PSEG

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

Hope Creek Operations

December 27, 1989

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 89-021-01

This Revised Licensee Event Report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(ii), and as noted in the original report. Please note that unavailability of personnel involved in the initial investigation precluded submitting this revision by the date originally expected (12/1/89).

Sincerely,

J.J.Hagan
General Manager -
Hope Creek Operations

RBC/

Attachment
SORC Mtg. 89-140

C Distribution

LICENSEE EVENT REPORT

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
HOPE CREEK GENERATING STATION	0 5 0 0 0 3 5 4	1 OF 5

TITLE (4): DEVIATION FROM ELECTRICAL SEPARATION CRITERIA BETWEEN TRANSIENT MONITORING CIRCUITRY AND REACTOR PROTECTION SYSTEM PANEL CIRCUITRY DUE TO INADEQUATE REVIEW OF DESIGN CHANGE PACKAGE IN 1986

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	**	NUMBER	MONTH	DAY	YEAR	FACILITY NAME (S)	DOCKET NUMBER (S)
1 0	1 3	8 9	8 9	-	0 2 1 - 0 1	1 2	2 7	8 9		

OPERATING MODE (9)	5	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)
		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)	XX 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	TELEPHONE NUMBER
R.B. Cowles, Lead Engineer - Technical	6 0 9 3 3 9 5 2 6 4

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?
					\\\\\\\					

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

ABSTRACT (16)

On 10/13/89, the Senior Nuclear Shift Supervisor (SNSS, SRO Licensed) was informed by I&C Systems Engineering that an engineering review of a design change affecting the General Electric Transient Analysis Recording System (GETARS) concluded that Class 1E electrical separation criteria had not been met in an Reactor Protection System (RPS) panel. Power from an external Class 1E Engineered Safety Features (ESF) Uninterruptable Power Supply (UPS) was connected to a GETARS multiplexer which interfaced with RPS circuitry, and adequate electrical separation was not provided. This configuration was in violation of separation criteria as established by Reg Guide 1.75. The root cause of this occurrence was the inadequate review of a 1986 design change package by construction support personnel. Actions were immediately taken to rectify the electrical separation deviations - primarily, removing the power supplies which did not conform to separation criteria, and re-powering affected GETARS components from internal RPS panel non-UPS power supplies. Other corrective actions include submitting an UFSAR change request to reflect the as-built design of the current configuration, implementing a design change to return the GETARS MUXs to original power sources, including this event in continuing training for engineering personnel on electrical separation, and disseminating this report to all engineering personnel.

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
Reactor Protection System (EIIS Designation: JC)
Transient Analysis Monitoring System (EIIS Designation: IP)
Engineered Safety Features Panels (EIIS Designation: JE)

IDENTIFICATION OF OCCURRENCE

Deviation From Electrical Separation Criteria Between Transient Monitoring Circuitry and Reactor Protection System Panel Circuitry Due to Inadequate Review of a Design Change

Event Date: 3/5/86
Discovery Date: 10/13/89
Discovery Time: 1350
This LER was initiated by Incident Report No. 89-137

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 5 (Refueling), outage work in progress.

DESCRIPTION OF OCCURRENCE

On 10/13/89, the Senior Nuclear Shift Supervisor (SNSS, SRO Licensed) was informed by I&C Systems Engineering that an engineering review of two design changes affecting General Electric Transient Analysis Recording System (GETARS) concluded that Class 1E electrical separation criteria had not been met in two Reactor Protection System (RPS) panels. Power from an external Class 1E Engineered Safety Feature (ESF) Uninterruptible Power Supply (UPS) was connected to GETARS multiplexers in RPS panel sections with RPS circuits. The method utilized to provide this UPS power did not meet the electrical separation criteria of Reg Guide 1.75.

APPARENT CAUSE OF OCCURRENCE

The root cause of this occurrence was the inadequate review of a design change by construction support personnel in 1986. The review failed to discover a design deficiency that did not ensure proper electrical separation between the RPS circuitry and GETARS multiplexers.

