

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9601160426 DOC. DATE: 96/01/02 NOTARIZED: NO DOCKET #
 FACIL: 50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylv 05000387
 AUTH. NAME AUTHOR AFFILIATION
 CODDINGTON, C.T. Pennsylvania Power & Light Co.
 STANLEY, H.G. Pennsylvania Power & Light Co.
 RECIPIENT NAME RECIPIENT AFFILIATION

SUBJECT: LER 95-013-00: on 951119, thermally induced pressure locking of HPCI valve occurred. Under bonnet pressure of 3,000-7,000 psig. Damaged HPCI injection valve repaired. W/960102 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5
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NOTES:

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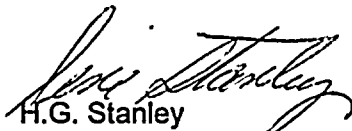
January 2, 1996

U.S. Nuclear Regulatory Commission
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SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 95-013-00
PLAS - 658 FILE R41-2

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

Attached is Licensee Event Report 95-013-00. This event was determined to be reportable per 10CFR50.72(b)(2)(iii) in that the High Pressure Coolant Injection (HPCI) System was inoperable due to the inoperability of the injection valve due to bonnet pressurization. This is a condition that alone could have prevented the fulfillment of a required safety function.


H.G. Stanley
VP - Nuclear Operations

Attachment

CTC/jmw

cc: Mr. T. T. Martin
Regional Administrator, Region I
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King of Prussia, PA 19406

Ms. Maitri Banerjee
Sr. Resident Inspector
U.S. Nuclear Regulatory Commission
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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 1						DOCKET NUMBER(2) 0 5 0 0 0 3 8 7 1			PAGE (3) OF 0 4		
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TITLE (4)
Thermally Induced Pressure Locking of HPCI Injection Valve

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)
1	1	95	95	013	00	0	1	96	SSES-Unit 2		05000388

OPERATING MODE (9) 4	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § : (Check one or more of the following) (11)									
POWER LEVEL (10) 0 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(iii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)							
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(1)(2)(iv)(B)							
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(v)							

(LICENSEE CONTACT FOR THIS LER (12))

NAME Cornelius T. Coddington - Senior Project Engineer-Licensing	TELEPHONE NUMBER AREA CODE: 7 1 7 5 4 2 - 3 2 8 9
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On November 30, 1995, with Unit 1 in Condition 4 (Cold Shutdown) at 0% power, PP&L determined that the damage to the pressure seal segmented retaining ring in the High Pressure Coolant Injection (HPCI) System injection valve bonnet was due to pressure in the valve bonnet. PP&L's analysis determined that a valve bonnet internal pressure of 3000 - 7000 psig would cause the damage to the valve bonnet. With this internal pressure there is no assurance that the HPCI injection valve would have opened. Therefore, PP&L believes that for some period of time between the last valve disassembly in April of 1992 and November 11, 1995, (date of shutdown of Unit 1), with the valve bonnet sufficiently pressurized, the HPCI injection valve was inoperable and therefore the HPCI System was inoperable. Since HPCI is a single train safety system, this condition was determined to be reportable under 10CFR50.72(b)(2)(iii)(D). PP&L has modified the Unit 1 HPCI injection valve by drilling a pressure relief hole in the valve disc. The damage found in the HPCI injection valve by itself did not affect valve operability. The Unit 2 HPCI injection valve was successfully stroked while Unit 2 was at 100% power and is operable. Operating procedures for Unit 2 have been revised to preclude pressure locking during plant evolutions.

**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 1	DOCKET NUMBER (2) Susquehanna Steam Electric Station	LER NUMBER (6)						PAGE (3)		
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

EVENT DESCRIPTION

PP&L's review of Generic Letter 95-07 identified that the HPCI (EIS Code: BJ) and RCIC injection valves for both Susquehanna SSES units were susceptible to thermally induced pressure locking. On November 11, 1995, Unit 1 was shut down to perform a repair of the Main Generator. During this forced outage, modifications to prevent thermally induced pressure locking were performed on the HPCI and RCIC injection valves by drilling a pressure relief hole in the downstream side of the valve disc.

