



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

Hope Creek Generating Station

August 17, 1994

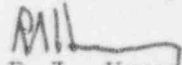
U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Dear Sir:

HOPE CREEK GENERATING STATION  
DOCKET NO. 50-354  
UNIT NO. 1  
LICENSEE EVENT REPORT 94-009-00

This Licensee Event Report is being submitted pursuant to  
the requirements of 10CFR 50.73(a)(i)(B).

Sincerely,

  
R.J. Hovey  
General Manager -  
Hope Creek Operations

LAA/

Attachment  
SORC Mtg. 94-056  
C Distribution

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The Energy People

LICENSEE EVENT REPORT																				
FACILITY NAME (1) HOPE CREEK GENERATING STATION												DOCKET NUMBER (2) 0 5 0 0 0 3 5 4						PAGE (3) 1 OF 7		
TITLE (4): Condition prohibited by Plant Technical Specifications - noncompliance with technical specification 3.3.7.4, Remote Shutdown System controls.																				
EVENT DATE (5)				LER NUMBER (6)						REPORT DATE (7)				OTHER FACILITIES INVOLVED (8)						
MONTH	DAY	YEAR		YEAR	*	NUMBER		*	REV	MONTH	DAY	YEAR		FACILITY NAME(S)				DOCKET NUMBER(S)		
0	7	1	8	9	4	-	0	0	9	-	0	0	0	8	1	7	9 4			
OPERATING (9) MODE 4				THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR: (CHECK ONE OR MORE BELOW) (11)																
POWER LEVEL % 0 0 0				20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)		OTHER (Specify in Abstract below and in Text)								
				20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)										
				20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)												
				20.405(a)(1)(iii) xx		50.73(a)(2)(i)(B)		50.73(a)(2)(viii)(A)												
				20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)												
////////////////////				20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)												
LICENSEE CONTACT FOR THIS LER (12)																				
NAME Lou Aversa, Senior Staff Engineer - Technical												TELEPHONE NUMBER 6 0 9 3 3 9 3 3 8 6								
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE NOTED IN THIS REPORT (13)																				
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS?	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS?											
				no																
SUPPLEMENTAL REPORT EXPECTED? (14) YES				NO	x	DATE EXPECTED (15)				MONTH	DAY	YEAR	////////////////////							
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### ABSTRACT (16)

During the Hope Creek fifth refuel outage, plant personnel performing an 18 month surveillance test of the remote shutdown system (RSS), discovered a design deficiency in the original plant design. The deficiency resulted in a technical specification non-compliance as the remote shutdown system redundant control for a single residual heat removal system suction valve would not operate as required. The incident report investigation and interim corrective actions were completed prior to reactor startup on April 25, 1994. In July a design change, which installed a new type control switch, was implemented as the permanent corrective action. The new control switch failed its post installation retest and a second incident report was generated. The root cause of the second failure was a personnel error. The control circuit wiring was revised and the valve tested satisfactorily. During a review of the second incident, and the corrective action closeout for the first event, it was determined that the initial event met the reporting requirements of 10CFR 50.73 and that an LER was required. Corrective actions for this event include counseling for the engineer who prepared the design change, as well as the Operations and Technical department personnel responsible for reviewing the initial event for reportability. Additional corrective actions include revising the 18 month RSS surveillance test and performing an evaluation of the surveillance and post maintenance retest program to determine if modifications are required.

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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)  
Remote Shutdown System (SM) EEIS Identifier (JL)

IDENTIFICATION OF OCCURRENCE

TITLE (4): Condition prohibited by plant Technical Specifications -non compliance with technical specification 3.3.7.4, Remote Shutdown System controls.

Event Date: 3/6/94, Discovery Date: 7/18/94

Event Time: 1100

This LER was initiated by Incident Report No. 94-124

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 4 (COLD SHUTDOWN)  
Reactor Power 0% of rated.

DESCRIPTION OF OCCURRENCE

On Sunday, March 6, 1994, during a planned refuel outage, Control Room personnel performing an 18 month surveillance test to demonstrate the operability of the Remote Shutdown System (RSS) identified a Residual Heat Removal (RHR) System valve that did not operate as required per the procedure. The "A" RHR pump suction valve from the suppression pool did not operate as expected when operated from a local control switch at a motor control center which provides the redundant control function for the RSS. The valve, which is normally open, was closed from the local switch; however, when the valve reached the closed position it immediately reopened. The Senior Nuclear Shift Supervisor (SNSS -SRO licensed) initiated a root cause investigation into the misoperation. A review of the electrical drawings for the valve indicated control from the local keylock switch at the MCC was dependent on the position of the valve control switch in the main control room. The switch in the main control room was repositioned and the valve was again stroked from the local MCC switch with satisfactory results. The SNSS initiated an incident report to determine if the above described operation of the valve was in accordance with the final safety analysis report (FSAR) and technical specification operability requirements. A follow up investigation determined that the design was not correct per the FSAR and a design change was initiated to correct the deficiency prior to startup. The event was reviewed for technical specification compliance and reportability. It was determined that the deficiency resulted in a technical specification noncompliance as the plant had operated with the deficiency since initial startup. A review of reportability determined that the event did not meet any of the reporting criteria under 10CFR 50.72. The design change was prepared prior to startup; however, the hardware needed for the installation was not available. Procedures for operation of the RSS were revised to provide interim measures to assure RSS operability until the new