ANALYSIS OF OCCURRENCE

General Electric Transient Monitoring System (GETARS) multiplexers number 12 and 14 are used to monitor various RPS signals including scram isolation and Main Steam Isolation Valve (MSIV) positions. During system installation, a Startup Deviation Report (SDR) was generated on 1/30/86 stating that multiplexers (MUX) 12 and 14 were not supplied with Uninterruptible power supplies (UPS) as required by the FSAR. (This FSAR requirement existed due to the necessity of utilizing GETARS for acceptance criteria verification during the power ascension Loss of Power test.) Because MUXs 12 and 14 interface with RPS, the UPS must be Class 1E. The SDR was subsequently dispositioned to provide a Class 1E UPS to these MUXs. A design change request (DCR) was initiated on 3/5/86 to resolve this issue as well as several other GETARS problem areas.

The closest available Class 1E UPS to the subject MUXs is located in the Engineered Safety Features (ESF) side of the RPS/ESF panels containing the MUXs. However, in accordance with FSAR section 8.1.4.14.1, RPS and ESF must be separated electrically and physically from one another. The method utilized to provide separation involved penetrating the separation wall in the RPS/ESF panel with wires sealed in conduit to connect each MUX to the UPS. This provided physical separation but not electrical separation.

On 10/9/89, the original DCP was reviewed for closure by the Hope Creek I&C group. In this review, the separation issue for these systems was discovered and analyzed. A re-evaluation of the design determined that it did not adequately address electrical separation as required by Reg Guide 1.75. The circuit was routed from the RPS side of the panel to the ESF side of the panel without required separation mechanisms installed in the circuit. It was determined that electrical separation within the MUXs could not be demonstrated in accordance with the requirements of Reg Guide 1.75.

A Deficiency Report (DR) was generated and a temporary modification was performed to provide conformance with the FSAR separation criteria by removing the Class 1E UPS power from the MUXs. A safety evaluation was prepared to support the temporary modification stating in essence that although each class 1E MUX should be powered from a UPS, the MUXs which monitor the RPS do not provide any useful information in a loss-of-power scenario, since the RPS interrogation power for the RPS will no longer be available. During the second refueling outage, a permanent design change was implemented to reflect this configuration.

PREVIOUS OCCURRENCES

A review of past occurrences at Hope Creek indicates that this is the first identified instance of non-conformance with electrical separation criteria.

SAFETY SIGNIFICANCE

The circumstances described in this report posed minimal safety significance. An electrical fault could potentially have been propagated from the ESF panel to the RPS panel via the as-found electrical arrangement. This scenario is unlikely, however, because single fuse protection existed between the RPS and ESF cabinets, non-safety inputs to GETARS MUXs were separated via fiber optic links, and the MUXs are each individually fused at the power infeeds. Because of the channelized nature of RPS, it is not possible for such a fault to significantly degrade the availability and reliability of RPS.

CORRECTIVE ACTIONS

1. An UFSAR change request will be submitted to reflect that MUXs 12 and 14 will not be powered from a UPS.

2. A design change was implemented to reconfigure the MUX power to its original source, a non-UPS Class 1E power source.

3. The design change process which was in place in 1986 has been superceded by a new design change procedure. This procedure includes a design input checklist and peer review process. The addition of these enhancements should preclude recurrance of a similar event. Specific corrective actions with respect to the personnel errors in the review of the 1986 design change are not possible, as the design change was prepared by construction support personnel no longer on site.

4. This incident will be discussed during continuing training for all E&PB electrical engineers with regard to electrical separation criteria.

CORRECTIVE ACTIONS, CONT'D

5. This report will be forwarded to the Vice President - Nuclear Engineering for dissemination to all E&PB personnel.

Sincerely,

J.J. Nagan
General Manager -
Hope Creek Operations

SORC Mtg. 89-140