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REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9105210079 DOC.DATE: 91/05/15 NOTARIZED: NO DOCKET #
FACIL:50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
AUTH.NAME AUTHOR AFFILIATION
HAMBY,M.R. Carolina Power & Light Co.
RICHEY,R.B. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-008-01:on 910403,common causes failure of high head safety injection alternate miniflow.Caused by water hammer that apparently occurred because of air void.Supports added to test connection lines.W/910515 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 2
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:Application for permit renewal filed. 05000400 A

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P. O. Box 165 • New Hill, N. C. 27562

R. B. RICHEY
Vice President
Harris Nuclear Project

MAY 15 1991

Letter Number: HO-910067 (0)

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

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 91-008-01

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed revised Licensee Event Report is submitted. This report is in accordance with the format set forth in NUREG-1022, September 1983. This revision clarifies the safety significance portion of the LER by discussing anticipated operator actions and procedural guidance that would have mitigated the consequences of this situation.

Very truly yours,

R. B. Richey
Vice President
Harris Nuclear Project

RBR:mbr

Enclosure

cc: Mr. S. D. Ebnetter (NRC - RII)
Ms. B. L. Mozafari (NRR)
Mr. J. E. Tedrow (NRC - SHNPP)

MEM/LER-91-008/1/OS1

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S PDR

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

DOCKET NUMBER (2)
0 | 5 | 0 | 0 | 0 | 4 | 0 | 0

PAGE (3)
1 | OF | 0 | 6

TITLE (4)
Common Cause Failure of High Head Safety Injection Alternate Miniflow

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 NAMES	DOCKET NUMBER(S)													
0	4	03	9	1	9	1	0	0	8	0	1	0	5	1	5	9	1		0	5	0	0	0

OPERATING MODE (9)
6

POWER LEVEL (10)
0 | 0 | 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

20.402(b)	20.405(c)	60.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	60.36(c)(1)	60.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	60.36(c)(2)	60.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	60.73(a)(2)(i)	60.73(a)(2)(vii)(A)	
20.405(a)(1)(iv)	60.73(a)(2)(ii)	60.73(a)(2)(vii)(B)	
20.405(a)(1)(v)	60.73(a)(2)(iii)	60.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME
M. R. Hamby, Project Specialist - Regulatory Compliance

TELEPHONE NUMBER
AREA CODE: 9 | 1 | 9 | 3 | 6 | 2 | - | 2 | 2 | 0 | 4

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
X	B Q	R V	C 7 1 1	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)
MONTH: | DAY: | YEAR: |

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

Common-cause failures, which would have affected both trains of High Head Safety Injection, were identified during testing while the plant was in a refueling outage. The failures involved alternate miniflow lines for both Charging/Safety Injection Pumps (CSIPs). These alternate miniflow lines are designed to protect the CSIPs for accidents where the RCS repressurizes after safety-injection is actuated. Water hammer in these lines had damaged relief valves and test connections on these alternate miniflow lines such that a significant portion of the safety injection flow would be diverted from the RCS.

This event is being reported in accordance with 10CFR50.73(a)(2)(v) as an event that alone could have prevented the fulfillment of a safety function.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Shearon Harris Nuclear Power Plant	DOCKET NUMBER (2) 0 5 0 0 0 4 0 0	LER NUMBER (6)			PAGE (3)		
		YEAR 9 1	SEQUENTIAL NUMBER - 0 0 8	REVISION NUMBER - 0 1			

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

EVENT DESCRIPTION:

On April 3, 1991, during the third refueling outage (RFO-3), it was determined that High Head Safety Injection (HHSI) had been in a degraded condition during Cycle 3. This degraded condition resulted from relief valve and drain line failures in the Charging/Safety Injection Pump (CSIP) alternate miniflow lines which would have diverted a portion of the safety injection flow.

The CSIPs provide charging flow and Reactor Coolant Pump seal injection during normal plant operation. While operating in this mode, the CSIPs are protected from pump deadhead operation by normal miniflow lines that are designed to provide a minimum flow of 60 gpm. During accident conditions, the CSIPs provide High Head Safety Injection to the RCS. While operating in this safety injection mode of operation, the normal miniflow lines are automatically isolated to ensure all safety injection flow is provided to the RCS.

