



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

Hope Creek Generating Station

DATE March 11, 1992

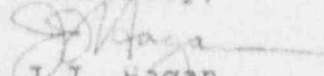
U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Dear Sir:

HOPE CREEK GENERATING STATION  
DOCKET NO. 50-354  
UNIT NO. 1  
LICENSEE EVENT REPORT 91-019-02

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

Sincerely,

  
J.J. Hagan  
General Manager -  
Hope Creek Operations

LLA/

Attachment  
SORC Mtg. 92-020  
C Distribution

9203190173 920311  
PDR ADOCK 05000354  
S PDR

TL Energy People

160085

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 Action - "E" Filtration Recirculation Ventilation System Recirc Fan start.																			
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	2	1 6 9 2	9	1	0 1 9	-	0 2	0	3	1 1 9 2									
OPERATING (9) MODE 1			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR: (CHECK ONE OR MORE BELOW) (11)																
POWER LEVEL % 1 0 0			<div style="display: flex; justify-content: space-between;"> <div> 20.402(b) 20.405(a)(1)(i) 20.405(a)(1)(ii) 20.405(a)(1)(iii) 20.405(b)(1)(iv) 20.405(a)(1)(v) </div> <div> 20.405(c) 50.36(c)(1) 50.36(c)(2) 50.73(a)(2)(i) 50.73(a)(2)(ii) 50.73(a)(2)(iii) </div> <div> AS 50.73(a)(2)(iv) 50.73(a)(2)(v) 50.73(a)(2)(vii) 50.73(a)(2)(viii)(A) 50.73(a)(2)(viii)(B) 50.73(a)(2)(x) </div> <div> 73.71(b) 73.71(c) OTHER (Specify in Abstract below and in Text) </div> </div>																
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?										
B	SH	FS	A340																
SUPPLEMENTAL REPORT EXPECTED? (14) YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>					DATE EXPECTED (15)					MONTH DAY YEAR									
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### ABSTRACT (16)

On 11/23/91 at 0500 hours, Control Room Operators (RO licensed) discovered that the "E" Filtration Recirculation Ventilation (FRVS) fan was running. After verifying no valid start signals were present the fan was secured. At 0638 hours during shift turnover the "E" FRVS fan started a second time. Operators noticed the fan start during panel walk down. They again verified no valid start signals were present and secured the fan. Operators could not determine the cause of the fan start and requested Instrument and Control Technicians to investigate. On 12/13/91 the E FRVS was instrumented and the FRVS System (A,B,C and D FRVS Recirc fans) was placed in service to determine the root cause of the spurious fan starts in conjunction with DOP/Halide testing. The FRVS System was in service for 6.5 hours with no auto fan starts occurring. The fans were secured at 1222 hours at the completion of the DOP/Halide test. At 1557 hours the E FRVS Recirc fan spuriously started and was subsequently secured by operations personnel. Subsequent investigation has revealed an accumulation of water in the low flow switch sensing lines as the most probable cause of the spurious fan starts. The testing did result in additional fan starts, on 12/23/91 the standby "E" FRVS Recirc unit, on 1/2/92 the standby "F" FRVS Recirc unit auto started and on 1/14/92 "E" FRVS Recirc unit auto started. An additional start of the "E" FRVS Recirc unit occurred on 2/16/92 following a surveillance test run. Previous corrective actions to ensure the accumulated water is drained periodically has improved operation of the system; however, subsequent investigation has revealed the need for more frequent draining and the possibility of rerouting the instrument tubing to eliminate collection points.

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)  
 Filtration Recirculation Ventilation System (FRVS)  
 (FIIS Designation: BH)

IDENTIFICATION OF OCCURRENCE

Engineered Safety Feature Actuation - Unplanned start of standby  
 Filtration Recirculation System Recirculation Fan E.

Event Date: 11/23/91, 12/13/91, 12/23/91, 1/2/92, 1/14/92 and 2/16/92  
 Event Time: 11/23/91 - 0500, 0638, 0801, 12/13/91 - 1557, 12/23/91 -  
 2345, 1/2/92 - 0707, 1/14/92 - 1710 and 2/16/92 - 0006.  
 This LER was initiated by Incident Report No. 91-163A, 91-174, 91-182,  
 92-003, 92-009 and 92-034.

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 1 (Power Operation)  
 Reactor Power 100%, Unit load 1111 MWe.

DESCRIPTION OF OCCURRENCE

On 11/23/91 at 0500 hours, Control Room Operators (RO licensed)  
 discovered that the "E" Filtration Recirculation Ventilation (FRVS) fan  
 was running. After verifying no valid start signals were present the  
 fan was secured. At 0638 hours during shift turnover the "E" FRVS fan  
 started a second time. Operators noticed the fan start during panel  
 walk down. They again verified no valid start signals were present and  
 secured the fan. Operators could not determine the cause of the fan  
 start and requested Instrument and Control Technicians to investigate.  
 The Technicians proceeded to drain the instrument lines as moisture  
 accumulation had been responsible for previous incidents of spurious  
 fan starts. No moisture was noted and no direct cause for the fan  
 starts could be determined. The fan started again at 0801 hours  
 prompting operations personnel to secure the operating fan and declare  
 the fan inoperable.

