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MAY 2 4 2002

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station OP1-17
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 50-388/2002-003-00
PLA - 5487 FILE R41-2

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

Attached is Licensee Event Report 50-388/2002-003-00, which discusses the temporary loss of both Control Structure Chillers. This event is reportable as an event or 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.

Bryce L. Shriver

Attachment

cc: Mr. H. J. Miller
Regional Administrator
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

cc: Mr. S. L. Hansell
Sr. Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 35
Berwick, PA 18603-0035

IE22

NRC FORM 366 (7-2001)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Susquehanna Steam Electric Station - Unit 2	05000388	1 OF 3

4. TITLE

Low Service Water Flow Causes Temporary Loss Of Control Structure Chillers

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
03	29	2002	2002	003	00	MAY	24	2002	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE	1
10. POWER LEVEL	24%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)	50.73(a)(2)(x)
	20.2203(a)(1)		50.36(c)(1)(i)(A)		50.73(a)(2)(iv)(A)	73.71(a)(4)
	20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)	73.71(a)(5)
	20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)	OTHER
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)	X	50.73(a)(2)(v)(D)	
	20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(vii)	
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)	
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)	

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Gerard M. Machalick - Nuclear Regulatory Affairs	570 / 542-3861

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED			15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On March 29, 2002, with Unit 1 in a refueling outage (Mode 5, 0% Power) and Unit 2 operating at reduced power (Mode 1, 24% Power) to support Unit 1 and Unit 2 cooling tower valve replacement activities, the operating Unit 1 Service Water (EIIS Code: KG) pump cavitated. The low Service Water flow condition caused the in-service 'A' Control Structure (CS) chiller to trip at 23:44 and inhibited the standby 'B' chiller from automatically starting. Actions were taken to restore selected systems using Emergency Service Water (ESW) in accordance with the off-normal procedure for loss of Service Water. By 00:12 on 3/30/02, the 'B' CS chiller was capable of fulfilling its required safety functions for all design conditions. The loss of Unit 1 Service Water was caused by low water level in the Unit 1 Cooling Tower basin and high Unit 1 Cooling Tower screen differential pressure. The inability to promptly restore the 'A' CS chiller to service following a low cooling water flow trip was caused by a design limitation within the chiller control logic and less than adequate procedures to restore the chillers. The operating procedures for the Service Water system and for CS Chillers will be revised to prevent recurrence of this event. The control logic for the CS chillers will be modified so that a loss of Service Water will not prevent manual or automatic starting with ESW. Based upon the short amount of time that neither chiller was fully available, and the fact that the chillers would have provided the required safety function in most accident situations, this event resulted in very low safety significance. There were no actual consequences to the health and safety of the public as a result of this event.

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17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

EVENT DESCRIPTION

On March 29, 2002, with Unit 1 in a refueling outage (Mode 5, 0% Power) and Unit 2 operating at reduced power (Mode 1, 24% Power) to support Unit 1 and Unit 2 cooling tower valve replacement activities, the operating Unit 1 Service Water pump cavitated. The cooling tower valve replacement activities required an unusual system alignment, and the Unit 2 cooling tower basin level was maintained by letdown from the Unit 1 cooling tower basin. The Unit 1 cooling tower basin level dropped to a point where air was entrained in the Service Water pump suction, the operating Service Water pump cavitated, and the cavitation caused reduced Service Water flow.

The low Service Water flow condition tripped the in-service 'A' Control Structure (CS) chiller (EIIS Code: KM) at 23:44 and inhibited the standby 'B' chiller from automatically starting. Actions were taken to restore selected systems using Emergency Service Water (ESW; EIIS Code: BI) in accordance with the off-normal procedure for loss of Service Water (Non-Essential Service Water; EIIS Code: KG). Initial attempts to restart the tripped 'A' CS chiller with ESW as the cooling water source were unsuccessful. Cooling water was supplied by the 'B' loop of ESW to the standby 'B' CS chiller, and that chiller was started to reestablish CS cooling and ventilation. However, the 'B' loop of ESW was also aligned to Unit 1 Turbine Building Closed Cooling Water (TBCCW; EIIS Code: KB), rendering that loop inoperable because the TBCCW piping is not designed to withstand seismic events. By 00:12 on 3/30/02, the operating Service Water pump was vented, Service Water system flow was restored, and Service Water was aligned as the cooling source for Unit 1 TBCCW. The 'B' ESW loop was operable and the 'B' CS chiller was capable of fulfilling its required safety functions for all design conditions.

CAUSE OF EVENT

The initiating event of the loss of CS chillers was the loss of Unit 1 Service Water, which was caused by low water level in the Unit 1 Cooling Tower basin and high Unit 1 Cooling Tower screen differential pressure. The inability to promptly restore the 'A' CS chiller to service following a low cooling water flow trip was caused by a design limitation within the chiller control logic and less than adequate procedures to restore the chiller. Specifically, the chiller control logic did not allow the chillers to automatically start for all accident conditions following a trip condition, even though cooling water would automatically align to the ESW system. The alarm response and off-normal procedures do not clearly provide the guidance to press the 'Reset' button on the chiller control panel, which is required prior to restarting the equipment.

ANALYSIS / SAFETY SIGNIFICANCE

Based on the fact that neither of the two CS Chillers were available for all design conditions for 28 minutes between 23:44 on 3/29/02 and 00:12 on 3/30/02, the required cooling for Control Structure equipment may not have been present during an accident scenario. Additionally, the ability to maintain the Control Room envelope pressurized may not have been present, due to interlocks with ventilation fans. This event is reportable for Unit 2 as an event or condition that could have prevented fulfillment of a safety function per 10CFR50.73(a)(2)(v).

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17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

The significance of the event is mitigated by the fact that the 'B' CS chiller would have automatically started under accident conditions. The only limitation on this chiller would have been following a seismic event, since the 'B' loop of ESW was aligned to Unit 1 TBCCW which is not designed to withstand seismic events.

The 'A' CS chiller would have automatically started for one accident scenario, a loss of offsite power. The loss of power to the chiller control logic would have reset the trip condition, and the chiller would have started with ESW providing the necessary cooling water.

The significance of the event was further limited by the short amount of time that the chillers and ventilation equipment were not available. Analysis of post-accident heat loads in the control structure determined that all functions required for safe shutdown can be provided with no cooling for up to 72 hours. Additionally, the impact of not having Control Room envelope pressurization has been estimated. Extrapolation of design-basis loss of coolant accident analysis estimates that this pressurization function could be lost for up to 1 hour without exceeding regulatory dose limits.

Based upon the short amount of time that neither chiller was fully available, and the fact that the chillers would have provided the required safety function in most accident situations, this event had very low safety significance. There were no actual adverse consequences to the health and safety of the public as a result of this event.

In accordance with guidance in NUREG-1022, Revision 2, the due date for this report is May 28, 2002.

CORRECTIVE ACTIONS

The following corrective actions will be taken to prevent recurrence:

- The operating procedures for the Service Water system will be revised to more clearly identify the cooling tower requirements for stable pump operation.
- The operating procedures for CS Chillers will be revised to provide guidance on resetting chiller trips.
- The control logic for the CS chillers will be modified so that a loss of Service Water will not prevent manual or automatic starting with ESW.

ADDITIONAL INFORMATION

Past Similar Events: LER 50-387/2002-001-00

Failed Component: None