If the plant accident is a secondary side break, safety injection will be automatically actuated. After the secondary side of the steam generator is dry, the excess heat removal would end and the RCS would repressurize. To prevent CSIP failure from deadhead operation in this event, an alternate miniflow is placed into service when the normal miniflow is isolated (see Attachment 1). This alternate miniflow path is through relief valves (1CS-744 and 1CS-755) which are set to open at 2300 +/- 69 psig and recirculate to the Refueling Water Storage Tank.

During RFO-3, testing identified damage to the alternate miniflow relief valves, 1CS-744 and 1CS-755, and test connections 1CS-754 and 1CS-756, immediately upstream of 1CS-755 and 1CS-744 respectively. Relief valve 1CS-755 was removed to test its relief setpoint in accordance with Inservice Inspection requirements. In its place, an orificed spool piece is installed to support integrated Engineered Safety Features (ESF) testing. The relief setpoint of 1CS-755 could not be determined on the available testing equipment because excessive valve seat leakage prevented pressurization. 1CS-755 was subsequently repaired and reset. The ESF testing that is performed during the outage actuates flow through the orificed spool piece that is installed to replace the relief valve. During the RFO-3 ESF testing, water hammer caused the piping connection upstream of 1CS-754 to fail. A small leak had previously existed in this weld, repair of this leak was scheduled for this outage. This piping has been rewelded and the welds upstream of the other test connection (1CS-756) were inspected by NDE. One weld indication near 1CS-756 was repaired. Supports were designed and installed to prevent recurrence of this event. Based on the failure of 1CS-755, the other relief valve in this system (1CS-744) was selected for testing. The lift setpoint of 1CS-744 was determined to be 1100 psig, normal setpoint is 2300 psig. This valve was disassembled and inspected. Damage to the valve actuation components was identified during this inspection. This valve will be repaired and reset, or replaced prior to plant entry into Mode 3.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Shearon Harris Nuclear Power Plant	DOCKET NUMBER (2) 0 5 0 0 0 4 0 0	LER NUMBER (6)			PAGE (3)		
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		9 1	- 0 0 8	- 0 1	0 3	OF	0 6

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

EVENT DESCRIPTION (continued)

The physical layout of the piping upstream of the alternate miniflow relief valves is shown in Attachment 2. This piping arrangement results in an air void being trapped below the relief valves when they are installed in the system. After the relief valves are installed and the clearance is removed, one of the upstream valves remains closed. This prevents water from refilling this piping. In addition, the piping upstream of the relief valves does not have a high point vent to remove the trapped air. Procedures are being developed to refill and vent this piping.

CAUSE:

The cause of this event was water hammer that apparently occurred because of an air void that remained in the alternate miniflow lines following previous testing and maintenance. Previous to this outage, LCS-744 was tested in May 1989. At that time, the as found relief setpoint was less than one percent below the acceptable range.

There have been no similar events reported.

SAFETY SIGNIFICANCE:

The amount of safety-injection flow diverted by the failures identified would have resulted in the HNP FSAR LOCA flow requirements not being met. In addition, for a large break LOCA, the additional flow through the alternate miniflow line would have resulted in CSIP runout conditions.

The consequences of the small or medium break LOCA may have been mitigated by local operator inspection in this area. This inspection would have occurred as a result of inadequate high head safety injection flow being indicated in the Control Room. If this inspection had not been successful in identifying the diversion, then plant conditions would have advanced until actions were initiated per EOP-FRP-C.2, "Response to Degraded Core Cooling." This procedure directs cooling and depressurizing of the RCS to inject the accumulators and to place Low-Head Safety Injection (LHSI) into service. Once this was accomplished, core cooling would be adequate and the plant would have been stabilized for recovery.