On 12/13/91 the E FRVS was instrumented and the FRVS System (A,B,C and  
 D FRVS Recirc fans) was placed in service to determine the root cause  
 of the spurious fan starts in conjunction with DOP/Halide testing. The  
 FRVS System was in service for 6.5 hours with no auto fan starts  
 occurring. The fans were secured at 1222 hours at the completion of  
 the DOP/Halide test. At 1557 hours the E FRVS Recirc fan spuriously  
 started and was subsequently secured by operations personnel. The  
 recorder paper was removed and forwarded to System Engineering for  
 evaluation. The testing did result in additional fan starts, on  
 12/23/91 the standby "E" FRVS Recirc unit, on 1/2/92 the standby "F"  
 FRVS Recirc unit auto started and on 1/14/92 "E" FRVS Recirc unit auto  
 started. An additional start of the "E" FRVS Recirc unit occurred on  
 2/16/92 following a surveillance test run.

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### ANALYSIS OF OCCURRENCE

The FRVS system is designed to mitigate the consequences of an accident by removing Iodine from the reactor building atmosphere prior to release and maintaining reactor building pressure negative following a design basis accident or refueling accident. The system consists of six 25% capacity recirculation fan units and two 100% capacity vent fan units. A typical alignment, when the system is placed in service, would consist of four recirculation units and one vent unit running with the remaining units in standby. The standby recirculation units will auto start if a low flow condition were to develop on a running recirculation fan. All fans start on an ESF signal of either Low Reactor Level (-38") or High Drywell pressure (1.68 psig) or Reactor Building/ Refuel Floor exhaust high radiation.

The low flow start signal is generated via flow switches located on the outlet of the recirculation units and is processed through the Bailey Logic panel. When the logic senses low flow on a running fan an auto start signal is generated to start a standby fan. The configuration of the logic will send an auto start signal whenever low flow is sensed; however, the duration of the signal is only one second long. This allows the standby fans to be placed in auto after the running fans have been secured. If the signal is reset by either a valid or spurious flow signal and subsequently low flow is sensed again, a new start signal will be generated to start the standby fan. The switch has a range of .04 - .15" of water, with the trip setpoint set at .1" of water.

A review of the test data gathered during and following the test runs revealed two failed flow switches associated with the low flow start logic for the E FRVS Recirc fan. One of the switches had failed in the low flow state, which would have prevented the E FRVS Recirc fan auto start if the C FRVS Recirc fan had developed an actual low flow. The remaining failed switch was operating intermittently changing state from low flow to adequate flow and low flow again regardless of C FRVS Recirc fan operation resulting in spurious fan starting.

The two low flow switches were removed from the units and an as found calibration was performed. One of the switches calibrated satisfactorily while the second unit was found to be out of tolerance. Following the calibration, both switches were disassembled for an internal inspection. The switch which failed calibration showed signs of moisture intrusion and the diaphragm appeared to be deformed. The second switch diaphragm appeared normal but signs of moisture intrusion were present.



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ANALYSIS OF OCCURRENCE (cont)

An inspection of the instrument sensing lines revealed approximately 4 ounces of water had accumulated in the line. The configuration of the sensing line is such that a large loop is formed between the sensing device and the flow switches. The loop accumulates water to such a degree that accurate communication from the sensing device to the switch is lost. The subsequent starts experienced on 12/23/91, 1/2/92, 1/14/92 and 2/16/92 were attributed to water accumulation in the sensing lines during follow up testing committed to in LER 91-019 rev 0.

APPARENT CAUSE OF OCCURRENCE

The cause of E and F FRVS Recirc fan starts is the accumulation of water in the low flow switch and instrument lines combined with minor pressure perturbation in the ventilation system causing actuation of the low flow auto start logic. Although procedures currently direct personnel to drain the accumulated water following system operation, the methods employed did not allow all the water to be drained due to different tubing configuration on individual fan units.

The accumulation of water is also responsible for the failure of the flow switch to sense actual flow when the fan is running thereby inhibiting the auto start feature of the standby units if a running fan were to trip.

PREVIOUS OCCURRENCES

There have been 9 previous occurrences of auto starts of the standby FRVS Recirculation fans as reported in LERS 87-016, 87-033, 90-006, 90-023, 90-034, 91-018, 91-019 rev 0 and 91-019 rev 1. The cause of the previous events were attributed to the less than adequate design of the auto start logic. In two of the events LER 90-034 and 91-018 similar conditions, as stated above, were reported as the cause of that event.

SAFETY SIGNIFICANCE

This event posed minimal safety significance as the system would have operated as designed in an actual emergency. Although a low flow condition on C FRVS Recirc fan would not have auto started the E FRVS Recirc fan, the F FRVS Recirc fan was capable of auto starting from the C FRVS Recirc fan.

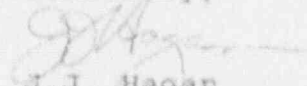
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CORRECTIVE ACTIONS

1. The instrument lines have been removed and cleaned and the two inoperable low flow switches have been replaced.
2. The cooling water coil on the outlet of the fan unit has been inspected to determine it was not the source of the moisture.
3. A Design Change Package has been approved for installation at the next outage which will prevent spurious starts from the low flow switches during normal plant operation.
4. System Engineering is continuing testing to determine why the water is accumulating in the instrument lines including a review of the effectiveness of previous corrective actions. Additional design changes may be implemented upon completion of the review.
5. A follow-up report will be submitted when the cause and corrective actions for item 4 are determined.

Sincerely,



J.J. Hagan  
General Manager -  
Hope Creek Operations

LLA/  
SORC Mtg. 92-020