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

Hope Creek Operations

December 20, 1993

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 93-011-00

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

Sincerely,

R.J. Hovey
General Manager -
Hope Creek Operations

LAA/

Attachment
SORC Mtg. 93-63
C Distribution

270016

The Energy People

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PDR ADOCK 05000354
S PDR

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 - service water pump start due to an invalid refuel floor high radiation signal.																			
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)				
1	1	2 1 9 3	9	3	- 0 1 1	-	0 0	1	2	2 0 9 3									
OPERATING (9) MODE		1		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR: (CHECK ONE OR MORE BELOW) (11)															
POWER LEVEL %		0 9 0		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)(x)							
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 NPRDS?	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS?										
B	IL	MON	S637	YES															
SUPPLEMENTAL REPORT EXPECTED? (14)				YES	NO	x	DATE EXPECTED (15)			MONTH	DAY	YEAR							

ABSTRACT (16)

On Sunday, November 21, 1993, at 0220 hours, control room personnel received indication of a failure on the "C" reactor building exhaust (RBE) radiation monitoring channel. The Nuclear Shift Supervisor (NSS-SRO licensed) contacted the shift Instrument and Controls technician (I&C tech - nonlicensed) to investigate the cause of the "loss of counts" indication on the channel. The I&C tech and NSS proceeded to investigate the malfunction. During the course of troubleshooting the "C" RBE channel, which inops the "C" Refuel Floor Exhaust (RFE) channel and provided 1 input to the 2 of 3 logic (expected system response), an unrelated failure of the "A" RFE channel resulted in completing the 2 of 3 logic causing an invalid actuation of the primary containment isolation system (PCIS) at 0306 hours. The radiation monitoring system was returned to a normal configuration, the invalid actuation was reset and all systems which responded to the PCIS signal were returned to a normal lineup. The root cause of this event was attributed to equipment failures in each of the RMS channels. Corrective actions included replacing the failed preamp cards in the two affected channels and sending the failed preamp cards to the vendor for failure analysis. Additionally this event will be reviewed with maintenance and system engineering controls personnel.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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HOPE CREEK GENERATING STATION	05000354	YEAR	*	NUMBER			*	REV						
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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
 Station Service Water System (SSWS) EEIS Identifier CC
 Radiation Monitoring System (RMS) EEIS Identifier IL

IDENTIFICATION OF OCCURRENCE

TITLE: Engineered Safety System Actuation - service water pump start due to an invalid refuel floor high radiation signal.

Event Date: 11/21/93

Event Time: 0306

This LER was initiated by Incident Report No. 93-121

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 1 (Power Operation)
 Reactor Power 90% of rated, 1080 MWe. Turbine Valve testing in progress

DESCRIPTION OF OCCURRENCE

On Sunday, November 21, 1993, at 0220 hours, control room personnel received indication of a failure on the "C" reactor building exhaust (RBE) radiation monitoring channel. The Nuclear Shift Supervisor (NSS-SRO licensed) contacted the shift Instrument and Controls technician (I&C tech - nonlicensed) to investigate the cause of the "loss of counts" indication on the channel. The I&C tech observed the channel indications and attempted a power up reset of the devices by turning the power off and then on. When the channel completed its self diagnostic the loss of counts indication had cleared; however, the channel operate indicator did not illuminate. Indications similar to this have occurred on previous occasions and were corrected by cleaning the contacts on the back of the RM23 device located in the main control room. The RM23 which serves the "C" channel RBE exhaust also serves the "C" channel refuel floor exhaust (RFE) radiation monitoring channel. The RM23 was removed and the I&C tech cleaned the contacts. As the I&C tech was about to restore the RM23, the "A" channel RFE signal ramped high, resulting in an invalid RFE exhaust high radiation signal at 0306 hours. The reactor building normal ventilation system isolated and the filtered recirculation ventilation system (FRVS) auto started as well as the required support systems. When the "C" channel RM23 was returned to its slot the "A" RFE channel returned to its normal value. After verifying the three RFE channels all indicated normal values the invalid actuation was reset. The "C" channel RBE out of operate indication did not clear. Subsequent investigation determined that the "C" RBE detector had a failed remote preamp card which was replaced and the "C" channel tested satisfactorily. As the "A" RFE channel was not indicating any type of malfunction and was able to meet the channel check criteria it was not declared inoperable; however, a work request was written to investigate the channels signal.