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DESCRIPTION (Con't)

keylock switch was installed in July. During a review of the corrective actions taken for this event on July 18, it was recognized that a report under the requirements of 10CFR 50.73 should have been made as a result of discovery of this condition in March.

ANALYSIS OF OCCURRENCE

The Remote Shutdown System is designed to provide the means of bringing the plant from 100% rated to cold shutdown conditions in the event a control room evacuation is required. The RSS provides controls for two separate and redundant channels each capable of bringing the plant to cold shutdown conditions. The primary channel controls can be completely separated from the main control room controls, in the event a fire occurs in the control room or relay rooms, by transfer switches at the Remote Shutdown Panel (RSP). An alarm is received in the main control room when control is transferred to the RSP. The control circuits for the redundant channel are not required to be separated from the main control room control circuits. Control switches for redundant components are provided at local panels throughout the plant, typically at the motor control centers which power the redundant components. The redundant controls are designed to operate in conjunction with the control room circuits.

The majority of the valves which would be operated in the event of a control room evacuation are associated with safe shutdown systems. The valves are designed with two distinct modes of operation, for accident conditions or routine operation. The control circuits are designed to operate with overload protection during normal operation, and bypass the overload protection automatically during accident conditions. This feature ensures that valves will travel to their accident positions regardless of the overload protection circuit. In addition to the auto bypass of the overload, the control operator can manually override the overload protection. This feature is accomplished in the control circuits by providing a continuous open or close signal which is determined by the control switch position. Keylock control switches are three position type switches which provide overload protection in the "overload enable" position and bypass overload protection when in the "open" or "close" position. Pushbutton type controls bypass the overload protection when the pushbutton is held depressed during a valve stroke. The manual mode is operator controlled in the event a valve does not operate properly via automatic signal. An additional feature on all keylock switch controlled valves is that the operating key is removed only when the switch is positioned for normal valve alignment. If the valve is out of normal position, an overhead alarm is received in the control room to alert operators to the abnormal switch position.



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ANALYSIS OF OCCURRENCE (Con't)

The RSS is demonstrated operable by the performance of a monthly channel check and an 18 month functional test. The monthly channel check verifies instrument status and panel indicators. The 18 month test, which is only performed while in cold shutdown, is used to verify proper operation of all RSS components by operation from the RSS or the local switches. During performance of the 18 month test, valves are stroked from the normal operating position through one complete cycle. The procedure specifies that a normally open valve is stroked closed and then returned to the open position. The "A" Residual Heat Removal (RHR) Pump torus suction valve (F004A) is a redundant channel component which is tested from a local control switch. During performance of the test, during RF05, the valve was given a close command and stroked closed. After reaching the closed position the valve re-opened and continued to cycle open and closed. As the valve did not operate properly the test was suspended and electricians were summoned to troubleshoot the control circuit. A review of the valve logic determined that the control room switch was in an incorrect position per the design, to support operation from the MCC. The normal keylock switch position in the control room is the "open" position. The valve logic for operation from the local switch required the control room keylock switch be in the "overload enable" position. As the test only specified valve position and did not specify a keylock position, the test was performed with the keylock switch in overload enable. The valve stroked properly from the local control switch and the step was marked satisfactory. The discrepancy was noted in the remarks section of the test for further evaluation prior to entry into operational condition 1 or 2.

A review of the Safety Analysis Report for the RHR system determined that the keylock switch in the main control room is required to be in the "open" position to ensure a suction flowpath exists for the RHR pump in the low pressure coolant injection mode of operation. A review of technical specifications for the RSS redundant controls determined that the valve would not meet the operability requirements unless the switch was left in the "overload enable" position. It was decided that a design change was needed to modify the control circuit to satisfy both requirements. The design change was prepared with the intent of installing it prior to the end of the outage. As the end of the outage approached it was evident that due to material problems the design change could not be implemented. In order to satisfy all requirements the operating procedures for the remote shutdown system and control room evacuation were revised to place the F004A keylock switch to "overload enable" position prior to evacuating the control room. When the new local control switch became available in early July, the design change was implemented. The operability retest of the valve failed as the new switch was miswired due to an installation instruction error. The wiring error was corrected and the valve was declared operable following a successful retest. An incident report was generated due to the inoperability of the valve following installation of the design change.

