappet's guiding surface is aluminum and the clearance between the polyurethane head and the guide is greater than the maximum expected head growth. During the Unit 1 sixth refuel and inspection outage (March - May, 1992), the new mechanical overspeed trip tappet assembly design was installed on the Unit 1 HPCI and RCIC turbines in accordance with the SIL recommendations. Implementation of this modification for the Unit 2 HPCI and RCIC turbines was planned for the upcoming Unit 2 fifth refuel and inspection outage (September - November, 1992).

CAUSE OF EVENT

On April 22, 1992 the Unit 2 HPCI turbine mechanical overspeed trip tappet assembly was found to be functioning improperly during an exercise test. The cause was due to tappet head swelling and binding due to the oil, moisture and elevated temperature environment. Even though the SIL No. 392 Supplement 1 modification had been completed for Unit 2 HPCI, it is believed that the tappet-to-valve body clearance stipulated in Supplement 1 was not large enough to account for the amount of swelling that occurred in the tappet head.

HPCI oil samples were analyzed and water content was found to be .76% and 1.19% water (1st and 2nd samples respectively). This is above the administrative limit of .5% water. The source of the moisture has been identified to be steam leakage past the HPCI Steam Admission Valve. The steam, after leaking past the valve, pressurizes the turbine seal area, leaks through the seal and enters the bearing housing where it condenses and mixes into the lube oil system.

REPORTABILITY/ANALYSIS

The event has been determined to be reportable per 10CFR50.73 (a)(2)(v) in that HPCI was declared to be INOPERABLE resulting in the loss of a single train safety system. This determination is considered to be conservative because the failure of the overspeed trip system to function properly would have had no impact on HPCI's ability to initiate and inject if required. The higher than normal moisture content in the HPCI lube oil system did not impair the HPCI System from performing its safety function as demonstrated by the successful performance of the HPCI quarterly flow surveillance test on April 22, 1992. There were no safety consequences or compromise to the public health or safety due to this event.



LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Unit 2 Susquehanna Steam Electric Station	DOCKET NUMBER (2) 0 5 0 0 0 3 8 8	LER NUMBER (6)			PAGE (3)	
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TEXT (If more space is required, use additional NRC Form 365A's) (17)

In accordance with the guidance provided in NUREG 1022 Supplement 1 Item 14.1 and 10CFR50.4(d), the required submission date was determined to be May 22, 1992.

CORRECTIVE ACTIONS

A new mechanical overspeed trip tappet assembly was installed in the Unit 2 HPCI turbine in accordance with the recommendations of SIL No. 392 Revision 1. Similar modifications have been made to the Unit 1 HPCI and RCIC Systems. The Unit 2 RCIC turbine mechanical overspeed trip tappet assembly will be replaced in the Unit 2 refuel and inspection outage scheduled for this fall.

The HPCI oil system has been flushed and the existing oil was replaced due to the high moisture content. Oil samples are being taken weekly while HPCI is in standby mode to confirm the moisture content stays within acceptable limits until the HPCI Steam Admission Valve steam leakage problem is resolved. The Steam Admission Valve will be repaired during an upcoming work window based on measured water content.

ADDITIONAL INFORMATION

Failed Component Identification:

Component: Device, overspeed

Manufacturer: Terry Steam Turbine Co.

Part Number: 124746C01

Previous Similar Events:

None