

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8803110084 DOC.DATE: 88/03/08 NOTARIZED: NO DOCKET #
 FACIL:50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
 AUTH.NAME AUTHOR AFFILIATION
 HOWE,A. Carolina Power & Light Co.
 WATSON,R.A. Carolina Power & Light Co.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 88-006-00:on 880208,emergency svc water sys inoperable
 due to isolation valve failures & design deficiency.

DISTRIBUTION CODE: IE22D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 5
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:Application for permit renewal filed.

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| INTERNAL: ACRS MICHELSON | 1 1 | ACRS MOELLER | 2 2 | D |
| AEOD/DOA | 1 1 | AEOD/DSP/NAS | 1 1 | D |
| AEOD/DSP/ROAB | 2 2 | AEOD/DSP/TPAB | 1 1 | S |
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| RGN2 FILE 01 | 1 1 | | | |
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| H ST LOBBY WARD | 1 1 | LPDR | 1 1 | I |
| NRC PDR | 1 1 | NSIC HARRIS,J | 1 1 | D |
| NSIC MAYS,G | 1 1 | | | S |

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LICENSEE EVENT REPORT (LER)

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|-----------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------|----------------|---------------------|-----------------|------------------|-----------------|-----------|----------------|--------------------------------------|--|-------------------------------|------------------|--------------------------------------------------------------|-----|------|
| 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 4 | | |
| TITLE (4) BOTH EMERGENCY SERVICE WATER SYSTEMS INOPERABLE DUE TO ISOLATION VALVE FAILURES AND DESIGN DEFICIENCY | | | | | | | | | | | | | | | | |
| 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 | 2 | 0 | 8 | 8 | 8 | 0 | 0 | 3 | | | | | 0 5 0 0 0 | | | |
| OPERATING MODE (9) | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11) | | | | | | | | | | | | | | |
| 1 | | 20.402(b) | | | | 20.405(c) | | | | 60.73(a)(2)(iv) | | | | 73.71(b) | | |
| POWER LEVEL (10) | | 20.405(a)(1)(i) | | | | 60.38(c)(1) | | | | X 60.73(a)(2)(v) | | | | 73.71(c) | | |
| 1 0 0 | | 20.405(a)(1)(ii) | | | | 60.38(c)(2) | | | | 60.73(a)(2)(vi) | | | | OTHER (Specify in Abstract below and in Text, NRC Form 366A) | | |
| | | 20.405(a)(1)(iii) | | | | X 60.73(a)(2)(i) | | | | 60.73(a)(2)(viii)(A) | | | | | | |
| | | 20.405(a)(1)(iv) | | | | 60.73(a)(2)(ii) | | | | 60.73(a)(2)(viii)(B) | | | | | | |
| | | 20.405(a)(1)(v) | | | | 60.73(a)(2)(iii) | | | | 60.73(a)(2)(ix) | | | | | | |
| LICENSEE CONTACT FOR THIS LER (12) | | | | | | | | | | | | | | | | |
| NAME ANDREW HOWE - SENIOR ENGINEER REGULATORY COMPLIANCE | | | | | | | | | | TELEPHONE NUMBER | | | | | | |
| | | | | | | | | | | AREA CODE | | | | | | |
| | | | | | | | | | | 9 1 9 3 6 | | 1 2 7 1 9 | | | | |
| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) | | | | | | | | | | | | | | | | |
| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPDOS | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPDOS | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| 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 fifteen single-space typewritten lines) (16)

ABSTRACT:

On February 8, 1988, during surveillance testing of the Emergency Service Water System (ESWS), the nonsafety portion of the ESW pump seal water supply system failed to isolate as required when two solenoid valves stuck open and a check valve failed to seat. Both ESW trains were declared inoperable due to the piping configuration of the seal water supply and the locations of the failed valves. Manual valves were closed to isolate the nonsafety piping and permit continued operation while repairs took place. Debris was discovered during disassembly of the failed check valve, and is also suspected of causing the solenoid valve failures. Repairs were completed the next day, the surveillance testing was completed and the ESW system was returned to service.

On February 12, 1988, a concern regarding the seal water piping configuration vulnerability to single passive failures was raised, and a manual valve was immediately closed to separate the trains while an evaluation was conducted. This evaluation concluded on February 25, 1988, that the piping configuration was vulnerable to single passive failures which could disable both ESW trains, in conflict with the system design requirements specified in the Final Safety Analysis Report. The two trains remain isolated by lock closed manual valve pending a permanent design change to the seal water system.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) | |
|----------------------------------------------|-------------------|----------------|-------------------|-----------------|----------|--------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | |
| SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1 | 0 5 0 0 0 4 0 0 | 8 8 | - 0 0 1 6 | - 0 1 0 | 0 2 | OF 0 4 |

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

INITIAL CONDITIONS:

The plant was operating at 100% power, normal operating conditions prior to and throughout this event.

