



Public Service Electric and Gas Company P.O. Box 233 Hancocks Bridge, New Jersey 08038

Hope Creek Operations

January 18, 1991

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 90-034-00

This Licensee Event Report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Sincerely,

J.J. Hagan
General Manager -
Hope Creek Operations

RBC/

Attachment
SORC Mtg. 91-006

C Distribution

The Energy People

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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	4		
TITLE (4): AUTOMATIC START OF THE FILTRATION, RECIRCULATION, AND VENTILATION SYSTEM - ENGINEERED SAFETY FEATURES (ESF) ACTUATION DUE TO DESIGN INADEQUACY IN CONTROL CIRCUITRY																						
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	2	2	4	9	0	9	0	-	0	3	4	-	0	0	0	1	1	7	9	1		
OPERATING MODE (9)		1 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)									
POWER LEVEL		20.405(a) (1) (i)			50.36(c) (1)					50.73(a) (2) (v)			73.71(c)									
1		20.405(a) (1) (ii)			50.36(c) (2)					50.73(a) (2) (vii)			OTHER (Specify in									
0		20.405(a) (1) (iii)			50.73(a) (2) (i)					50.73(a) (2) (viii) (A)			Abstract below									
////////////////////		20.405(a) (1) (iv)			50.73(a) (2) (ii)					50.73(a) (2) (viii) (B)			and in Text)									
////////////////////		20.405(a) (1) (v)			50.73(a) (2) (iii)					50.73(a) (2) (x)												
LICENSEE CONTACT FOR THIS LER (12)																						
NAME										TELEPHONE NUMBER												
Richard Cowles, Senior Staff Engineer - Technical										6	0	9	3	3	9	3	4	3	1			
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE NOTED IN THIS REPORT (13)																						
CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS?	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS?													
SUPPLEMENTAL REPORT EXPECTED? (14)				YES	NO	XX	DATE EXPECTED (15)			MONTH	DAY	YEAR	////////////////////									

ABSTRACT (16)

On 12/24/90 at 1830, the "F" Filtration, Recirculation, and Ventilation System (FRVS) recirculation fan was discovered running during shift turnover. A review of strip charts indicated that the fan automatically started at about 1545. On 1/7/91 at 2215, control room operators observed the "E" FRVS recirculation fan auto-start for no apparent reason.

In both cases, after verifying that the fan was not running for testing or other reasons, the Nuclear Shift Supervisor (NSS, SRO licensed) directed that the fans be stopped and returned to a normal (standby) status. Subsequent investigation determined that the cause of the "F" and "E" FRVS recirculation fan starts was an apparently spurious low flow signal from the respective FRVS vent fans. The primary cause of this and similar recent spurious FRVS auto-starts is the less than adequate design of the "E" and "F" FRVS fan auto-initiation circuitry. The inherent sensitivity of FRVS flow instrumentation renders the circuitry susceptible to spurious fan starts under normal operating conditions, with only minor fluctuations in system operating parameters. Additionally, it was determined that condensation accumulation in FRVS instrument tubing may contribute to the fluctuations. Corrective actions include expediting a previously identified design change request to modify the "E" and "F" FRVS fan auto-start circuitry. The proposed design change will incorporate a momentary time delay in the circuitry to preclude spurious starts. Additionally, test procedures for all FRVS units will be modified to require blowdown of FRVS instrument tubing following test completion.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)						
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HOPE CREEK GENERATING STATION	05000354	90	-	0	3	4	-	0	0	0	2	OF	0	4

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
 Filtration, Recirculation and Ventilation System (FRVS)
 (EIIIS Designation: BH)

IDENTIFICATION OF OCCURRENCE

Automatic Start of the FRVS System - Engineered Safety Features (ESF) Actuation due to Design Inadequacy in Control Circuitry

Event Dates: 12/24/90; 1/7/91

Event Times: 1545; 2215

This LER was initiated by Incident Report Nos. 90-171 and 91-004

CONDITIONS PRIOR TO OCCURRENCE

12/24/90: Plant in OPERATIONAL CONDITION 1 (Power Operation), reactor power 100%, unit load 1110MWe.

1/7/91: Plant in OPERATIONAL CONDITION 5 (Refueling), 3rd refuel outage in progress.