For a large break LOCA, if the CSIPs fail, LHSI Pumps would still function and would recover core cooling as decay heat production decreased. Potentially the operators would have detected CSIP runout prior to pump damage. Guidance on detecting potential CSIP runout is included in the EOP User's Guide and the indications of CSIP runout were included in operator training prior to Cycle 2.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

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

CORRECTIVE ACTIONS:

- 1) The broken piping upstream of test connection, LCS-754 was repaired by rewelding the line. The weld indication upstream of LCS-756 was also repaired.
- 2) Supports were added to test connection lines upstream of LCS-754 and LCS-756 to prevent future cracking.
- 3) Relief valves LCS-744 and LCS-755 are being rebuilt and will be retested, or replaced prior to entry into Mode 3.
- 4) Maintenance instructions for installation of these relief valves (LCS-744 and LCS-755) are being changed to refill the piping prior to installation and to vent the piping through the relief valves by hydraulic pressure following installation, thereby eliminating the air void.
- 5) A procedure is being prepared to ensure this piping remains full of water following any activity that could potentially drain this piping.
- 6) The procedure described in corrective action 5 will be performed quarterly during Cycle 4 to ensure this piping remains full. Following Cycle 4, if it is determined that corrective actions 4 and 5 maintain this piping full, then this quarterly testing will be terminated.

EIIS CODE INFORMATION:

BQ - High Pressure Safety Injection System

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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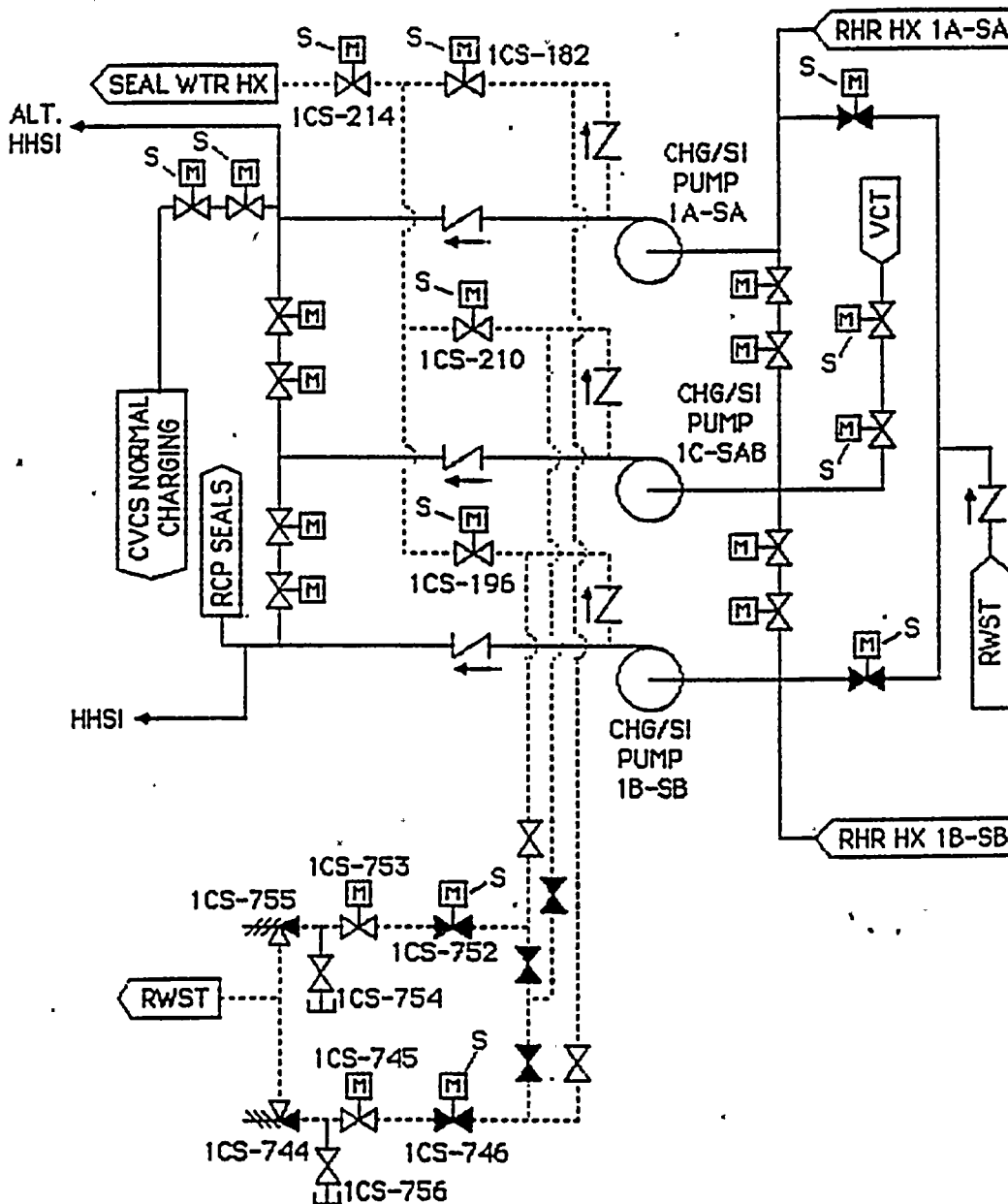
YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
91	008	01

