



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

Hope Creek Generating Station

DATE April 6, 1992

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 92-004

This Licensee Event Report is being submitted pursuant to the requirements of 10CFR 50.73(a)(2)(iv).

Sincerely,

J.J. Hagan for JTH
J.J. Hagan
General Manager -
Hope Creek Operations

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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 5

TITLE (4): Engineered Safety System Actuation: Channel "B" Emergency Core Cooling System actuation during design change implementation due to design deficiency and personnel errors.

EVENT DATE (5) MONTH DAY YEAR LER NUMBER (6) YEAR * NUMBER * REV REPORT DATE (7) MONTH DAY YEAR OTHER FACILITIES INVOLVED (8) FACILITY NAME(S) DOCKET NUMBER(S)

OPERATING (9) MODE 4 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR: (CHECK ONE OR MORE BELOW) (11)

20.402(b)	20.405(c)	XX	50.73(a)(2)(iv)	73.71(b)
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)	OTHER (Specify in Abstract below and in Text)
20.405(a)(1)(iii)	50.73(a)(2)(i)		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)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Louis 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 NRPDS?	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS?

SUPPLEMENTAL REPORT EXPECTED? (14) YES NO DATE EXPECTED (15) MONTH DAY YEAR

ABSTRACT (16)

On 3/8/92 at 1814, during Cold Shutdown, control room personnel received indication of a channel "B" Loss of Coolant Accident (LOCA) signal initiation. Technicians implementing a Design Change Package (DCP) in conjunction with a Functional test procedure, inadvertently created a short circuit and momentary loss of power to the "B" channel Emergency Core Cooling System (ECCS) trip units. As leads were being landed to the rear of a Rosemount trip unit a wire retaining ring attached to the screw inadvertently rotated such that it came in contact with the power bus bar. A momentary drop in voltage, when a power terminal was grounded, resulted in a spurious -129" reactor vessel level signal being generated with a partial containment isolation and injection to the reactor vessel via Core Spray and Low Pressure Coolant Injection Systems. After ascertaining the cause of the initiation and verifying that all expected system responses occurred, the Senior Nuclear Shift Supervisor (SNSS, SRO licensed) directed that affected systems and components be reset and returned to a normal configuration. Post incident review determined the cause of the event was a design deficiency in the accessibility of a terminal strip inside the ECCS cabinets and personnel errors in job planning. The DCP being implemented is part of a previously initiated, ongoing series to correct this design deficiency to avert similar incidents during testing. The Planning department will be instructed to include steps to prevent an ESF when the DCP is resumed during Refuel Outage 4.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION															
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)							
		YEAR	*	NUMBER	*	REV									
HOPE CREEK GENERATING STATION	05000354	9	2	-	0	0	4	-	0	0	0	2	of	0	5

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
 EIIS Designators are listed in the text and denoted as (XX)

IDENTIFICATION OF OCCURRENCE

Engineered Safety System Actuation: Channel "B" Emergency Core Cooling System actuation during design change implementation due to design deficiency and personnel errors.
 Event Date: 3/8/92
 Event Time: 1814
 This LER was initiated by Incident Report No. 92-054

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 4 (Cold Shutdown), Reactor Power 0%, Unit load 0 MWe.

DESCRIPTION OF OCCURRENCE

On 3/8/92 at 1814, control room personnel received indication of a channel "B" Loss of Coolant Accident (LOCA) signal initiation. The following system responses and indications were observed:

LOCA level 1 signal to the "B" channel load sequencer with Automatic starts of the following systems / components:

- "B" Residual Heat Removal (RHR) (BO) pump with injection
- "B" Core Spray (BM) Pump with injection
- "B" Emergency Diesel Generator (EK)

Trip of the "B" Reactor Auxiliaries Cooling Pump (CC)
 Channel "B" Primary Containment Isolation System (PCIS) (JM) isolations

Prior to the initiation of the channel "B" LOCA signal, Controls Department technicians informed the Nuclear Shift Supervisor (NSS, SRO licensed) that they would be implementing a Design Change Package (DCP) in conjunction with a Functional test procedure, in the "B" Channel Emergency Core Cooling System (ECCS) logic cabinet. The functional test would verify proper operation of the SRV Low Low Set function and the Core Spray Injection Valve low reactor pressure permissive, while the DCP would land permanent test leads to the output of a Low Low Set trip unit. During a pre job briefing the technicians informed the NSS that a LOCA signal may occur during performance of the test. The NSS reviewed the work package and determined that current plant conditions were adequate to support the test and approved the work request.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

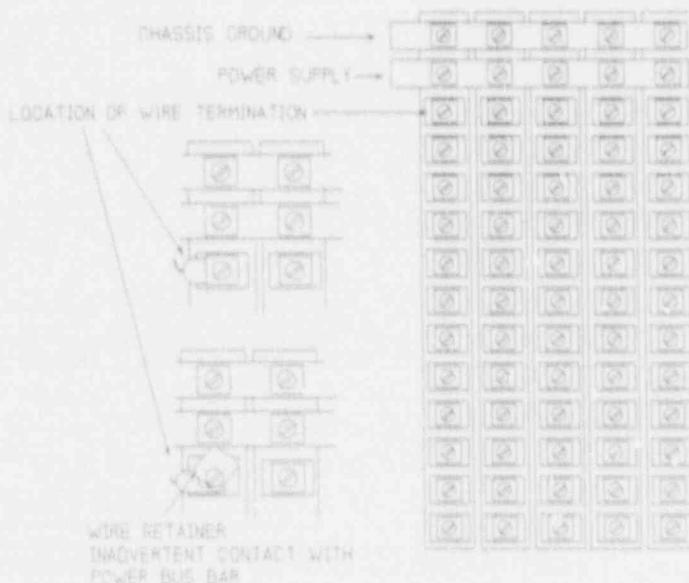
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)					
		YEAR	*	NUMBER	*	REV			of				
HOPE CREEK GENERATING STATION	05000354	9	2	0	0	4	0	0	0	3	of	0	5