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ANALYSIS OF OCCURRENCE (Con't)

A root cause investigation was initiated which determined that the design change had omitted necessary wiring changes for the new local control switch for the F004A. The investigation also identified that a reportable condition under the requirements of 10CFR 50.73, had been missed upon discovery of the F004A inoperability during RFO5. The initial event investigation, during RFO5, was conducted by operations and technical department personnel. The investigation determined that the F004A design deficiency had existed since initial plant startup. A review of completed surveillances from previous outages indicated that the surveillances had been passed by placing the control room switch in the "overload enable" position for reasons identified above. The root cause of the technical specification non-compliance was attributed to design deficiency. Procedural deficiency and less than adequate implementation of the work order retest program were identified as the root causes of the design deficiency being unrecognized over the period. Operations personnel reviewed the event against the reporting requirements of 10CFR 50.72 and correctly determined the event was not reportable under these requirements. The Licensee Event Response Coordinator (LERC), a member of the technical staff, reviews this type of event for 50.73 reportability. During the refuel outage the person who normally performs this function had been temporarily assigned to the outage group. The review was performed by other personnel in the technical staff who did not recognize the initial event as being reportable under 50.73. During review of the second incident by the LERC on July 18, the first event was identified as a reportable condition under 10CFR 50.73 and that a LER should be submitted for the initial event.

The root cause of the initial design deficiency could not be determined. The F004A is one of a small population of valves with a control circuit that continuously provides an open command to the valve due to the keylock switch being left in the "open" position. With the keylock in the open position the valve will attempt to open any time the valve is not at the full open position. Most valve control circuits employ pushbutton type switches which provide a momentary open or close command to energize the control contacts. Once the contactor drops out upon the valve reaching the desired position an additional operator action to re-initiate valve movement is required. The keylock switch operates in a similar fashion to pushbutton controls when valves are stroked with the keylock in the overload enable position. On some valves the keylock switch remains in the overload enable position after valve stroking is completed. The Emergency Core Cooling System valves that are keylock operated are returned to the open position after the valves have completed stroking to comply with the FSAR system operating description. As all keylock valves are operated in the overload enable position and only a small population of valves have the keylock switches placed in open following operation, it is conceivable that this condition was overlooked in the original design. This would account for the conflict in the control circuit design where a closed command is initiated from the local redundant control and once

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ANALYSIS OF OCCURRENCE (Con't)

the valve has closed, the control room switch is positioned to provide an open signal. Additionally, of all the valves designed with redundant controls for the RSS, this is the only keylock valve that is maintained in the open position. The remaining redundant controls were verified to operate properly without additional control room switch modifications.

APPARENT CAUSE OF OCCURRENCE

The root causes of the technical specification noncompliance condition was a design deficiency incorporated in the initial plant design and the subsequent failure to identify the deficiency through testing. The testing deficiencies were attributed to a less than adequate surveillance test procedure that did not specify the proper initial conditions for verifying operability. Inadequate follow-up by operations personnel when testing indicated that a problem existed with the valve control circuit, and a less than adequate retest following the troubleshooting of the control circuit.

The root cause of the late report was due to personnel error. An inadequate review of the reporting requirements by operations and technical staff personnel involved in the initial event investigation failed to identify the 50.73 reporting requirement.

PREVIOUS OCCURRENCES

There has been one previous occurrence of a condition prohibited by the technical specification due to design deficiency reported in LER 91-007-02.

SAFETY SIGNIFICANCE

This incident posed minimal safety significance. The Remote Shutdown System was capable of achieving cold shutdown conditions through the use of the primary controls. If required, the redundant torus suction could have been closed by initiating a close command at the local breaker and removing the power when the valve closed, or by manual operation of the valve at the local handwheel.

CORRECTIVE ACTIONS

The F004A valve control circuit was modified to override signals from the control room switch when the redundant control switch is being operated.

The surveillance test procedure for the RSS will be reviewed and revised appropriately to ensure control room control switches are set properly for test validity.

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CORRECTIVE ACTIONS

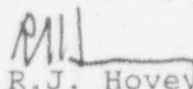
Operations and Technical department personnel involved in the review of the reportability determination have been counseled.

Personnel involved in the preparation and review of the design change which incorrectly installed the new redundant control switch have been counseled.

Operations personnel will review this incident for lessons learned during Requalification training.

The surveillance and post maintenance retest program is currently being evaluated to determine if modifications are required.

Sincerely,



R.J. Hovey  
General Manager -  
Hope Creek Operations

LAA/  
SORC Mtg. 94-056  
Recommended approval: Yes