

P2194226

POWER REACTOR

EVENT NUMBER: 27700

FACILITY: BROWNS FERRY
 UNIT: [1] [] [3]
 RX TYPE: [1] GE-4, [2] GE-4, [3] GE-4

REGION: 2
 STATE: AL

NOTIFICATION DATE: 08/23/94
 NOTIFICATION TIME: 14:57 [ET]
 EVENT DATE: 08/23/94
 EVENT TIME: 14:57 [CDT]
 LAST UPDATE DATE: 08/23/94

NRC NOTIFIED BY: MACHON
 HQ OPS OFFICER: DOUG WEAVER

NOTIFICATIONS

EMERGENCY CLASS: NOT APPLICABLE
 10 CFR SECTION:
 CDEF 21.21(b)(2) DEFECTS/NONCOMPLIANCE

WALTER HAASS

NRR

| UNIT | SCRAM CODE | RX CRIT | INIT PWR | INIT RX MODE | CURR PWR | CURR RX MODE |
|------|------------|---------|----------|--------------|----------|--------------|
| 1 | N | N | 0 | | 0 | |
| 3 | N | N | 0 | | 0 | |

EVENT TEXT

FOUR 25 TON SAFETY RELATED WATER COOLED AIR CONDITIONING UNITS (ACUs) HAVE CONDENSERS DESIGNED FOR A LOWER PRESSURE THAN THE SYSTEM OPERATING PRESSURE. THE DESIGN PRESSURE IS 150 PSIG AND THE OPERATING PRESSURE IS 277 PSIG (300 PSIG FOR POST ACCIDENT CONDITIONS).

THE UNITS WERE MANUFACTURED BY ELLIS AND WATTS. SINCE THE UNITS WERE CUSTOM DESIGNED FOR THIS APPLICATION, THIS PROBLEM IS NOT BELIEVED TO AFFECT OTHER PLANTS. THE UNIT 2 ACUs ARE OF A DIFFERENT DESIGN AND ARE NOT AFFECTED.

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Enclosure 1

Tennessee Valley Authority
Browns Ferry Nuclear Plant (BFNP)
10CFR21 Report

25 Ton Safety Related, Water Cooled Air Conditioning Unit (ACU)

1. Name and address of the Individual (or individuals) informing the Commission.

R.D. Machon, Browns Ferry Site Vice President
Browns Ferry Nuclear Plant Units 1 and 3
Browns Ferry Nuclear Plant Road
Athens, Alabama 35611

2. Basic Component supplied which fails to comply or contains a defect.

Four 25 Ton Safety Related Water Cooled ACU's. The ACU's are primarily composed of a refrigerant system, and an air system connected to the ventilation ducts of the electric board rooms. Emergency Equipment Cooling Water (EECW) is used to cool the condensers and electric power is provided for compressors, fans, and instruments.

3. The firm constructing or supplying the basic component which fails to comply or contains a defect.

Ellis and Watts supplied the ACU's, ITT Standard supplied the water cooled condensers (a subcomponent of the ACU's) to Ellis and Watts.

4. Nature of the defect, or failure to comply, and the safety hazard created, or could be created.

Nature of the defect or failure to comply

The condensers were designed to a lower pressure than the system (refrigerant) operating pressure. The condensers were designed and ASME Section VIII stamped for shell side (refrigerant side) pressure of 150 psig. During performance testing at the factory, normal pressure at the compressor discharge (inlet to the condensers) was 277 psig and for post accident conditions the pressure reached 300 psig. The shell side safety relief valve as well as compressor high pressure cutoff switch were set to 350 psig. Thus the condensers shell side would be subjected to a pressure well above their design. An inadequate system (cycle) analysis was performed and the pressures, relief settings, etc. were not coordinated.

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Evaluation of Safety Hazard Created

Currently BFNP Unit 2 is operating with Units 1 and 3 defueled. No immediate safety hazard exists since these ACU's are not required with Unit 1 and 3 defueled and their failure does not impact the operating unit. Temporary cooling is provided for Unit 1 and 3 components needed for Unit 2 support. The Unit 2 ACU's are of a different type and not affected by this design problem.

Evaluation of Potential Safety Hazard Created

A) Following installation of these ACU's, Unit 1 and 3 would be each supplied with two redundant ACU's (total of four, two for Unit 1 and two for Unit 3) each having 100% capacity to cool the electric board rooms in their respective units. The design error in the condensers applies to all four of the ACU's (common mode failure) and could cause failure of both safety related ACU's in a reactor unit.

B) The electric board rooms contain numerous safety related components including 480 volt and 4KV distribution systems (480 volt and 4KV Boards).

C) The 480 volt distribution system provides power to the ACU's themselves, to safety related 480 volt Motor Control Centers, 480 volt power for safety related isolation valves, power to the containment monitoring sample pumps, the standby gas treatment system blowers and numerous emergency ventilation blowers. The electric board rooms also contain 4 KV distribution systems providing Class 1E 4KV power to safety related equipment and 4KV power to the diesel generator distribution system.

D) If the ACU condensers fail due to overpressurization, the ACU's cannot provide the needed cooling for the Electrical Board Rooms resulting in a temperature in excess of the Environmental Qualification of the components served by the ACU's.

E) Failure of the above electrical equipment would compromise numerous safety systems which would reduce BFNP's ability to mitigate an accident and potentially result in a radiological release .

5. The date on which the information of such defect or failure to comply was obtained.

During on site, post modification leak testing it was determined that none of the ACU's were holding their refrigerant charge. With the ACU and the condenser vendor representatives on site, the leakage was isolated to the condensers and the condenser heads removed to test the tube sheets. At this time the condenser vendor noticed the ASME Section VIII stamp of 150 psig and questioned the ACU vendor as to the normal system pressure. A review of system design was performed and on July 13, 1984 the system pressure was confirmed to be in excess of 150 psig.

6. The number of identical components in use or supplied.

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Enclosure 2

Summary of Commitment

All four ACU's will be completed prior to Unit 3 Fuel Load.