

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) BROWNS FERRY UNIT 1	DOCKET NUMBER (2) 0 5 0 0 0 2 5 9	PAGE (3) 1 OF 04
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TITLE (4) INADEQUATE WATER SEAL DESIGN OF PIPING FLOOR PENETRATION COULD CAUSE FLOODING OF RESIDUAL HEAT REMOVAL SERVICE WATER PUMP ROOMS DURING DESIGN BASIS FLOOD

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)		
08	18	88	88	023	00	09	16	88	BROWNS FERRY UNIT 2			0 5 0 0 0 2 6 0		
									BROWNS FERRY UNIT 3			0 5 0 0 0 2 9 6		

OPERATING MODE (9) _____

POWER LEVEL (10) _____

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.408(e)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.408(a)(1)(i)	<input type="checkbox"/> 50.38(a)(1)	<input type="checkbox"/> 50.73(a)(2)(vi)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.408(a)(1)(ii)	<input type="checkbox"/> 50.38(a)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.408(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
<input type="checkbox"/> 20.408(a)(1)(iv)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.408(a)(1)(v)	<input type="checkbox"/> 50.73(a)(7)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Stephen B. Jones, Engineer, Plant Operations Review Staff	205 729-3788

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

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)

During an inspection of the residual heat removal service water pump rooms, on June 17, 1988, ground water was observed entering the pump room through a subterranean pipe penetration. Modifications to the buried piping just outside of the rooms had recently been finished. The original fill soil had been replaced with compacted sand. The ground water entering the room was determined to be coming from efforts to further compact the ground for support of a large crane. A review of the penetration drawings revealed that a water seal at the pipe penetration had not been provided and the seal at the floor penetration was inadequate. An engineering evaluation determined that the lack of an adequate water seal was a condition that violated the requirement that the RHRSW pump rooms be water tight. This design deficiency has existed since initial construction of the plant. A water tight seal is being designed and will be installed on the floor piping penetrations of all RHRSW pump rooms.

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

Description of Event

All three units were defueled when the condition was discovered. The condition effects all three units.

Browns Ferry has twelve residual heat removal service water (RHRSW) (RIIS Identifier BS) deck mounted pumps located on the intake structure. The twelve pumps are located in four pump rooms. Each pump room contains three RHRSW pumps. Each pump room is enclosed on four sides by walls of sufficient height to prevent flooding of the room during the design basis flood. The entrance to the room is through a water tight door. Two pipes leave each pump room, one to the emergency equipment cooling water (EECW) (RIIS Identifier BI) header and one to the RHRSW header. These pipes leave the pump room separately below grade level. The pipes enter a small pipe pit on the room side of the wall then exit through a penetration in the buried wall. The only access to the pipe external to the pump room and reactor building is by uncovering the buried pipe.

On June 17, 1988, ground water was noticed leaking into the "D" RHRSW pump room pipe pit through the pipe wall penetration. Investigation determined there was not a design to prevent water inleakage through the wall piping penetration and the floor penetration seal was inadequate to prevent water intrusion into the pump room. A design evaluation determined that the lack of an adequate water seal was a design deficiency that could allow flooding of the room during the design basis flood and that the condition has existed since initial construction.

Cause of Event

During modification to piping external to the pump room the pipe guard sleeve was sealed. The original fill soil was replaced with compacted sand. This apparently made a lower resistant flow path for ground water along the pipe. Further investigation determined that a water tight seal design was not made in the original design and the floor penetration seal design was not adequate to prevent water intrusion. The omission of adequate flood seal design is the result of inadequate design and review when the plant flood protection plan was developed.

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

Corrective Action

The floor of the pipe pit is a gravel base making it possible for water to enter from below as well as through the pipe wall penetrators. Therefore, a water tight seal design will be provided and installed that will prevent water from entering the RHRSW pump rooms via the pipe floor penetrations. Pipe penetrations in the intake, reactor building, radwaste, and diesel generator buildings that require a water seal are being evaluated to ensure an adequate seal exists. Seals in these areas will be modified as required. The procedures that govern that design process have been upgraded since the original design of the plant, approximately 15 years ago, current procedures require design reviews and interface reviews for plant modifications. These existing procedures will minimize the chances of omissions similar to the type that caused this condition.

Analysis of Event

The condition described in this report, lack of water tight seals in piping penetrations, has existed since initial construction of the plant. This condition in conjunction with the design basis flood could possibly lead to the flooding of the RHRSW pump rooms. The flood water would have to saturate the ground enough to provide a low resistance flow path to and along the piping buried approximately six feet. The leakage must then be at a rate in excess of the sump pump capacity for the individual rooms. There are two sump pumps in each room rated at 150 gallons per minute. If the leakage did exceed the sump pump capacity, there has not been a calculation performed to determine what the maximum leakage could be, the rooms could flood to a level that submerged the RHRSW pumps. The RHRSW pumps are designed to operate exposed to rain since the top of the RHRSW pump room is open but are not designed for submergence. If all twelve RHRSW pumps in the four pump rooms become submerged and fail, EECW and RHRSW would be lost. The consequence of these losses are given below.

The RHRSW provides heat removal from the reactor system via the residual heat removal system (RIIS identifier BO) (RHR). The loss of RHRSW would have removed the primary method of removing heat from the reactor following shutdown or an accident.

The EECW system provides cooling for the diesel generators (DG) (RIIS identifier EK), various ventilation coolers (RIIS identifier VI), and the reactor building closed cooling water (RBCCW) (RIIS identifier CC). The loss of EECW would have disabled the DGs. The rooms cooled by EECW and the equipment cooled by RBCCW could have exceeded design temperatures. The loss of the DG and equipment cooled by EECW would have seriously inhibited the ability to maintain the reactor in cold shutdown.

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

Previous Similar Events - The LERs below describe events where FSAR requirements were not designed into the plant.

259/87026	259/85026
259/85024	259/85012
259/86010	259/85012
259/85027	

Commitments

- * Provide water tight penetration seals in RHRSW pump rooms
- * Inspect and repair as required penetration seals in intake, diesel generator, radwaste, and reactor buildings required for flood protection

TENNESSEE VALLEY AUTHORITY

Browns Ferry Nuclear Plant
Post Office Box 2000
Decatur, Alabama 35602

DEC 6 1988

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

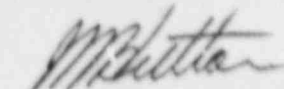
TENNESSEE VALLEY AUTHORITY - BROWNS FERRY NUCLEAR PLANT UNIT 1 - DOCKET
NO. 50-259 - FACILITY OPERATING LICENSE DPR-33 - REPORTABLE OCCURRENCE REPORT
BFRO-50-259/88023

The enclosed report provides details concerning the inadequate water seal of piping floor penetrations and possible flooding of residual heat removal service water pump rooms during design basis flooding. This report is submitted in accordance with 10 CFR 50.73 (a)(2)(ii).

This transmittal is being made to correct the omission of the report date on the original LER submittal.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



Guy G. Campbell
Plant Manager
Browns Ferry Nuclear Plant

Enclosures
cc (Enclosures):

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U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
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Atlanta, Georgia 30339

NRC Resident Inspector, Browns Ferry Nuclear Plant