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ANALYSIS OF OCCURRENCE

The portion of the radiation monitoring system discussed in this report is designed to monitor the reactor building and refuel floor ventilation system and to provide isolation signals for these systems in the event abnormal radiation levels are detected. The signals also provide starts to the FRVS and accompanying support systems to mitigate the consequences of a release. The system is comprised of three components, a detector located in the ventilation system exhaust plenum, a signal processor (RM80) and the RM23 which processes the trip signals to the primary containment isolation system (PCIS). The isolation logic requires 2 out of 3 RFE or 2 out of 3 RBE channels to actuate. The RM23 processor can monitor more than one channel input and provide independent output signals for each channel. When an RM23 is removed from its slot, all associated channel output signals will be output as an inop trip and input to the 2 out of 3 logic.

The loss of counts indication encountered during this event has been experienced on previous occasions. The previous event investigation identified dirty contacts on the back of the RM23 as the predominant cause for communication failures. The corrective actions included a revision to the preventive maintenance procedures for the RM23 to inspect and clean the connections regularly, and discussing the event with the I&C technicians. The tech recognized the condition and remembering the previous corrective action notified the NSS that removing the RM23 and cleaning the connectors may resolve the problem. The NSS concurred and after checking the status of the "A" and "B" RMS channel indications granted permission for the "C" channel RM23 to be removed. Shortly after the "C" channel RM23 was removed from the rack the "A" channel RFE ramped upscale in combination with the "C" channel RFE inop trip resulting in the PCIS actuation. The RM23 for "C" channel was restored and the "C" RBE still indicated downscale with the "C" RFE still indicating satisfactorily. When the indication did not change the upstream components were checked and it was later determined that the remote preamp at the detector had failed. The device was replaced and the channel tested satisfactorily. Following the high rad ramp signal on the "A" RFE channel, a check of the channel was performed with no conclusive reason for the ramped signal. The channel was again indicating properly as verified by performance of a channel check with the "B" and "C" RFE channels.

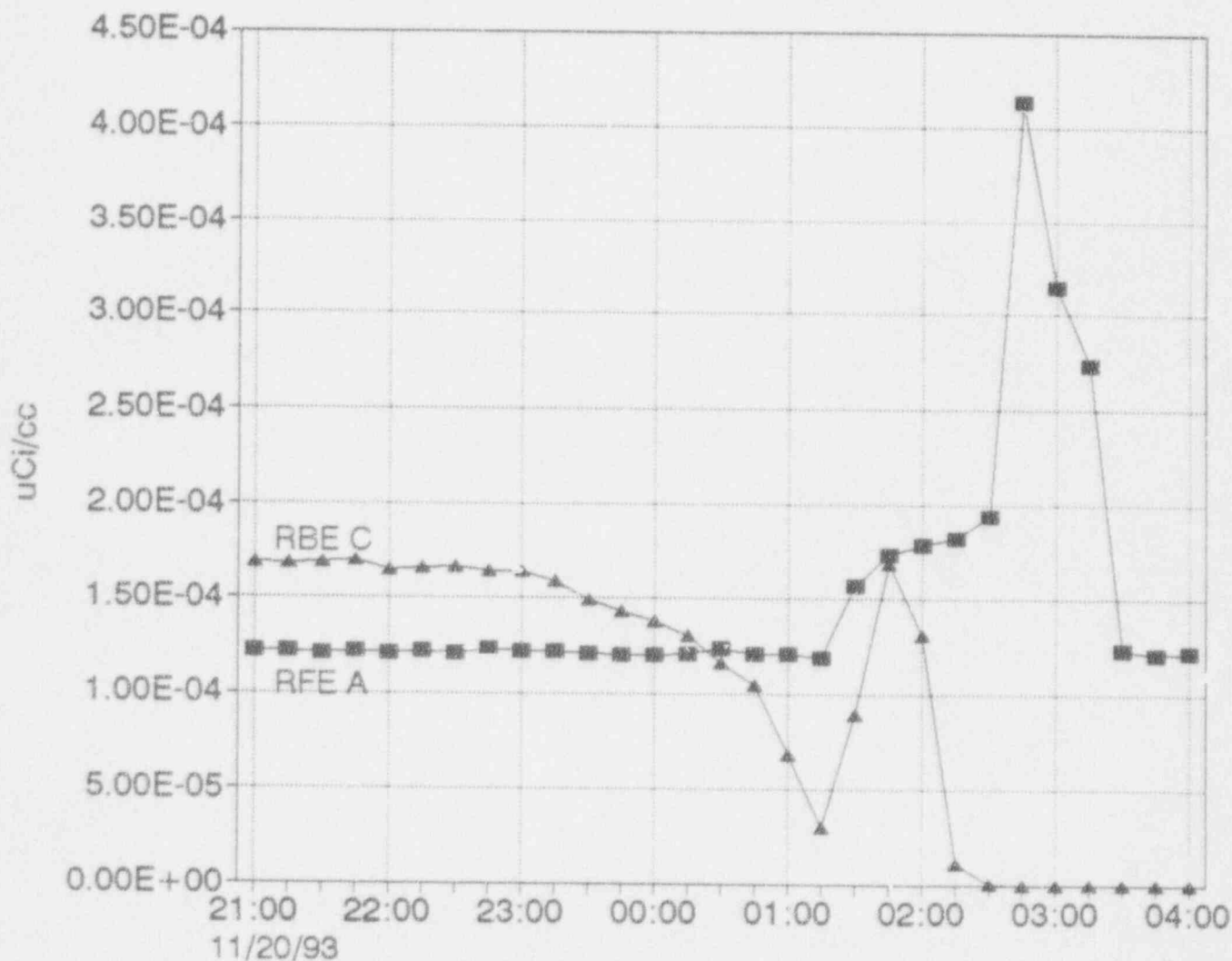
Subsequent investigation of this event determined the most likely cause to be noise on the common ground. A review of the RMS historical data indicated that the "A" RFE operation became erratic at or near the same time the "C" channel RBE failed. The RMS printout of 15 minute averages for the period preceding the "A" RFE ramped signal indicated a slow increase in the readings of the "A" RFE channel. The magnitude of the rise and the rate at which it was occurring would not be readily apparent when looking at a snapshot reading of the channel.

