LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4) Emergency Equipment Cooling Water System Containment Isolation Function Outside Design Basis And Subsequent Identification Of Several New Bypass Leakage Paths

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MON	DAY	YR	YR	SEQUENTIAL NUMBER	REVISION NUMBER	MON	DAY	YR	FACILITY NAMES	DOCKET NUMBER (S)
03	03	97	97	- 0 0 3 -	0 1	05	08	97		0 5 0 0 0
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OPERATING MODE (9): 4

POWER LEVEL (10): 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11)

X 10 CFR 50.73(a)(2)(ii)(B)

OTHER -

(Specify in Abstract below and in text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

Andrew V. Antrassian - Compliance Engineer	TELEPHONE NUMBER AREA CODE	313 586-1856

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	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
[ ] YES (If yes, complete EXPECTED SUBMISSION DATE)	[X] NO				

On March 3, 1997, it was determined that the Emergency Equipment Cooling Water System (EECWS) containment isolation function was outside the design basis. The EECWS is normally in standby and portions of the system piping distribute cooling water supplied by the Reactor Building Closed Cooling Water System (RBCCWS). The RBCCWS is isolated from the EECWS upon initiation of the EECWS. The Updated Final Safety Analysis Report (UFSAR) Containment Isolation System (CIS) design basis identifies that no single failure will result in loss of the containment function. It was determined that a single failure of an electrical division could result in the loss of the EECWS containment isolation function. The EECWS containment penetrations have been modified to provide diverse power such that a single failure will not result in the loss of the containment isolation function. On April 8, 1997, during review of this modification, a total of twelve previously unrecognized bypass leakage paths were identified in the EECWS, Post Accident Sampling System, and Compressed Air System. When leak rate data for these new bypass leakage paths was added to previous bypass leakage rate totals, the UFSAR bypass leakage limit of 4% La was exceeded on two occasions. Alarm Response Procedures (ARPs) have been revised to provide guidance to Operators to manually isolate the EECWS return header primary containment penetrations in the event that certain accident conditions exist. A UFSAR revision has been approved to properly identify the twelve new bypass leakage paths and these paths have been added to the bypass leakage program.

Initial Plant Condition:

Operational Condition:	4 (Cold Shutdown)
Reactor Power:	0 Percent
Reactor Pressure:	0 psig
Reactor Temperature:	122 degrees Fahrenheit

Description of the Event:

On March 3, 1997, with the plant in a maintenance outage, it was determined that the Emergency Equipment Cooling Water System (EECWS) [BI] containment isolation function was outside the plant design basis. At 1527 hours, a four-hour non-emergency notification was made regarding this condition in accordance with 10CFR50.72(b)(2)(i).

The EECWS is an Engineered Safety Features (ESF) system consisting of two independent, redundant, full capacity cooling water divisions. During normal operation, the EECWS is in the standby mode and system piping is used to distribute cooling water provided through system supply and return cross connect lines by the Reactor Building Closed Cooling Water System (RBCCWS) [CC]. The EECWS is activated and system piping is isolated from the RBCCWS upon manual initiation, loss of offsite power, high drywell pressure, or low RBCCWS supply/return header differential pressure. Division I (II) EECWS containment and RBCCWS isolation valves are powered by Division I (II) electrical busses.

The Fermi 2 Updated Final Safety Analysis Report (UFSAR) identifies the EECWS primary containment penetrations as General Design Criteria (GDC) 56 penetrations (i.e., the associated piping connects directly to the containment atmosphere). While the EECWS piping inside containment is not physically open to the containment atmosphere, this piping does not meet the UFSAR definition of a closed containment barrier. The UFSAR Containment Isolation System (CIS) [JM] design bases identify that the electrical and mechanical designs ensure that no single failure will result in loss of the containment function. Further, CIS valves for a single division of a redundant ESF system may be powered from a single electrical division so that a single failure of an electrical division can not disable both divisions of an ESF system. In these cases, a redundant mechanical barrier (i.e., a closed system beyond the isolation valves) exists so that the containment isolation function is not lost as a result of a single failure. The UFSAR CIS design requirements, in part, require that closed systems used as an isolation barrier inside and outside containment be designated Seismic Category I and at least Quality Group B.

Description of the Event (Continued):

The EECWS piping outside containment is designated Quality Group C and Seismic Category I. The RBCCWS piping is designated Quality Group D and Seismic Category II/I. Consequently, even though this piping is physically closed, it does not meet the definition of a closed system and can not be considered a redundant mechanical barrier. A single failure of an electrical division could result in the EECWS containment and RBCCWS isolation valves of the same division failing in the open position which could result in the loss of the containment isolation function.

A modification to provide diverse power to the EECWS primary containment penetrations is discussed in the Corrective Actions section below. During review of this modification, it was identified that the supply and return primary containment penetrations for both divisions of the EECWS may be potential bypass leakage paths which were not previously recognized. UFSAR Table 6.2-2, Summary Of Primary Containment Penetrations And Associated Isolation Valves, indicates that these four penetrations were not considered bypass leakage paths and the penetrations were not included in the bypass leakage program. On April 8, 1997, it was confirmed that the EECWS primary containment penetrations are bypass leakage paths and that this constitutes a condition outside the design basis of the plant. At 1104 hours, a four-hour non-emergency notification was made regarding this condition in accordance with 10CFR50.72(b)(2)(i).

A review was conducted to identify any other bypass leakage paths that were not properly identified in UFSAR Table 6.2-2 and/or not included in the bypass leakage program. Seven additional penetrations in the Post Accident Sampling System (PASS) [IP] and one additional penetration in the Compressed Air System (CAS) [LF] were identified which were not previously recognized as bypass leakage paths.

