

# PRIORITY

(ACCELERATED RIDS PROCESSING)

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9512050148      DOC. DATE: 95/11/30      NOTARIZED: NO      DOCKET # 05000400  
 FACIL: 50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina  
 AUTH. NAME      AUTHOR AFFILIATION  
 VERRILLI, M.      Carolina Power & Light Co.  
 DONAHUE, J.W.      Carolina Power & Light Co.  
 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 95-006-01: on 950824, ECCS sys piping was not fully contained within RAB emergency exhaust sys boundary resulted in condition outside design basis. Periodically inspected affected piping for leakage. W/951130 ltr.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 4  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc

NOTES: Application for permit renewal filed.      05000400

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Carolina Power & Light Company  
Harris Nuclear Plant  
PO Box 165  
New Hill NC 27562

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SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1  
DOCKET NO. 50-400  
LICENSE NO. NPF-63  
LICENSEE EVENT REPORT 95-006-01

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report revision is submitted to provide additional information regarding the inconsistencies between the design of the Reactor Auxiliary Building Emergency Exhaust System and the associated offsite dose analysis.

Sincerely,

J. W. Donahue  
General Manager,  
Harris Plant

MV

Enclosure

c: Mr. S. D. Ebnetter (NRC - RII)  
Mr. N. B. Le (NRC - PM/NRR)  
Mr. D. J. Roberts (NRC - SHNPP)

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## LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Shearon Harris Nuclear Plant-Unit #1

DOCKET NUMBER (2) 50-400

PAGE (3) 1 of 3

TITLE (4) Emergency Core Cooling System piping not fully contained within Reactor Auxiliary Building Emergency Exhaust System boundary, resulting in condition outside design basis.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	24	95	95	-- 006 --	01	11	30	95	FACILITY NAME	DOCKET NUMBER 05000
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		76%	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)(vi)		OTHER	
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(vii)(A)		(Specify in Abstract below and in Text. NRC Form 366A)	
			20.405(a)(1)(iv)		X 50.73(a)(2)(ii)		50.73(a)(2)(vii)(B)			
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)			

## LICENSEE CONTACT FOR THIS LER (12)

NAME

Michael Verrilli Sr. Analyst - Licensing

TELEPHONE NUMBER (Include Area Code)

(919) 362-2303

## COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

## SUPPLEMENTAL REPORT EXPECTED (14)

YES

(If yes, complete EXPECTED SUBMISSION DATE).

X NO

EXPECTED SUBMISSION DATE (15)

MONTH

DAY

YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On August 24, 1995, a discrepancy related to the original design of the Reactor Auxiliary Building (RAB) Emergency Exhaust System was determined to constitute a condition outside the design basis of the plant as described in the Harris Plant Final Safety Analysis Report (FSAR). This discrepancy pertains to a portion of Emergency Core Cooling System (ECCS) piping that is physically located outside of the boundary of the RAB Emergency Exhaust System envelope. If leakage consisting of highly radioactive water occurred from this section of piping during a postulated design basis loss of coolant accident (LOCA), offsite dose rates would be higher than originally concluded. Specifically, the FSAR dose rate analysis assumed that released effluent would first be processed through the RAB Emergency Exhaust System filtration units, prior to being released to the atmosphere. This would not be true for ECCS leakage outside of the emergency ventilation system boundary. The cause of the inconsistency was determined to be inadequate documentation and communication of assumptions between two separate engineering groups within the plant's architect engineering firm during initial plant design, which resulted in incorrectly assuming that all ECCS leakage would be filtered. Additional engineering analysis, including a recalculated offsite dose assessment were completed and provided to the NRC. The analysis incorporated the unfiltered ECCS leakage values and based on administrative controls and limitations concluded that offsite dose rates will remain within acceptable regulatory limits.

LICENSEE EVENT REPORT (LER)  
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FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Shearon Harris Nuclear Plant - Unit #1	50-400	95	006	01	2 OF 3

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

**EVENT DESCRIPTION:**

In July 1995, during a review of regulatory issues, the validity of the dose assessment analysis for Emergency Core Cooling System (ECCS) leakage outside of containment, contained in section 15.6.5 of the Harris Final Safety Analysis Report (FSAR), was questioned by Harris plant personnel. Additional research into this analysis was performed by CP&L Engineering personnel. The main concern was that the methodology of the ECCS leakage assumptions in the dose calculation did not match the assumptions in the Standard Review Plan (SRP). After reviewing sufficient information confirming that a potential problem did indeed exist, a Condition Report (CR #95-1862) was initiated on August 7, 1995, and a formal investigation was initiated to resolve the concern. After re-evaluating the ECCS components located outside the boundary of the RAB Emergency Exhaust System and the corresponding assumed external leakage rates, it became apparent that dose rates exceeded those values originally used to establish the licensing basis of the plant. A 1-hour non-emergency report for a condition outside the design basis of the plant was made to the NRC per 10CFR50.72, via the Emergency Notification System on August 24, 1995.