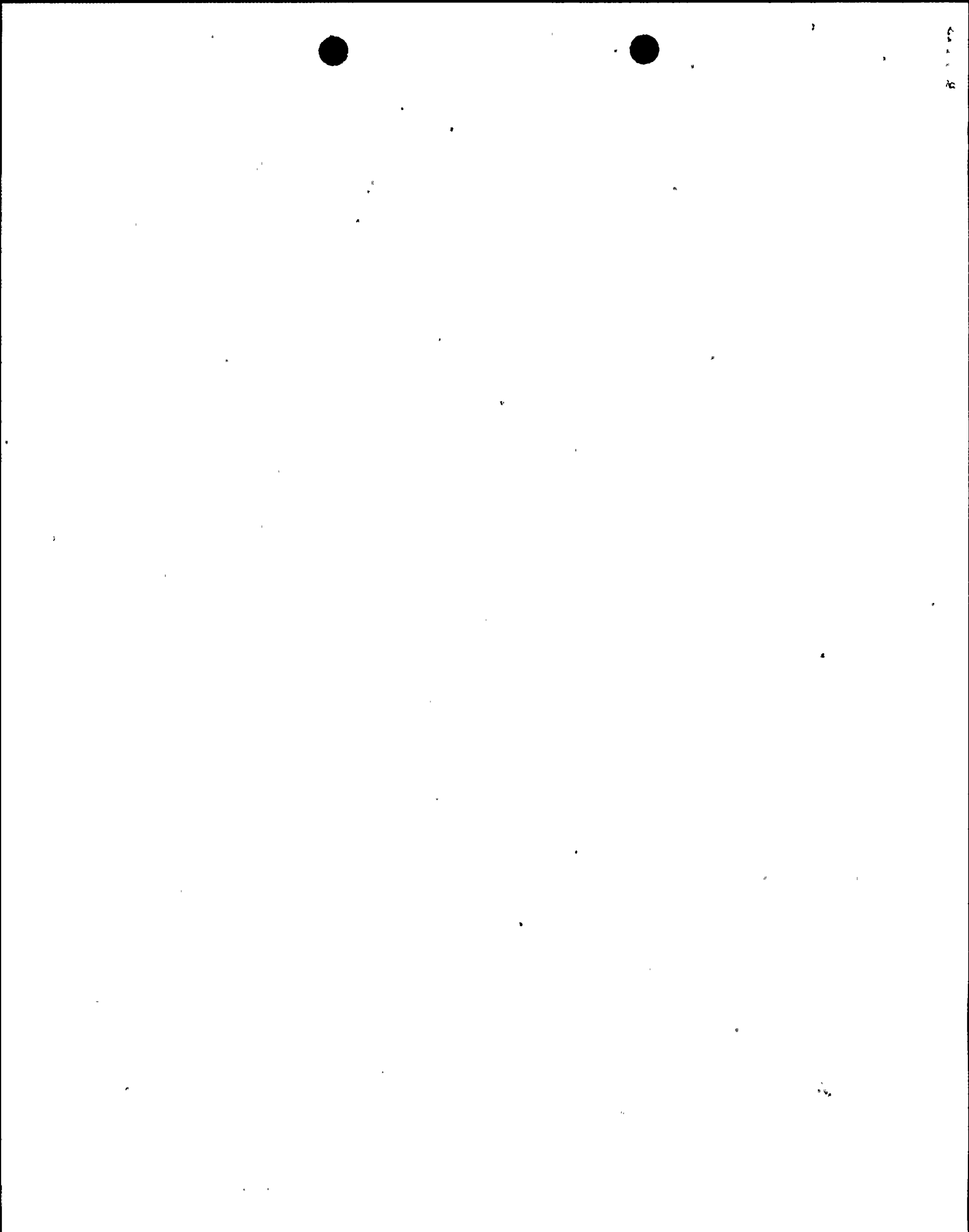
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LER 91-008