DESIGN INFORMATION:

Refer to Attachment A, which shows the Emergency Service Water (ESW) pump seal and bearing water supply configuration. The ESW pumps are normally not in service, and start automatically on Safety Injection Actuation, loss of off-site power, or low service water header pressure (indication of failure of normal supply). During this idle condition, one of the ESW Pump Seal/Bearing Water Booster pumps draws water from the ESW header and supplies clean water via a cyclone separator to the ESW pumps' seals and bearings to prevent accumulation of debris between the bearing and the shaft sleeves of the ESW pump which can result from the stagnating water in the ESW pump intake bay. This flow helps to increase the life of the bearing, but interruption of this flow would not damage either the bearings or the seals.

When the ESW pump is started, the booster pumps trip and the valves close to isolate the nonsafety piping from the safety-related piping. Seal and bearing water is then provided by the safety-related ESW Screen Wash pumps which tie into the seal water supply header downstream from the isolation valves.

DESCRIPTION:

On February 8, 1988, surveillance test OST-1215, Emergency Service Water System Operability, was in progress. During testing, two solenoid operated, fail close valves, numbers 1SW-1335 and 1SW-1338, failed to close on demand. These valves are manufactured by Target-Rock, model number 79Q-024 (EIIS:BI:ISV). In addition, check valve 1SW-1336 was not properly seating. This valve is manufactured by Rockwell, model number H6283-BV985 (EIIS:BI:ISV).

The solenoid valves and the check valve isolate the nonsafety seal water booster pump from the safety-related seal water supply piping. Since both ESW pump seal water supplies were now unisolable from the nonsafety portion of the system, both ESW trains were declared inoperable, and Specification 3.0.3 was entered at 1430. Valves 1SW-1332 and 1SW-1324 (EIIS:BI:ISV) were closed, which restored operability to train A ESW since it was now isolated from the nonsafety piping. Specification 3.0.3 was exited at 1452, and Specification 3.7.4, Emergency Service Water, remained in effect for the B train ESW, due to valve 1SW-1338 being unable to close.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) | | |
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| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | | |
| SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1 | 0 5 0 0 0 4 0 0 | 8 8 | 0 0 6 | 0 0 0 | 0 3 | OF | 0 4 |

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

DESCRIPTION (continued)

Repairs were made to the failed valves, and the surveillance test was satisfactorily completed on February 9, 1988 at 1518. The valves 1SW-1332 and 1SW-1324 were reopened to restore the system to its normal lineup.

On February 12, 1988, a concern was raised regarding the configuration of the safety-related ESW pump seal water supply. The two trains are cross-connected without capability to automatically isolate, causing the potential for a single passive failure to affect both ESW pumps. Valve 1SW-1324 was closed to separate the two safety trains while an evaluation was conducted. This evaluation was completed on February 25, 1988, and concluded that the seal water supply design was not in accordance with the requirement in the Final Safety Analysis Report (FSAR) that the ESW system be protected from passive failures. The evaluation also concluded that maintaining one of the two manual isolation valves (1SW-1332 or 1SW-1324) closed was acceptable to comply with the FSAR requirements.

CAUSE:

The valve failures have been attributed to debris accumulation, discovered during disassembly of the check valve 1SW-1336. As described above, the source of water for this system is the ESW header during ESW pump idle periods, when the normal service water pumps are in service supplying water from the cooling tower basin to the ESW headers. Accumulation of debris in the basin is expected, since raw lake water is the supply.

The design of the seal water supply for the ESW pumps did not consider the requirements in the FSAR for the system to be protected from all passive failures. ANSI Standards 58.9-1981 and 51.1-1983 allow exclusion of piping from passive failure considerations when the probability of such failures coincident with a demand for the system to function is sufficiently small. The seal water piping meets this criteria, but the FSAR requirement is that passive failures must be a design consideration.

SAFETY SIGNIFICANCE:

The failure of the valves to isolate had no direct impact on plant safety since the ESW system was not challenged while the valves were inoperable. Had the ESW system been demanded to operate at that point, a diverging flowpath would have existed from the discharge of the ESW Screen Wash Pumps (EIS:BI) back through the idle ESW Seal and Bearing Water Booster Pump 1B-NNS to the ESW header, potentially starving the seal water supply to the ESW pumps. The postulated failure of the nonsafety portion of the piping would increase this effect. This condition existed for 22 minutes, when the A train was isolated from the failed portion of the system.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (8) | | | PAGE (3) | | |
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| SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1 | 0 5 0 0 0 4 0 0 | 8 8 | - 0 0 6 | - 0 0 | 0 4 | OF | 0 4 |

