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REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9112160317 DOC.DATE: 91/12/09 NOTARIZED: NO DOCKET #
 FACIL:50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylv 05000387
 AUTH.NAME AUTHOR AFFILIATION
 LLOYD,H. Pennsylvania Power & Light Co.
 STANLEY,H.G. Pennsylvania Power & Light Co.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-015-00:on 911107,determined that HPCI was inoperable in that pressure & flow requirements of quartly flow surveillance could not be met.Caused not determined.Broken poppet replaced & other poppets inspected.W/911209 ltr.

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 TITLE: 50.73/50.9 Licensee. Event Report (LER), Incident Rpt, etc./

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December 9, 1991

U.S. Nuclear Regulatory Commission
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Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 91-015-00
FILE R41-2
PLAS - 509

Docket No. 50-387
License No. NPF-14

Attached is Licensee Event Report 91-015-00. This report is being made pursuant to 10CFR50.73(a)(2)(V)(D), in that the High Pressure Coolant Injection System, a single train safety system, would not pass its surveillance requirements due to a broken turbine steam control pilot valve. The control valve was repaired and the system was restored to operable status.

H.G. Stanley
Superintendent of Plant - Susquehanna

HL/mjm

cc: Mr. T. T. Martin
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LICENSEE EVENT REPORT (LER)

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-630), 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 1** DOCKET NUMBER (2) **0 5 0 0 0 3 8 7** PAGE (3) **1 OF 0 3**

TITLE (4) **High Pressure Coolant Injection System Inoperable Due to Broken Steam Control Valve Pilot**

EVENT DATE (5)			LER NUMBER (8)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
1	1	07	9	1	015	0	0	12		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9) **1**

POWER LEVEL (10) **1 0 0**

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

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.38(c)(1)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.38(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME **Harrison Lloyd, Jr., Power Production Engineer** TELEPHONE NUMBER **7 1 7 5 4 2 - 3 9 1 7**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	
X	B	J	T	R	B	T	1	4	7	YES

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15) **0 6 3 0 9 2**

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

On November 7, 1991, with Unit 1 at 100% power, it was determined that the High Pressure Coolant Injection System (HPCI) was inoperable in that the pressure and flow requirements of the Quarterly Flow Surveillance could not be met. Inspection of the turbine steam chest revealed that the head of the #1 poppet (Pilot valve) had broken off. An engineering failure analysis will be performed to determine the failure mode. This event was determined to be reportable per 10CFR50.73(a)(2)(V)(D) as a condition that alone could have prevented the fulfillment of the safety function of the system. However, sufficient safety margin exists in the design such that HPCI could have performed its intended function. The broken poppet was replaced and the other poppets were inspected. The surveillance test was then satisfactorily completed. Any additional corrective actions will be determined depending on the results of the failure analysis.



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-630), 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 1 Susquehanna Steam Electric Station	DOCKET NUMBER (2) 0 5 0 0 0 3 8 7	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9 1	- 0 1 5	- 0 0	0 2	OF	0 3

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

DESCRIPTION OF EVENT

On November 7, 1991, with Unit 1 in Condition 1 at 100% power it was determined that the High Pressure Coolant Injection System (HPCI), (EIIS Code: BJ) was inoperable.

Following Maintenance on various system valves, the HPCI system was placed in service for the quarterly flow surveillance, SO-152-002. The surveillance failed the acceptance criteria by a small margin. Instrument and Control personnel (utility; non-licensed) performed a calibration of the HPCI turbine control system and the subsequent test showed the control valve at 60% open in lieu of the normal 35% open with similar system performance. It was decided that the steam chest cover would be removed and upon removal, it was discovered that the head of the #1 poppet was broken off and lying near the #3 poppet venturi. The poppet valves open sequentially via a lifting rack in the order of 4-1-3-5-2. As the lifting rack is raised, it comes in contact with the lifting knob of the poppet valves, opening them one at a time. The #1 poppet contains a pilot to reduce the force due to steam pressure in the chest. Since the #1 poppet would not open, steam pressure prevented the #5 poppet valve from opening and thus slightly reduced the turbine performance.

CAUSE OF EVENT

An investigative team was formed to determine the cause of the #1 poppet valve failure. An engineering failure analysis will be performed to determine the failure mode and the overall root cause. Included in this analysis will be metallurgical evaluation as well as procurement/manufacturing data.

REPORTABILITY/ANALYSIS

This event was determined to be reportable per 10CFR50.73(a)(2)(V)(D) as an event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident. The amount by which the system failed the surveillance acceptance criteria was minimal. The acceptance criteria is that the HPCI pump develops a flow of at least 5000 gpm against a test line pressure of greater than or equal to 1266 psig. With the control valve in the degraded condition, the discharge pressure at 5000 gpm flow was 1200 psig. If the poppet had failed during an actual vessel injection, the HPCI system may not have been able to provide design flow and pressure. However, sufficient margin exists in the design such that HPCI would have performed its intended function in any operating or accident scenarios. It was also determined that the broken

**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-830), 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 1 Susquehanna Steam Electric Station	DOCKET NUMBER (2) 0 5 0 0 0 3 8 7	LER NUMBER (6)			PAGE (3)	
		YEAR 9 1	SEQUENTIAL NUMBER 0 1 5	REVISION NUMBER 0 0	0 3	OF 0 3

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

poppet head being loose inside the steam chest with the turbine running would not have worsened conditions due to physical configurations within the steam chest. This condition did not cause a degradation in our ability to protect the health and safety of the public and/or plant personnel.

In accordance with guidance provided in NUREG 1022, Supplement 1, item 14.1, and 10CFR50.4(d), the required submission date for the report was determined to be December 9, 1991.

CORRECTIVE ACTION

The #1 poppet was replaced and the remaining four were examined to ensure no defects existed. The surveillance test was then satisfactorily completed on November 14, 1991. Any additional corrective actions will be determined at a future date depending on the results of the failure analysis. An update to this LER will be submitted to identify any additional actions taken to prevent recurrence.

A similar event occurred on Unit 2 in 1986. The failure was attributed to fatigue in combination with lack of nitriding in the area of the fracture. The Unit 2 HPCI System has performed satisfactorily since the repair was completed. This type failure will only occur during system operation when forces are applied to these components. Satisfactory operation during the quarterly flow verification assures continued operability. As mentioned previously, should the failure occur during an actual vessel injection, the HPCI System would still perform its intended function given the system design margin.

ADDITIONAL INFORMATION

Failed Component Identification:

Component: Valve, pilot

Manufacturer: Terry Steam Turbine, Co.

Part Number: 58234

Previous Similar Events:

Docket No. 50-388 LER 86-008-00 HPCI System Inoperable due to a Broken Control Valve.