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ANALYSIS OF OCCURRENCE (Con't)

Although the two channels power supplies and circuits are physically separated, it is possible that the noise being generated by the "C" channel was being passed to the "A" channel RM80 through the common ground, and due to an unrelated failure on the "A" preamp card, a false high output was generated on the "A" RFE channel. The failure on the "A" RM80 preamp card would not be evident until such time as a noise induced increase in the reading was present. When the "C" RBE RM80 channel was removed from operation the "A" RFE channel returned to pre-event values. The "A" RBE and "C" RFE channels which share the same ground cable did not respond to the failure of the "C" RBE as their preamp devices were working properly.



A review of the remaining channel outputs, for the time period reviewed in this event, did not reveal any similar fluctuations or problems as seen on the "A" channel. The two preamp cards have been sent to the vendor for failure analysis.

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APPARENT CAUSE OF OCCURRENCE

The apparent root cause of the Isolation was due to failures of the A & C preamps for the "C" RBE and "A" RFE radiation monitoring channels and removal of the "C" RM23 which provided one of the required 2 out of 3 signals needed for actuation. The method of assessing the remaining channels performance prior to removing the "C" channel from service did not reveal the malfunction associated with the "A" RFE channel that the 15 minute trend readouts presented. The root cause of the preamp failures will be identified by vendor analysis of the cards.

PREVIOUS OCCURRENCES

An invalid actuation of PCIS resulting from the RMS system had been previously reported (ref: LER 88-016-00) however, the root cause of the previous occurrence was unrelated to this event.

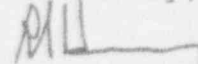
SAFETY SIGNIFICANCE

This incident posed minimal safety significance as the RMS and PCIS systems functioned as designed to initiate when a detector failure is sensed.

CORRECTIVE ACTIONS

1. The failed preamp cards in the "C" RBE and "A" RFE RMS channels have been replaced.
2. The failed preamp cards have been sent to the vendor for failure analysis. Based on the analysis additional corrective actions may be implemented.
3. This event will be reviewed with maintenance and system engineering controls personnel.

Sincerely,



R.J. Hovey
General Manager -
Hope Creek Operations

LLA/

SORC Mtg. 93-63

Recommended approval: Yes