



U.S. Nuclear Regulatory Commission
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Washington, DC 20555

MAR 28 2005

Serial: HNP-05-037
10CFR50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
LICENSEE EVENT REPORT 2005-001-00

Ladies and Gentlemen:

The enclosed Licensee Event Report 2005-001-00 is submitted in accordance with 10 CFR 50.73. This report describes a Single Failure Vulnerability for the Reactor Auxiliary Building Emergency Exhaust System.

Please refer any questions regarding this submittal to Mr. Dave Corlett, Supervisor - Licensing/Regulatory Programs, at (919) 362-3137.

Sincerely,

A handwritten signature in black ink, appearing to read 'BCW' followed by a stylized flourish.

B. C. Waldrep
Plant General Manager
Harris Nuclear Plant

BCW/sfm

Enclosure

c: Mr. R. A. Musser (HNP Senior NRC Resident)
Mr. C. P. Patel (NRC-NRR Project Manager)
Dr. W. D. Travers (NRC Regional Administrator, Region II)

Progress Energy Carolinas, Inc.
Harris Nuclear Plant
P.O. Box 165
New Hill, NC 27562

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME: Harris Nuclear Plant - Unit 1
2. DOCKET NUMBER: 05000400
3. PAGE: 1 OF 5

4. TITLE: Reactor Auxiliary Building Emergency Exhaust System Single Failure Vulnerability

5. EVENT DATE: 1/27/2005
6. LER NUMBER: 2005-001-00
7. REPORT DATE: 03/28/2005
8. OTHER FACILITIES INVOLVED: N/A

9. OPERATING MODE: 1
10. POWER LEVEL: 100
11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)

12. LICENSEE CONTACT FOR THIS LER: Robert G. Hill - Lead Engineer, 919-362-2033

Table with 10 columns: CAUSE, SYSTEM, COMPONENT, MANUFACTURER, REPORTABLE TO EPIX. All cells are empty.

14. SUPPLEMENTAL REPORT EXPECTED: YES (checkbox) NO (checkbox checked)
15. EXPECTED SUBMISSION DATE: MONTH, DAY, YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)
At approx. 14:00 on Jan. 27, 2005, with reactor power approximately 100%, Harris Nuclear Plant identified a single failure vulnerability for both trains of the Reactor Auxiliary Building Emergency Exhaust System (RABEES). When the RABEES filtration trains are in their standby alignment, the cooling bleed valve associated with the train that was last running remains open. This bleed valve is a motor operated valve located at the inlet to the opposite train's filter unit and shuts when the associated train fan starts. If a Safety Injection Signal occurs coincident with a loss of the electrical bus for the last running train, the open bleed valve would fail to shut upon start of the associated train's fan creating an air flow leakage path that was not considered in the design bases for RABEES. This leak path could reduce the exhaust flow from the RABEES boundary and prevent the system from establishing the required negative 1/8 inch water gauge pressure in the areas served by RABEES. The root cause is a deficiency from initial plant design. Procedure changes were implemented on 1/28/05 to ensure that both bleed valves are shut when both RABEES fans are secured. When a single RABEES fan is in service, the applicable Tech Spec LCO is entered because one of the bleed valves must remain open. An engineering change has been initiated to eliminate the single failure vulnerability.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

I. DESCRIPTION OF EVENT

The Reactor Auxiliary Building Emergency Exhaust System (RABEES) [VF] serves to limit the post-accident radiological releases from selected potentially contaminated portions of the Reactor Auxiliary Building (RAB). These areas include the charging pump, Residual Heat Removal (RHR) heat exchanger [BP], containment spray [BE] and RHR pump room, mechanical, electrical and Heating and Ventilation (H&V) rooms and mechanical, electrical and H&V penetration areas. Since leakage in these areas following a Safety Injection Signal (SIS) is a potential source of additional offsite dose, the RABEES is provided to ensure that such airborne leakage is filtered prior to release to the environment.

The Harris Plant Technical Specification 3/4.7.7 requires two independent Reactor Auxiliary Building Emergency Exhaust Systems be operable in modes 1 through 4. Specifically, surveillance requirement 4.7.7.d.3 requires verification that the system maintains the areas served at a negative pressure of greater than or equal to 1/8 inch water gauge relative to the outside atmosphere.

At approximately 14:00 on January 27, 2005, with reactor power approximately 100%, Harris Nuclear Plant identified a single failure vulnerability where both trains of the RABEES could be inoperable. This condition was discovered by the system engineer researching a question from the Operations Department. When the RABEES filtration trains are shutdown and placed in their standby alignment, the cooling bleed valve associated with the train that was last running remains open. This bleed valve is a motor operated valve located at the inlet to the opposite train's filter unit and shuts when the associated train fan starts. If a Safety Injection Signal occurs coincident with a loss of the electrical bus for the last running train; the open bleed valve would fail to shut upon start of the associated train's fan, creating an air flow leakage path that was not considered in the design bases for RABEES. This leak path could reduce the exhaust flow from the RABEES boundary and prevent the system from establishing the required negative 1/8 inch water gauge pressure in the areas served by RABEES.

The A train RABEES was declared inoperable on 1/27/05 at 14:00 and was inoperable for 29 hours 50 minutes until procedure changes were implemented on 1/28/05.

II. CAUSE OF EVENT

The root cause of the bleed valve single failure vulnerability is a design deficiency existing since original plant construction. Due to the long time period since occurrence (over 20 years), the inappropriate act that led to this deficiency could not be determined. Research of the Corrective Action Program database indicated that single failure design deficiencies is not a generic problem or an adverse trend at HNP.