During disassembly of the HPCI injection valve, damage was observed in the following areas: (1) valve bonnet pressure seal segmented retaining ring was bent approximately 0.135 inches, (2) pressure seal spacer ring was bent, and (3) packing follower flange was bent approximately 1/4 inch. The cause of the damage was a build up of pressure in the valve bonnet which resulted in forces great enough to cause deformation in those areas. PP&L's analysis indicated that with this internal pressure (between 3000 - 7000 psig), the opening of the HPCI injection valve could not be assured. Therefore, PP&L believes that for some time between the last valve disassembly in April 1992 and November 11, 1995, with the valve bonnet sufficiently pressurized, the HPCI injection valve was inoperable and therefore, on November 30, 1995, it was determined that the HPCI system was inoperable. Since HPCI is a single train safety system, this condition was determined to be reportable under 10CFR50.72(b)(2)(iii)(D). The damage found in the HPCI injection valve by itself did not affect valve operability.

No damage was found in the Unit 1 RCIC injection valve.

Since both units' HPCI and RCIC systems injection valves were determined to be susceptible to thermally induced pressure locking and to ensure operability of the Unit 2 HPCI and RCIC system injection valves, the valves were satisfactorily stroked while Unit 2 was at 100% power.

CAUSE OF EVENT

PP&L has determined that the cause of the damage found in the HPCI System injection valve was thermally induced pressure locking. PP&L calculation concluded that under bonnet pressure of 3000 - 7000 psig was required to cause the damage found in the valve. This pressure is above the pressure required to pressure lock the valve. In addition, the valve and disk assembly were designed to be a leak tight pressure boundary. Thus there were no provisions for pressure relief or equalization in the original valve design.

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

Also contributing to the event was PP&L's not fully recognizing all pressure locking mechanisms and contributors at the time previous valve susceptibility screenings were completed in the 1990-1991 time frame. Hence, the HPCI injection valves were not identified as susceptible until specific screening criteria was provided for resolution of Generic Letter 95-07.

REPORTABILITY/ANALYSIS

This event was determined to be reportable per 10CFR50.72(b)(2)(iii)(D) in that for an undetermined time the Unit 1 HPCI injection valve was inoperable due to thermally induced pressure in the valve bonnet which caused damage to certain valve components. Since the HPCI injection valve was inoperable, the HPCI System was inoperable; thus Susquehanna SES Unit 1 HPCI system was in a condition that alone could have prevented the fulfillment of a required safety function.

PP&L has determined that the damage to the HPCI injection valve components did not effect valve operability in that the valve was successfully stroked after Unit 1 was shut down on November 11, 1995 and prior to the discovery of the damage. Since the Unit 2 HPCI injection valve was also determined to be susceptible to thermally induced pressure locking, the Unit 2 valve was successfully stroked to confirm that the valve was operable.

In accordance with the guidelines provided in NUREG-1022, Supplement 1, Item 14.1 and 10 CFR 50.4(d), the required submission date for this report was determined to be January 2, 1996.

CORRECTIVE ACTIONS

The following corrective actions have been identified:

- The damaged Unit 1 HPCI injection valve has been repaired and returned to service.
- The Unit 1 HPCI and RCIC injection valves have been modified by drilling a hole in the Feedwater side disk to preclude pressure locking.
- The screening of safety-related gate valves for pressure locking and thermal binding per Generic Letter 95-07 guidance has been completed.
- The Unit 2 HPCI and RCIC injection valves have been stroked at 100% power to confirm operability.

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

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

- Operating procedures have been revised to ensure guidance is in place to preclude pressure locking of the Unit 2 HPCI and RCIC injection valves for plant evolutions which have the potential for pressure locking the valves (i.e., Feedwater Temperature increases).
- The Unit 2 HPCI and RCIC injection valves will be modified by drilling a hole in the Feedwater side disk to preclude pressure locking.

ADDITIONAL INFORMATION

Past Similar Events: Docket No. 50-387 LER 91-013-00

Failed Component: HPCI injection valve HV-155F006

Manufacturer: Anchor Darling

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