DESCRIPTION OF OCCURRENCE (con't)

When the technician loosened a termination screw on a terminal board in the ECCS relay cabinet during implementation of the design change, a wire retaining ring attached to the screw inadvertently rotated such that it came in contact with an adjacent power supply terminal. This occurred despite the technicians efforts to insulate the bus bar with tape and restricting the movement of the retainer while loosening the screw. The momentary drop in voltage when the power terminal was grounded resulted in a spurious -129" reactor vessel level signal being generated. After ascertaining the cause of the initiation and verifying that all expected system responses occurred, the SNSS directed that affected systems and components be reset and returned to a normal configuration.

ANALYSIS OF OCCURRENCE

The Rosemount trip units monitor plant parameters and provide trip signals for ECCS equipment when predetermined action levels are exceeded. The system is configured with up to 12 trip units located in a rack with a common 24 vdc power supply and ground via bus bars which run the length of the cabinet rear. There are an additional 14 terminals on the rear of the rack for each trip unit for field wiring and interconnections. The location of the rack and the close proximity of the termination posts render modifications to the rear panel difficult. For this reason, and the previous ESF actuation which occurred during DCP implementation on 6/19/91 (see LER 91-014-00), it had been decided to complete the DCP during a shutdown.



ROSEMOUNT TRIP UNIT CONNECTIONS

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)							
		YEAR	*	NUMBER	*	REV			of						
HOPE CREEK GENERATING STATION	05000354	9	2	-	0	0	4	-	0	0	0	4	of	0	5

ANALYSIS OF OCCURRENCE (con't)

On 3/8/92, during a planned mid-cycle outage, Controls Department technicians were assigned to complete installation of a design change package which installed external test leads on ECCS cabinets. The work involved landing of the test leads to terminals on the rear of Rosemount trip units for the Nuclear Boiler Division 2 trip system. Similar work had been attempted during unit operation on 6/19/91, but due to limited access of the cabinet a spurious ECCS actuation occurred and it was decided to hold completion of the DCP until the unit was shutdown. (see LER 91-014-00). The external test leads were being installed to eliminate the need to install temporary test leads each time the functional test is performed. The I&C supervisor performed a pre job briefing with technicians who were to perform the DCP and surveillance test. The supervisor outlined the cause of previous initiation and discussed methods to be used to reduce the risk of a spurious initiation. However the briefing did not result in any contingency actions to secure equipment or inhibit the logic to prevent an initiation.

Though the briefing noted the possibility of an ESF actuation, the NSS did not recognize how this particular evolution could cause a LOCA signal. The NSS did not recognize the additional risk due to the DCP implementation. The Planning Department who created the work package did not include any special instructions to secure "B" Channel equipment to prevent a spurious initiation. Also the design change package did not specify any special conditions or precautions to reduce the possibility of spurious initiations.

As the leads were being landed to the rear of a Rosemount trip unit a wire retaining ring attached to the screw inadvertently rotated such that it came in contact with the power bus bar. When the bus bar was momentarily grounded a temporary loss of power to the channel "B" ECCS trip units in the cabinet occurred and when power to the trip units returned, selected trip units actuated.

APPARENT CAUSE OF OCCURRENCE

The cause of this occurrence is a previously identified design deficiency associated with the ECCS relay cabinet, inadequate precautions in the work package and inadequate pre job briefing between the technicians and the NSS to ensure the risks associated with the work, and measures to prevent a spurious initiation were thoroughly understood. A design change was being implemented at the time of this occurrence to correct the design deficiency. A corrective action, from a previous event, to complete the DCP during an outage was satisfied; however, planning did not take full advantage of the outage conditions to disable the logic or inhibit pump operation as the system was not required for shutdown condition.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)				
HOPE CREEK GENERATING STATION	05000354	YEAR	*	NUMBER	*	REV						
		9	2	- 0 0 4	-	0 0						0 5 of 0 5

PREVIOUS OCCURRENCES

Six previous occasions of ESF/ECCS actuations have occurred at Hope Creek due to accessibility and human factors problems in various relay cabinets (Ref: LERs 86-057, 86-089, 87-003, 87-010, 91-003, 91-014). The first four events resulted in development of a design change to enhance the testability of all similar cabinets by installing test boxes external to selected high risk cabinets. The fifth event occurred during surveillance testing, while the sixth event occurred when a portion of the design change was being implemented during power operation.

SAFETY SIGNIFICANCE

This incident posed no threat to the health and safety of the general public. The channel "B" ECCS systems initiated and isolated as designed. Additionally, redundant ECCS channels were unaffected and available for service if needed.

CORRECTIVE ACTIONS

1. The portion of the design change being implemented at the time of this event was completed and tested satisfactorily.

The full design change is scheduled for completion during the stations 4th refueling outage.
2. Maintenance Department Management will review this event with all Controls Department supervisors and technicians involved in the continuing implementation of the design change. Lessons learned from this event will be discussed in departmental continuing training.
3. Planning department will ensure all work orders, for the remainder of the DCP, contain steps to disable equipment to preclude a similar event.
4. The pre job briefing guidelines will be reviewed with Operations and Maintenance department personnel.

Sincerely,

J.J. Hagan for JJH
 J.J. Hagan
 General Manager
 Hope Creek Operations