Continued operation was justified with compensatory measures that included establishment of an ECCS leakage limit to ensure that calculated off site dose following a design basis accident would remain within 10CFR100 limits and leak testing and inspection requirements for the subject ECCS piping.

Further engineering analysis, including a recalculated offsite dose assessment were completed and provided to the NRC in a letter dated September 23, 1995 and at a NRC meeting on September 25, 1995. The analysis incorporated the unfiltered ECCS leakage values and based upon established administrative controls and limitations concluded that offsite dose rates would remain within acceptable regulatory limits.

**CAUSE:**

A root cause investigation was performed by Harris Engineering personnel and determined the cause of this condition to be inadequate documentation and communication of assumptions, between two separate engineering groups within the plant's architect engineering firm during initial plant design, which resulted in incorrectly considering that all ECCS leakage would be filtered prior to release to the environment. The investigation revealed that the plant was intentionally designed (by the architect engineer) and constructed with a portion of the ECCS recirculation piping outside of the RAB Emergency Exhaust System boundary. Locating much of the Charging/Safety Injection Pump (CSIP) suction and discharge piping above the pump cubicles in the RAB mezzanine area was intended to improve accessibility, reduce ALARA concerns, as well as provide a benefit by improving the associated stress analysis. This approach was considered acceptable based on the design criteria and NRC regulations that existed at the time (early 1970's). The offsite dose assessments, which are based in part on ECCS leakage assumptions, were performed years later at a time when requirements and interpretations were different than when the original plant design was completed. These original dose assessments incorrectly considered that all ECCS leakage would be filtered by the emergency exhaust system.

**SAFETY SIGNIFICANCE:**

There were no adverse safety consequences as a result of this condition. This is based on the fact that the ECCS piping and components outside the RAB Emergency Exhaust System boundary are designed such that large leak rates are not expected during normal operation. This, combined with normal plant operational, maintenance, and health physics practices would have controlled leakage to ensure that resulting offsite airborne radioactivity levels following a design basis accident remained within 10CFR100 limits. It should also be noted that ECCS leakage from outside the emergency exhaust system boundary is not likely to escape the boundary of the RAB. The RAB is an enclosed structure that is normally drawn to a negative pressure and, though not credited in the offsite dose analysis, the airborne leakage from these areas would most likely be drawn in to one of the adjacent emergency exhaust system boundary rooms and limit the realistic release of airborne radioactive material to the environment.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
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Shearon Harris Nuclear Plant - Unit #1	50-400	95	006	01	3 OF 3

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

**PREVIOUS SIMILAR LERs:**

There have been no similar LER's submitted.

**CORRECTIVE ACTIONS COMPLETED:**

The following compensatory measures were established and were applicable for operation in Modes 1-4 pending completion of the engineering analysis:

1. An administrative leakage limit was established for this portion of the ECCS system.
2. The affected piping areas were periodically inspected for leakage by Operations personnel.
3. Radiation monitor trends were periodically reviewed by Operations personnel as an early means of leakage detection.
4. Administrative controls were developed to maintain the RAB boundary to minimize unfiltered leakage.

**ADDITIONAL CORRECTIVE ACTIONS COMPLETED:**

1. A root cause investigation was completed and the results were utilized for this LER revision.
2. Engineering analysis and a new dose assessment were completed to incorporate the postulated unfiltered ECCS leakage.
3. Procedure PLP-114 was revised to incorporate the administrative requirements delineated in the new dose assessment.
4. A modification was completed to allow the RAB Equipment Drain System to be vented to the RAB Emergency Exhaust System versus the Normal RAB Ventilation System. This modified drain system configuration will ensure that radioactive leakage from ECCS components is directed through the safety related filtration units prior to being released to the atmosphere.
5. The recalculated offsite dose analysis was submitted to the NRC for review and approval on September 23, 1995.

**EIIS INFORMATION:****System Name/Code:**

Chemical and Volume Control System (CVCS) - CB

Residual Heat Removal/Low Pressure Safety Injection - BP

High Pressure Safety Injection - BQ