ATTACHMENT 1





LICENSEE EVENT REPORT (LER)
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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

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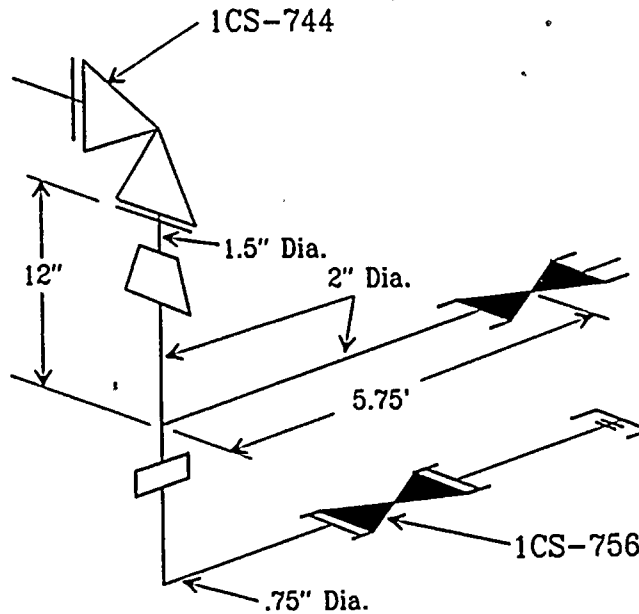
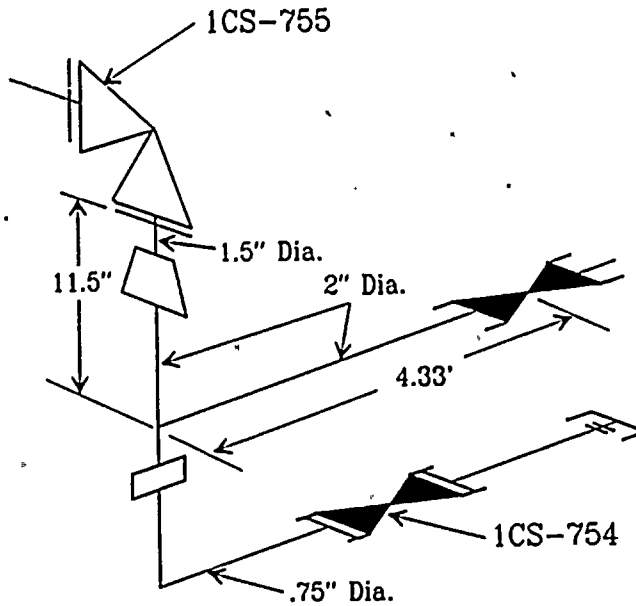
Shearon Harris Nuclear Power Plant

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

LER 91-008

ATTACHMENT 2



DISTRIBUTION

w/enclosure 2

Docket File

NRC PDR
Local PDR
PD21 Reading File
S. Varga
G. Lainas
M. Virgilio 13-E-4
S. Peterson 13-H-3
L. Plisco 10-A-19
M. Satorius RIV
F. Congel 10-E-2
W. Beckner 10-E-4
T. Novak 9112
E. Adensam
P. Anderson
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