

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Salem Generating Station - Unit 1 DOCKET NUMBER (2) 0 5 0 0 0 2 7 2 1 OF 0 4 PAGE (3)

TITLE (4) Disc. Leak Paths From 13(23) AFW Pump Compartments - Control of Design Reqt.

| 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) | | | | | | |
| 1 | 1 | 13 | 8 | 78 | 7 | 0 | 1 | 7 | 0 | 2 | 0 | 12 | 6 | 8 | 8 | Salem Unit 2 | 0 5 0 0 0 3 1 1 |
| | | | | | | | | | | | | | | | | | 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) | | | | | | | | | | |
| POWER LEVEL (10) | 6 | 20.402(b) | 20.408(a) | 50.73(a)(2)(iv) | 73.71(b) | | | | | | | |
| | 0 | 20.408(a)(1)(i) | 50.38(a)(1) | 50.73(a)(2)(v) | 73.71(a) | | | | | | | |
| | 0 | 20.408(a)(1)(ii) | 50.38(a)(2) | 50.73(a)(2)(vi) | <input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 365A) | | | | | | | |
| | 0 | 20.408(a)(1)(iii) | 50.73(a)(2)(i) | 50.73(a)(2)(vii)(A) | Info Only | | | | | | | |
| | | 20.408(a)(1)(iv) | 50.73(a)(2)(ii) | 50.73(a)(2)(vii)(B) | | | | | | | | |
| | | 20.408(a)(1)(v) | 50.73(a)(2)(iii) | 50.73(a)(2)(ix) | | | | | | | | |

LICENSEE CONTACT FOR THIS LER (12)

| | |
|---------------------------------|---------------------|
| NAME | TELEPHONE NUMBER |
| M. J. Pollack - LER Coordinator | 6 0 9 3 3 9 4 0 2 2 |

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

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NFRDS | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NFRDS |
|-------|--------|-----------|--------------|---------------------|-------|--------|-----------|--------------|---------------------|
| | | | | | | | | | |
| | | | | | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

| | | | | | |
|---|--------------------------|-------------------------------|-------|-----|------|
| YES (If yes, complete EXPECTED SUBMISSION DATE) | NO | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | | |

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

On 11/13/87 an NRC inspector identified leakage paths from the No. 13 Auxiliary Feedwater (AFW) Turbine Driven Pump compartment {BA}. Subsequent investigation revealed six (6) unsealed openings from the Unit 1 pump and one unsealed opening from the Unit 2 pump. The compartment encloses the steam feed piping to the AFW Turbine Driven Pump such that a postulated pipe break would not damage adjacent vital electrical equipment located outside the compartment. The root cause of the Steam Driven AFW Pump compartment deficiencies has been attributed to control of design requirements. The leakage paths identified on the Salem Units 1 & 2 Steam Driven AFW Pump enclosures have been sealed. A review of other protective pipe rupture enclosures, to verify their integrity has been maintained, is continuing. To ensure that adequate attention is given to the maintenance of these structures in the future, the Program Analysis Group (PAG) will issue a Field Directive identifying the areas that are designed to accommodate the effects of a pipe rupture. Based on the Field Directive, administrative controls to maintain protective structures in a condition that meets their design requirements will be reviewed and changes made as necessary.

8802090450 880126
PDR ADOCK 05000272
S PDR

IE22
4

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| Salem Generating Station | DOCKET NUMBER | LER NUMBER | PAGE |
|--------------------------|---------------|------------|--------|
| Unit 1 | 5000272 | 87-017-02 | 2 of 4 |

PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as {xx}

IDENTIFICATION OF OCCURRENCE:

Discovered Leakage Paths From 13(23) Aux Feedwater Pump Compartment - Control of Design Requirements

Event Date: 11/13/87

Report Date: 01/26/88

This report was initiated by Incident Report No. 87-449.

CONDITIONS PRIOR TO OCCURRENCE:

Mode 6 Reactor Power 0% - Unit Load 0 MWe

DESCRIPTION OF OCCURRENCE:

On 11/13/87, an NRC inspector identified leakage paths from the No. 13 Auxiliary Feedwater (AFW) Turbine Driven Pump compartment (BA). Subsequent investigation revealed six (6) leakage pathways from the Unit 1 pump compartment and one pathway from the Unit 2 pump compartment. The compartment encloses the steam feed piping to the AFW Turbine Driven Pump such that a postulated pipe break would not damage adjacent vital electrical equipment located outside the compartment.

The Unit 1 pump compartment pathways consist of four (4) pipe penetrations where excessive annulus areas exist between the pipe and the compartment wall, one (1) hole cut to accommodate a protruding bolt, and one (1) small hole cut through the steel compartment wall for no known reason. The Unit 2 pump compartment pathway is a pipe penetration with an excessive annulus area between the pipe and wall.