DESCRIPTION OF OCCURRENCE

On 12/24/90 at 1830, the "F" FRVS recirculation fan was discovered running during shift turnover. A review of strip charts indicated that the fan automatically started at about 1545. After verifying that the fan was not running for testing or other reasons, the NSS directed that the fan be stopped and returned to a normal (standby) status. The start of the fan was not immediately noted by control room personnel because no annunciation exists in the control room to alert operators when an FRVS unit automatically starts.

On 1/7/91 at 2215, control room operators observed the "E" FRVS recirculation fan start for no apparent reason. Again, after verifying the operational status of the fan, the NSS directed that the fan be stopped and returned to a standby status.

In each case, the NSS initiated a four hour non-emergency report in accordance with 10CFR50.72 due to the apparently spurious nature of the fan auto-starts. The FRVS system at Hope Creek is classified as an ESF system.

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APPARENT CAUSE OF OCCURRENCE

The primary cause of these occurrences was determined to be a less than adequate design of the "E" and "F" FRVS recirculation fan auto-initiation circuit.

ANALYSIS OF OCCURRENCE

The FRVS system is designed to perform two primary functions; removal of radioactive particulates and maintaining negative reactor building pressure in an accident scenario. The "E" and "F" FRVS recirculation fans are normally in standby, and will automatically start if a low flow signal is generated from any one of the "A", "B", "C" or "D" FRVS ventilation trains.

No FRVS testing or maintenance was in progress at the time of either occurrence, and a review of the control room alarm chronologs did not reveal any plant conditions which may have resulted in the start of the fans. All FRVS units were in standby (no fans running) at the time of these occurrences. No work was taking place immediately adjacent to any of the FRVS units.

Subsequent investigation of this occurrence took place concurrently with an ongoing engineering evaluation of FRVS flow instrumentation and circuitry based on similar events in May and October, 1990 (reference: LERs 354/90-006-00 and 90-023-00). Results of this evaluation concluded that the design of the "E" and "F" FRVS fan auto-initiation circuit is less than adequate. The flow switches on the FRVS units have a range of 0 - .15"WC, with a trip setpoint of .1"WC. The inherent sensitivity of the flow switches renders the circuitry susceptible to spurious fan starts under normal operating conditions, with only minor fluctuations in system operating parameters. Systems Engineering has determined that the auto-initiation circuits for the "E" and "F" FRVS recirculation fans should be enhanced with a short time delay to preclude spurious starts from these momentary system fluctuations. Additionally, it was determined that condensation accumulation in FRVS instrument tubing may contribute to the fluctuations.

A search of the Nuclear Plant Reliability Data System (NPRDS) concluded that no failures of similar flow switches have been reported. All similar flow switches at Hope Creek have been verified to be operating within expected parameters.

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PREVIOUS OCCURRENCES

Four spurious starts of FRVS ventilation trains have been previously reported (ref: LERs 87-016, 87-033, 90-006, and 90-023). The initiating causes of events described in LERs 87-016, 90-006 and 90-023 could not be definitively determined. In response to the problems noted in 90-006 and 90-023, Systems Engineering initiated a design change request to modify the auto-initiation circuits to include a momentary time delay. The cause of the event described in LER 87-033 was attributed to dirty flow switch contacts on the "A" and "B" FRVS ventilation trains.

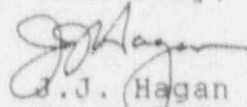
SAFETY SIGNIFICANCE

These incidents had no safety impact because, had either FRVS recirculation fan been required to start to mitigate the consequences of an analyzed accident, they were already in service. Additionally, all other FRVS trains were operable during the course of this event.

CORRECTIVE ACTIONS

1. Systems Engineering is expediting a design change to install a time delay in the auto-initiation circuit of the "E" and "F" FRVS units to preclude spurious actuations due to momentary system perturbations.
2. An evaluation is being conducted to determine the feasibility of providing audible annunciation for an "E" or "F" FRVS auto-start.
3. All FRVS unit surveillance test procedures are being modified to require blowdown of the associated instrument tubing following running of the units.

Sincerely,



J.J. Hagan
 General Manager -
 Hope Creek Operations

RBC/

SORC Mtg. 91-006