Historical Local Leak Rate Test (LLRT) data was reviewed for all twelve of the penetrations not previously recognized as bypass leakage paths. When the leak rate data for the new bypass leakage paths was added to previous bypass leakage rate totals, the as-found and as-left bypass leakage limit of 4% La identified in UFSAR Section 6.2.1.2.2.3, Bypass Leakage Paths, was exceeded during Refueling Outage 2 (RFO2) and Outage 88-01. The as-found and as-left bypass leakage rates calculated for the current maintenance outage (Outage 97-01) considering the new bypass leakage paths are below the 4% La limit.

The conditions discussed above involving (1) the EECWS containment isolation function, (2) the twelve previously unrecognized bypass leakage paths, and (3) the UFSAR limit of 4% La being unknowingly exceeded on two occasions, are conditions outside the design basis of the plant and are collectively being reported in accordance with 10CFR50.73(a)(2)(ii)(B).

Cause of the Event:

The Fermi 2 Final Safety Analysis Report (FSAR) originally identified the EECWS primary containment penetrations as subject to GDC 57 (i.e., not directly connected to the containment atmosphere). In FSAR Amendment 29, dated April 1980, the EECWS penetrations were changed from GDC 57 to GDC 56. Based on a review of Fermi 2 correspondence from that time frame, the rationale for the change appears to be that because certain EECWS components and piping inside containment were designated Quality Group D, the EECWS could not be considered a closed system inside containment. The cause of this condition is a design basis deficiency in that the plant design was not adequately upgraded when the EECWS containment penetrations were changed from GDC 57 to GDC 56.

The cause of the four previously unrecognized EECWS bypass leakage paths is also due to the plant design not being adequately upgraded when the change in designation of these penetrations from GDC 57 to GDC 56 occurred. The cause of the seven previously unrecognized PASS bypass leakage paths is due to an oversight. At the time the PASS was installed, evaluation of the susceptibility of the penetrations through which the PASS was routed to bypass leakage was not performed. The cause of the previously unrecognized CAS bypass leakage path is due to an inappropriate assumption. The CAS was evaluated, and was not considered a bypass leakage path because system pressure was assumed to exceed post accident drywell pressures so that any leakage would be into containment. This assumption did not consider a Loss Of Power (LOP) coincident with a Loss Of Coolant Accident (LOCA) which would result in loss of the Station Air Compressor. The CAS pressure may not exceed post accident drywell pressures and therefore a bypass leakage path could exist.

Analysis of the Event:

The CIS is designed to provide protection against the release of radioactive materials to the environment by providing a minimum of one protective barrier between the reactor and the environs under all postulated conditions. This condition would result in failure of the containment isolation function only in the unlikely event of a Design Basis Accident (DBA) coincident with a single failure and a failure of the EECWS/RBCCWS pressure boundary. In addition, Seismic Category II/I, Quality Group D, RBCCWS piping is designed to maintain structural integrity following a safe shutdown earthquake. Major differences between Quality Group B and Quality Group C EECWS components are in Non-Destructive Examination requirements at the time of installation. From the standpoint of quality of material, manufacture, and installation, the differences are negligible. Therefore, EECWS and RBCCWS piping would be reasonably expected to maintain structural integrity during and following a DBA. Based on this information, the condition related to the EECWS containment isolation function is considered of minor safety significance.

Analysis of the Event (Continued):

The UFSAR bypass leakage limit of 4% La assures that the majority of primary containment leakage is processed by the Standby Gas Treatment System (SGTS) prior to release. With the twelve new bypass leakage paths considered, the UFSAR limit of 4% La was unknowingly exceeded during RFO2 (4.1% La as-found / 4.4% La as-left) and Outage 88-01 (12.5% La as-found / 11.1% La as-left). Had these additional bypass leakage paths been recognized at the time, valve maintenance would have been performed as necessary to reduce the as-left leakage rates to within the 4% La limit prior to startup from these outages. The as-found bypass leakage rates for the outages following both RFO2 and Outage 88-01 were less than the 4% La limit. The dose consequences of the most limiting case (i.e., 12.5% La) have been evaluated and have been determined to be within 10CFR100 guidelines. Based on this information, the conditions related to the twelve previously unrecognized bypass leakage paths and unknowingly exceeding the 4% La bypass leakage limit are considered of minor safety significance.

Corrective Actions:

A review of UFSAR Table 6.2-2, Summary Of Primary Containment Penetrations And Associated Isolation Valves, was conducted which verified that no other primary containment penetrations have design basis deficiencies similar to that described in this report.

The EECWS primary containment penetrations have been modified to provide diverse power such that a single failure will not result in the loss of the containment isolation function.

Alarm Response Procedures (ARPs) have been revised to provide guidance to Operators to manually isolate the EECWS return header primary containment penetrations in the event that certain accident conditions exist. This will limit the leakage of radioactive material which could pass through the EECWS primary containment penetrations and bypass secondary containment.

A revision to UFSAR Table 6.2-2 has been approved to properly identify the twelve new penetrations as bypass leakage paths. In addition, the twelve penetrations have been added to the bypass leakage program.

Additional Information:

A. Failed Components

None

B. Previous LERs on Similar Problems

LER 87-052 documented a design discrepancy involving the Primary Containment Radiation Monitoring System (PCRMS) primary containment penetrations. No previous LERs have documented unrecognized bypass leakage paths or bypass leakage rates in excess of specified limits.