APPARENT CAUSE OF OCCURRENCE:

The root cause of the Steam Driven AFW Pump compartment deficiencies is associated with control of design requirements. "Notes" on the AFW Pump enclosure controlled drawings (both Units) state that the compartment structure is designed for an internal pressure of 50 pounds per square foot (psf). Also, the drawing "Notes" indicate that gaps and cracks in the structure should be minimized during erection and plugged as required to ensure a reasonable degree of watertightness.

It cannot be conclusively determined what activities took place that resulted in these leakage paths whether from the original design configuration or as the result of design modifications.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| Salem Generating Station | DOCKET NUMBER | LER NUMBER | PAGE |
|--------------------------|---------------|------------|--------|
| Unit 1 | 5000272 | 87-017-02 | 3 of 4 |

ANALYSIS OF OCCURRENCE:

The Salem Unit 1 AFW Pump compartment was analyzed due to the greater open area than the Unit 2 AFW Pump enclosure. The total unsealed area for the Unit 1 and Unit 2 compartments was approximately 20 square inches and four square inches, respectively. The AFW Pump enclosure is designed to contain the steam release from a postulated steam pipe rupture such that adjacent vital electrical equipment is not damaged.

In the event of a postulated pump steam supply line rupture (high energy line break) within the compartment, the compartment temperature and pressure would rise. At 0.33 psi, exhaust dampers will open to vent steam into the adjacent Auxiliary Building pipe alley. The total effective free flow area provided by the dampers is 1265 in². The unsealed openings represented an increase in the available exhaust area of 1.6%. The total steam discharge rate from a postulated break is 11.0 lb_m/s of steam at an initial pressure of 1020 psia, 547°F. The amount of steam discharged to the adjacent area of the enclosure through the unsealed openings is 1.6% of 11.0 lb_m/s which equals 0.17 lb_m/s. This will be an adiabatic expansion into the area at slightly less than atmospheric pressure. This process will reduce the temperature of the exiting steam to 300°F. The specific volume of steam at these conditions (14.7 psia and 300°F) and a mass flow rate of 0.17 lb_m/s will result in 300 cfm of steam exhausted into the area. Steam with a molecular weight of 18 will rise to the ceiling. The ceiling area has ventilation exhaust ducts with an exhaust capacity of 500 cfm. Therefore, the steam will be exhausted, via the Auxiliary Building Ventilation System, and will not accumulate in the adjacent area. The operability of equipment adjacent to the enclosure will not be compromised by the steam release.

The adjacent area contains the 11(21) and 12(22) Motor Driven AFW Pumps, various AFW valves, Main Steam System valves (Unit 2 only), the 1(2)A and 1(2)C West 230 V Vital Motor Control Centers (MCCs), and various electrical panels, including the Alternate Shutdown Panel (Panel 213). This equipment will remain operable during the postulated steam release.

The 230 V MCCs provide power and control to a variety of Emergency Core Cooling System (ECCS) valves, including one Residual Heat Removal (RHR) Pump Minimum Flow Valve (11RH29) (BP), the Safety Injection Pump Minimum Flow Valves (SJ67 & 68), an RHR Loop Crosstie Valve (11RH19), one suction valve from the Reactor Water Storage Tank to the Charging Pumps (1SJ1), a Containment Sump Isolation Valve (11SJ44), and Component Cooling Water discharge valve from the RHR Heat Exchanger (11CC16).

Since an ECCS actuation is not expected to occur as a result of the postulated break, these ECCS valves would not be required to operate. Also, since a fire is not postulated coincident with a pipe break, the Alternate Shutdown Panel would not be required. However, in the event of a break in the steam supply line to the AFW Turbine Driven Pump, the Motor Driven AFW Pumps and valves would be required to operate.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| Salem Generating Station | DOCKET NUMBER | LER NUMBER | PAGE |
|--------------------------|---------------|------------|--------|
| Unit 1 | 5000272 | 87-017-02 | 4 of 4 |

ANALYSIS OF OCCURRENCE: (cont'd)


during normal plant cooldown to remove heat from the core until the RHR System could be placed in operation.

In summary, the equipment adjacent to the Steam Driven AFW Pump are necessary to normal plant operation as well as mitigation of design base accidents. They are required to be protected against the dynamic effects of a postulated pipe rupture. As discussed above, the operability of equipment adjacent to the Steam Driven AFW Pump compartment would not have been effected by a postulated steam supply line break.

CORRECTIVE ACTION:

The leakage paths identified on the Salem Units 1 & 2 Steam Driven AFW Pump enclosures have been sealed. A review of other protective pipe rupture enclosures, to verify their integrity has been maintained, is continuing.

To ensure that adequate attention is given to the maintenance of these structures in the future, the Program Analysis Group (PAG) will issue a Field Directive (by February 16, 1988) identifying the areas that are designed to accommodate the effects of a pipe rupture. Based on the Field Directive, administrative controls to maintain protective structures in a condition that meets their design requirements will be reviewed and changes made as necessary.


 General Manager -
 Salem Operations

MJP:pc

SORC Mtg. 88-009