PSEG

Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038

Hope Creek Operations

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

NOV 24 1995

Dear Sir:

HOPE CREEK GENERATING STATION
DOCKET NO. 50-354
UNIT NO. 1
LICENSEE EVENT REPORT 95-025-00

This Licensee Event Report is being submitted pursuant to the requirements of 10CFR50(a)(2)(v) and 10CFR50(a)(2)(vii).

Sincerely,

M. E. Reddemann
General Manager -
Hope Creek Operations

RAR/tcp

Attachment
SORC Meeting 95-108
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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)
HOPE CREEK	05000354	1 OF 6

TITLE (4)

HIGH PRESSURE COOLANT INJECTION SYSTEM DECLARED INOPERABLE DUE TO AN OUT OF ADJUSTMENT LIMIT SWITCH

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 NAME	DOCKET NUMBER
										05000
10	24	95	95	-- 025 --	00	11	24	95	FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	92	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	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)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	X 50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	X 50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Jan Moyle, NSSS Technical Engineer	(609) 339-3022

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	BJ	SHV	A363	Y						

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

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

The High Pressure Coolant Injection (HPCI) System was declared inoperable, and a Technical Specification Action Statement was entered on October 24, 1995 due to concerns with the HPCI system's ability to restart if it tripped after receipt of an injection signal. The apparent cause of this event is the HPCI Turbine Stop Valve closed limit switch, which had come out of adjustment. This event posed minimal safety significance due to mitigating factors that were designed into the HPCI System. The limit switch has been adjusted. Other Corrective Actions include replacing the limit switch, repairing the HPCI Turbine Steam Admission Valve, and initiating a recurring task to inspect the switch.

A four-hour report was made to the NRC Operations Center at 1539 in accordance with the requirements of 10CFR50.72(b)(2)(iii). This report is being submitted in accordance with 10CFR50.73 (a)(2)(v) and 10CFR50.73(a)(2)(vii).

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
HOPE CREEK	05000354	95	-- 025 --	00	2 OF 6

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

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
High Pressure Coolant Injection, EIIS Identifier: BJ

CONDITIONS PRIOR TO OCCURRENCE

Plant in Operational Condition 1 (Power Operations)
Reactor at 92% of Rated Thermal Power, Coastdown in progress

There were no systems, structures, or components that were inoperable at the start of the event that contributed to the event.

DESCRIPTION OF OCCURRENCE

On October 24, 1995, at 1131, the High Pressure Coolant Injection (HPCI) Auxiliary Oil Pump (AOP) was placed in service to support an oil sample. HPCI was declared inoperable while the sample was being drawn, and was declared operable after the completion of the sample. The AOP was then removed from service at 1143. At 1144, a Nuclear Control Operator (NCO - RO Licensed) observed that the HPCI Turbine Stop Valve (1FDFV-4880) indicated open. When the HPCI Turbine is not in operation and the AOP is not in service, the HPCI Turbine Stop Valve should indicate full closed.

At 1210, an Equipment Operator (EO - non licensed) locally observed the HPCI Turbine Stop Valve to be closed. The closed limit switch was exercised, which resulted in a closed indication being received. The AOP was placed back in service and the HPCI Turbine Stop Valve was observed to stroke open. When the AOP was removed from service, the HPCI Turbine Stop Valve was observed to properly close, but the open indication again remained illuminated.

HPCI was declared inoperable, and a Technical Specification Action Statement was entered, at 1230, due to concerns with the HPCI system's ability to restart if it tripped after receipt of an injection signal. A limit switch was found to be out of adjustment. At 1507, the AOP was placed back in service to support limit switch adjustments. The limit switch was adjusted and the base screw, which had been found to be slightly loose, was tightened. After a successful retest, HPCI was declared operable at 1600, and the Action Statement was exited.

A four-hour report was made to the NRC Operations Center at 1539 in accordance with the requirements of 10CFR50.72(b)(2)(iii).

ANALYSIS OF OCCURRENCE

The primary purpose of HPCI is to maintain reactor pressure vessel inventory after small pipe breaks that do not depressurize the reactor vessel. The HPCI system consists of a turbine driven pump that supplies water to the reactor vessel at rated pressure. Steam admission to the turbine is controlled by a motor-operated steam admission valve and hydraulic stop and control valves. The hydraulic stop and control valves are hydraulically opened and spring closed. When the AOP is operated, the stop and control valves open. When the AOP is removed from service, the valves close.

The closed limit switch for the HPCI Turbine Stop Valve controls both the open and closed indicating lights, the ramp generator, and system valve permissives. When the closed limit switch is made up (valve in the closed position), the closed light comes on, the open light goes out, the ramp generator resets to a standby condition, and the HPCI injection valves close, if opened. When the switch is not made up (valve is not fully closed), the closed light goes out, the opened light comes on, the ramp generator initiates, and a permissive is provided that allows the HPCI injection valves to open if there is an initiation signal.