III. SAFETY SIGNIFICANCE

There are no significant safety consequences as a result of this condition. The RABEES would have achieved sub-atmospheric pressure in the areas served to prevent unfiltered release of radiological contaminants during a Design Basis Accident (DBA).

The safety significance determination of the single failure vulnerability of the RABEES is focused on the inability to maintain the areas served at a negative pressure of 1/8 inch water gauge. This is determined by looking at the ability of the system to contain airborne radiological containments in the event of a DBA. The 1/8 inch water gauge requirement stems from the Control Room habitability requirements in the Standard Review Plan NUREG-0800 Section 6.4. This standard establishes control room in-leakage requirements for both radiological and hazardous chemical events. It endorses the guidelines in Regulatory Guide 1.78 for protection of the control room from toxic gases. Section C.8 of Reg. Guide 1.78 states that in the calculation of the rate of air infiltration (air leakage into the control room from ducts, doors, or other openings) with the control room isolated and not pressurized, use of the assumption for a pressure differential of 1/8 inch water gauge across all leak paths assumption is suggested.

NRC FORM 366AU.S. NUCLEAR REGULATORY COMMISSION
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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)**(SAFETY SIGNIFICANCE – continued)**

Guidelines for control room habitability have now been updated by NEI 99-03 Revision 1 (issued March 2003), Control Room Habitability Guidance. This document states that if a design or Technical Specification differential pressure value does not exist then: a) for adjacent spaces that are at essentially outside atmosphere, a positive 0.125 inch water gauge pressure differential is recommended to allow for atmospheric variation; and b) for adjacent areas inside a building where conditions are more stable, a positive pressure differential of 0.05 inches water gauge is sufficiently high to demonstrate assurance of pressurization.

The areas served by the RABEES are located within the interior space of the Reactor Auxiliary Building and do not communicate directly with the atmosphere. As such, the RABEES boundary conditions are stable and the NEI 99-03 Revision 1 requirement of 0.05 inches water gauge would be sufficient to demonstrate assurance that RABEES could contain the post-accident radiological contamination. From analysis, the worst case RABEES boundary pressure would be 0.094 inch water gauge. Therefore, the RABEES has adequate operating capacity to ensure that sufficient sub-atmospheric conditions will be achieved to contain radiological contaminants in the event of a DBA coincident with loss of an electrical bus.

Based on the above evaluation, the RABEES would not have been able to maintain the Tech Spec required negative 1/8 inch water gauge pressure in a single failure design bases operating condition. However, the RABEES would have achieved sub-atmospheric pressure in the areas served to prevent unfiltered release of radiological contaminants during a DBA. Therefore, there would have been no adverse radiological consequences as a result of a failed open bleed valve on the running filtration unit.

This report is submitted pursuant to the requirements of 10CFR50.73 (a)(2)(i)(B) as a condition prohibited by Technical Specifications. This is due to the inability of the RABEES to meet single failure criteria and still satisfy Technical Specification surveillance requirement 4.7.7.d.3 to meet the negative 1/8 inch water gauge pressure requirements.

IV. CORRECTIVE ACTIONS

The root cause is a deficiency from initial plant design. The A train RABEES was declared inoperable on 1/27/05 until procedure changes were implemented on 1/28/05 to ensure that both bleed valves are shut when both RABEES fans are secured. When a single RABEES fan is in service, the applicable Tech Spec LCO is entered because one of the bleed valves must remain open. An engineering change has been initiated to eliminate the single failure vulnerability.

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V. PREVIOUS SIMILAR EVENTS

The following previous Harris Plant single failure design vulnerabilities are identified:

LER 94-003-01

Condition Report CR 94-2483 "Single Failure of 1SW-270 Affecting Both ESW Trains" – An unanalyzed single failure was identified in one train of Emergency Service Water (ESW) that could prevent the High Head Charging Safety Injection Pumps (CSIPs) from performing their safety function due to inadequate oil cooling.

The corrective actions for this condition report included initial and continuing training on single failure concerns. The RABEES concerns identified were from the original plant design and predate this corrective action. In addition, a general review was performed on other piping systems for cross connections that could have adverse system operational effects which included High and Low Head Safety Injection, Component Cooling Water, and the Auxiliary Feedwater systems. No similar vulnerabilities were found. A review of piping system single failure vulnerabilities would not have discovered a single failure vulnerability in the RABEES.

LER 96-024-00

Condition Report CR 96-3648 "Single Failure Causing AH-16 A & B to be Inoperable" - Potential common mode failure related to the design of a smoke detector circuit in the AH-16 Fan unit's ductwork that could prevent the safety function of cooling safety components in the RAB Electrical Equipment Protection Room.

The RABEES concerns identified were from the original plant design and predate the identification of the AH-16 A & B potential common mode failure.

NCR 63463 (2002) "RWST Level Transmitters" - During a review of the susceptibility of the Refueling Water Storage Tank (RWST) Level Transmitters to a flood, a design basis non-compliance concern from original plant design was identified for the existing instrumentation installation.

The low number of actual single failure design deficiencies indicates there is not an adverse trend in this area, or a need to investigate additional components or systems for single failure deficiencies. Furthermore, these single failure design deficiencies related to original plant design were found through the course of operating the plant.

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VI. COMMITMENTS

The actions committed to by Carolina Power & Light Company doing business as Progress Energy Carolinas, Inc. (PEC) in this document are identified below. Any other actions discussed in this submittal represent intended or planned actions by PEC. They are described for the NRC's information and are not regulatory commitments.

Commitment(s)	Scheduled Completion Date
Implement an engineering change to eliminate the single failure vulnerability.	Refueling Outage 13 (Current schedule May 15, 2006)