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

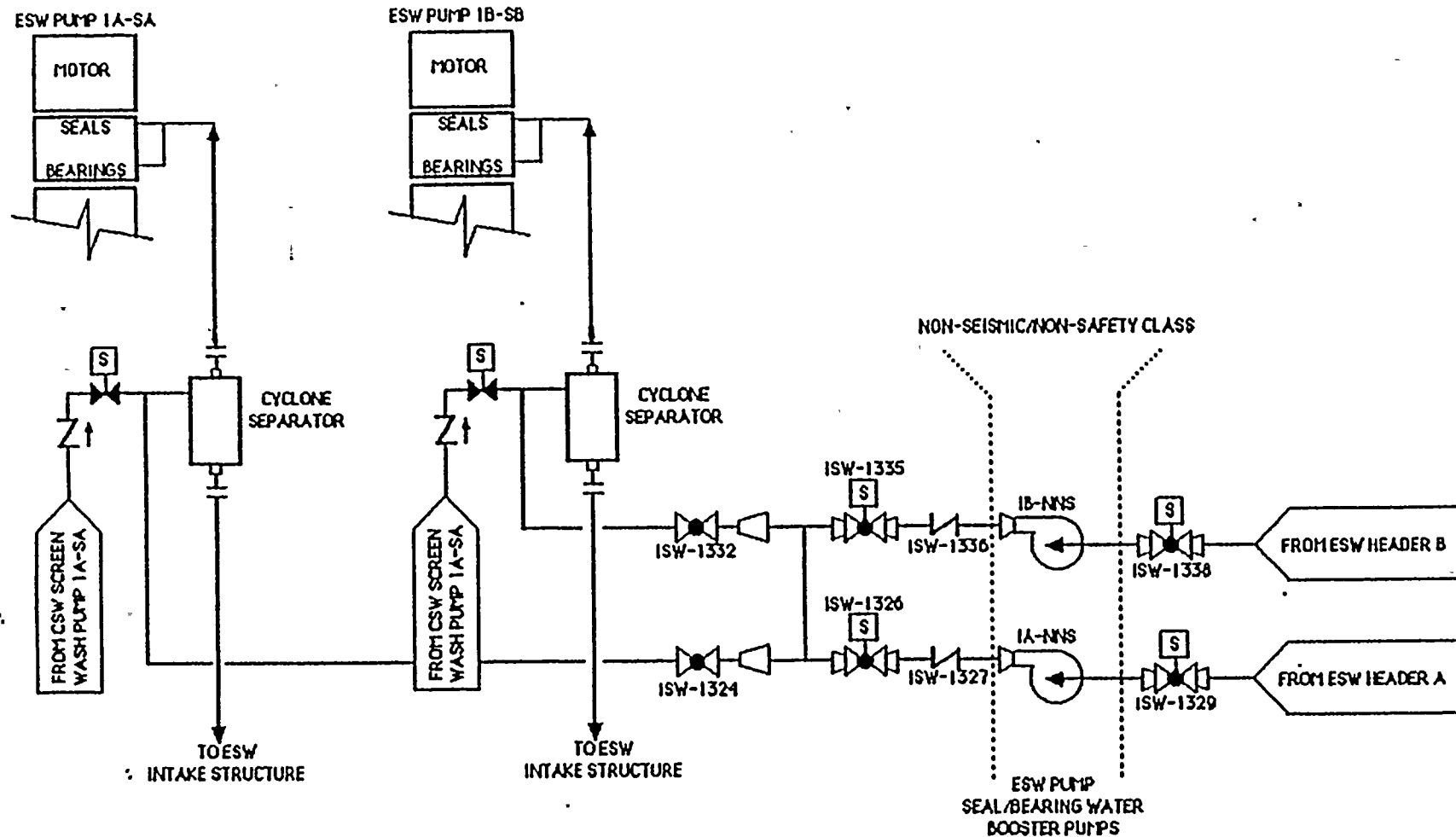
SAFETY SIGNIFICANCE: (continued)

The potential for a passive failure in the safety-related seal water supply, which would have the same effect as described above, has been determined to be improbable and unrealistic as defined in ANSI Standards 51.1-1983, Section 3.2.2, and 58.9-1981, Section 3.6, and would not be a design consideration under these requirements.

Debris accumulation in these valves has occurred previously, but not such that all valves were unable to isolate, rendering both ESW trains inoperable.

CORRECTIVE ACTION:

1. The failed valves were repaired and retested, and the ESW system was returned to operable status on February 9, 1988.
2. The two safety trains of ESW seal water supply were isolated on February 12, 1988, and will remain isolated pending design changes to the system.
3. A change to the system configuration is being considered for implementation which will simplify the system configuration and ensure the ESW seal water supply meets the FSAR requirements.
4. A review of other similar applications of small valves required to isolate safety-related lines where poor water quality is expected is being conducted.



ATTACHMENT A
 ESW PUMP SEAL/ BEARING WATER SUPPLY
 Ref. Dwg.: CAR 2165-S-0936 Rev. 8



Carolina Power & Light Company

HARRIS NUCLEAR PROJECT
P.O. Box 165
New Hill, NC 27562

MAR 08 1988

File Number: SHF/10-13510C
Letter Number: HO-880078 (0)

U.S. Nuclear Regulatory Commission
ATTN: NRC Document Control Desk
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SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 88-006-00

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. This report fulfills the requirement for a written report within thirty (30) days of a reportable occurrence and is in accordance with the format set forth in NUREG-1022, September, 1983.

Very truly yours,

James By Direction

R. A. Watson
Vice President
Harris Nuclear Project

RAW:acm

Enclosure

cc: Dr. J. Nelson Grace (NRC - RII)
Mr. B. Buckley (NRR)
Mr. G. Maxwell (NRC - SHNPP)

MEM/LER-88-006/1/OS1

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