When the ramp generator initiates, it ramps up the speed demand signal to the governor until it reaches a saturated condition where it remains until it is reset back to standby. During HPCI turbine startup, this permits the turbine to come up to speed in a controlled manner. When the turbine reaches operating speed, the ramp generator remains saturated high so that the signal from the flow controller controls the governor. If the turbine is started after the ramp generator initiates and saturates, the turbine is expected to overspeed several times (the trip automatically resets) before coming under control of the flow controller. This condition has the potential to pose operability concerns related to system response time and potential over-pressurization of pump discharge piping.

If the HPCI turbine is in operation and trips at +54" with the HPCI Turbine Stop Valve limit switch failed in the not closed condition, the HPCI injection valves will not close. However, the valves can be manually closed from the control room.

PRIOR SIMILAR OCCURRENCES

There have been several previously reported occurrences of an unplanned entry into a Technical Specification Action Statement due to HPCI being declared inoperable, most recently in LER 354/95-021. However, none of the previously reported events were similar to this one.

CAUSE OF THE OCCURRENCE

The apparent cause of this event is the HPCI Turbine Stop Valve closed limit switch, which had come out of adjustment. This switch is changed out every five years, and is scheduled to be changed out during the current refueling outage. Normally, the HPCI Turbine Stop Valve is cycled only during valve and HPCI turbine inservice testing, which is performed on a quarterly basis. However, recently the valve has been cycled more frequently due to the operation of the AOP to support the increased number of oil samples that have been taken. The increased oil samples are the result of moisture intrusion into the oil reservoir. This intrusion is caused by seat leakage through the HPCI Turbine Steam Admission Valve and was discussed in LER 354/95-021. The increased stroking frequency may have contributed to the need for switch adjustments.

SAFETY SIGNIFICANCE

This event posed minimal safety significance. If the turbine starts after the ramp generator initiates and saturates, the turbine is expected to overspeed several times (the trip automatically resets) before coming under control of the flow controller. This condition has the potential to pose operability concerns related to system response time and potential over-pressurization of pump discharge piping.

Overpressurization of turbine driven pump discharge lines caused by overspeed events was the subject of INPO SOER 89-01, Testing of Steam Turbine/Pump Overspeed Trip Devices. In both cases cited in the SOER in which overpressurization occurred, the failure was caused by failure of the overspeed trip mechanism. Consequently, it was recommended in the SOER to perform periodic testing of overspeed trip mechanisms. This testing program has been fully implemented at Hope Creek and includes the HPCI overspeed trip mechanism. Therefore, there is reasonable assurance that had the HPCI turbine oversped as a result of being started with the limit switch in a failed condition, the overspeed trip mechanism would have sufficiently controlled speed to limit overpressurization to a minimal amount of time (1 to 3 seconds), which would not result in damage to the piping.

SAFETY SIGNIFICANCE

The HPCI overspeed trip automatically resets when speed decreases sufficiently, thereby allowing the turbine to come back up to speed. During this time, if the limit switch fails in the open position, the HPCI injection valves will remain open and the system flow will increase. As flow increases, the signal from the flow controller will decrease the speed demand signal to the governor and cause the turbine control valve to throttle closed to control turbine speed. At this point, the system will operate as designed.

If the limit switch does not fail on the overspeed trip, and properly goes to the closed position, the injection valves will close and the ramp generator will reset. Upon automatic reset and restart of the system, the ramp generator will respond properly and control the startup transient as well.

In either of the two scenarios, the HPCI turbine will trip and reset, and the system will stabilize at rated flow. However, additional time would be required beyond what is normally required for the system to reach rated flow. The following factors would mitigate the impact of this additional time.

1) The HPCI system would have been available to provide high pressure makeup when control oil pressure was sufficient to control the stop and control valves. At that point, the signal from the flow controller would become the controlling signal to the governor in lieu of the signal from the ramp generator.

2) The Reactor Core Isolation Cooling system remained operable and available to provide high pressure injection.

3) The ADS system remained operable to provide the design backup function. Per the UFSAR, upon failure of HPCI, ADS will automatically reduce Reactor Pressure Vessel pressure to within the design capability of the low pressure ECCS.

If the HPCI turbine had been in operation and tripped at +54" with the limit switch failed in the not closed condition, the HPCI injection valves would not have closed. However, the valves could have been manually closed from the control room.

SAFETY SIGNIFICANCE

The Hope Creek Technical Specifications provide an allowable out of service time of 14 days for the HPCI system, provided that the Core Spray System, Low Pressure Injection System, the Automatic Depressurization System, and the Reactor Core Isolation Cooling System are operable. During this event, these systems were operable. The HPCI system was inoperable for three and one half hours.

CORRECTIVE ACTIONS

The HPCI Turbine Stop Valve closed limit switch was adjusted.

The HPCI Turbine Stop Valve limit switch will be replaced in the current refueling outage.

The HPCI Turbine Steam Admission Valve will be repaired during the upcoming refueling outage. After it has been determined that the repairs have been successful, the frequency of the oil samples will be decreased.

A recurring task will be initiated to inspect the switch to ensure that the base screw has not loosened and that the switch is within the vendor recommended range of adjustment.