NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Haddam Neck	05000213	1 of 4

TITLE (4)
Spent Fuel Pool Cooling Shut Down Due to Discovery of Loose Parts

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
03	01	96	96	005	01	09	05	97	FACILITY NAME	DOCKET NUMBER 0500

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	20.201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	[X] OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	Voluntary

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Sue Muik, Engineering	(860)267-2556

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	DA	V	T074	N						

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

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

On March 1, 1996 at 1419 hours, with the plant in Mode 1, at 100% power, Nuclear System Operators (NSOs) notified the Control Room of loud clanking noises inside the 'A' Spent Fuel Pool (SFP) Cooling Heat Exchanger and its associated inlet piping after transferring from the 'A' SFP Cooling pump to the 'B' SFP Cooling pump. The 'B' SFP Cooling pump was subsequently stopped. Several months prior to this event the 'B' SFP Cooling pump discharge check valve was replaced after it was found to have missing internals however all missing parts were not recovered. Troubleshooting efforts verified that the 'B' SFP Cooling pump discharge check valve was the cause. Inspection of the 'B' Train piping confirmed no loose parts or damage. The 'A' SFP Cooling Heat Exchanger was disassembled, inspected and parts were retrieved. The 'B' SFP Cooling pump was placed back in service on March 2, 1996 at 2225 hours. During this temporary loss of Spent Fuel Pool Cooling, spent fuel pool temperature increased from 85 degrees F to 101 degrees F. The event duration was 32 hours 06 minutes. The root cause of the check valve failure was inadequate design in that the close proximity of the check valve to the pump discharge resulted in abnormal wear of the valve. This supplemental report is issued to retract originally proposed corrective actions that are no longer required due to the HNP being in a permanently defueled state.

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		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER	
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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

BACKGROUND INFORMATION

The Spent Fuel Pool Cooling System (EIIS Code: DA) cools and circulates the borated water contained in the Spent Fuel Pool. Two cooling pumps are used to circulate the contents of the spent fuel pool through two heat exchangers (EIIS Code: HX) which are cooled by Service Water (EIIS Code: BI) to remove decay heat generated by the spent fuel assemblies. During normal operations with the plant in Modes 1, 2, 3 or 4, the 'A' heat exchanger and 'A' SFP Cooling pump are typically used.

EVENT DESCRIPTION

On March 1, 1996, at 1419 hours, with the plant in Mode 1, at 100% power Nuclear System Operators notified the Control Room of loud clanking noises inside the Spent Fuel Pool Cooling heat exchanger (E-10-1A) and its associated inlet piping in the Spent Fuel Building lower level after transferring Spent Fuel Pool Cooling pump (P-21-1A) to (P-21-1B). The 'B' Spent Fuel Pool Cooling pump (P-21-1B) was subsequently stopped. During this process, the operators were able to observe the operation of the 'A' Spent Fuel Pool Cooling pump discharge check valve (SF-CV-812), the discharge valves on both pumps and the cross-connect valve. All valves operated normally. They were not able to fully observe the operation of the 'B' pump discharge check valve. Aside from an oil leak on the 'A' Spent Fuel Pool Cooling pump (P-21-1A), both pumps operated normally with no abnormal vibration and with normal discharge pressure.

Several months prior to this event the 'B' Spent Fuel Pool Cooling pump discharge check valve was replaced after it was found to have missing internals. All missing parts were not recovered. As a result of this recent issue a test was run to verify the operability of the 'B' Spent Fuel Pool Cooling Pump discharge check valve (SF-CV-866) whose results indicated that, in fact, the check valve internals were not operable. The 'B' Spent Fuel Pool Cooling pump was placed back in service on March 2, 1996 at 2225 hours. During this temporary loss of Spent Fuel Pool Cooling, Spent Fuel Pool temperature increased from 85 degrees F to 101 degrees F. The event duration was 32 hours 06 minutes.

CAUSE OF THE EVENT

The root cause of the check valve failure was inadequate design in that the close proximity of the check valve to the pump discharge resulted in abnormal wear of the valve.

SAFETY ASSESSMENT

This event is not reportable under 10CFR50.73 however this LER is being submitted as a voluntary report.

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

The complete loss of spent fuel pool cooling is an analyzed event. Under postulated worst case conditions the analysis determined that it would take several hours before the water in the spent fuel pool would begin to boil. At the time of the event, the actual heat load on the spent fuel cooling system was considerably less than that assumed in the loss of spent fuel cooling analysis due to the extended period of time that had elapsed since the reactor was shut down on January 28, 1995. Based upon the conditions existing at the time of the event, a fuel pool heatup rate of approximately one degree per hour would be anticipated. This low postulated heatup rate would have allowed manual operator action to mitigate the loss of forced spent fuel cooling utilizing a plant abnormal operating procedure had restoration not been successfully completed.

Based upon the above, this event has low safety significance.

CORRECTIVE ACTION

Technical Support Engineering inspected piping from both Spent Fuel Pool Cooling Pumps (P-21-1A & 1B) to the plate heat exchanger (E-10-1B) for loose parts and/or damage from loose parts with a bore-a-scope. Minor scratches were identified and determined to have no effect on the structural integrity of piping. The 'A' SFP Cooling Heat Exchanger was also disassembled, inspected and the majority of the valve internals were retrieved.

Corrective action consisted of replacing the check valves with a better design (thicker hinge pin) and relocating the B discharge check valve (SF-CV-866) further downstream of the pump discharge.

In addition, surveillance procedure SUR 5.7-30, "Inservice Testing of SF-CV-812, SF-CV-866, SF-V-124, and SF-V-837" was revised to verify the disk integrity of the check valves.

Design Engineering was to perform a check valve application review for split flapper type check valves. This review effort was to be incorporated into the Check Valve Design Application Review Program.

ADDITIONAL INFORMATION

Corrective actions pertaining to the Check Valve Design Application Review Program will no longer be undertaken. This action is as a result of the Haddam Neck plant being in a permanently defueled state. Safety related check valves will continue to be surveilled and receive inservice inspection in accordance with Technical Specification requirements. Additionally, non-safety related check valves will be surveilled and inspected in accordance with their respective level of required service.

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The check valve represented by this LER are 4 inch wafer type check valves manufactured by the Techno Corporation, Model Number 5053-316.

PREVIOUS SIMILAR EVENTS

The following LERs address losses of spent fuel pool cooling however none were due to loose parts:

LER 90-027-00, Temporary Loss of Spent Fuel Cooling Due to Loss of Power

LER 91-014-00, Spent Fuel Pool Cooling System Isolated for Preplanned Maintenance

LER 91-016-00, Spent Fuel Pool Cooling System Isolated to Clean Service Water Piping

LER 91-018-00, Spent Fuel Pool Cooling System Isolated for Heat Exchanger Cleaning

LER 92-002-00, Temporary Loss of Spent Fuel Cooling Due to Preplanned Surveillance Testing

LER 92-007-00, Temporary Loss of Spent Fuel Cooling Due to Preplanned Surveillance Testing

LER 94-011-00, Unplanned Loss of Spent Fuel Pool Cooling