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JAFP-92-0255

United States Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, D.C 20555

SUBJECT: DOCKET NO. 50-333
LICENSEE EVENT REPORT: 92-012-00- Improper Normal Position of the Residual Heat Removal Minimum Flow Valves Resulting in Potential RHR Pump Failure

Dear Sir:

This report is submitted in accordance with 10CFR50.73(a)(2)(vi) (B) and (D).

Questions concerning this report may be addressed to Mr. Mike Grady at (315) 349-6588.

Very truly yours,

RADFORD J. CONVERSE

RJC:MG:llm

Enclosure

cc: USNRC, Region I
USNRC Resident Inspector
INPO Records Center

Cert No P840796A50

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
JAMES A. FITZPATRICK NUCLEAR POWER PLANT	0 5 0 0 0 3 3 3	1 OF 0 4

TITLE (4) Improper Positioning of the Residual Heat Removal Minimum Flow Valves Resulting in Potential RHR Pump Failure

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 NAME	DOCKET NUMBER(S)
0 2	2 4	9 2	9 2	—	0 1 2	—	0 0	0 3	2 3	9 2		0 5 0 0 0
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OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Mike Grady, System Engineer	AREA CODE 3 1 5 — 3 4 9 — 6 5 8 8

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

EIIS codes are in []

ABSTRACT

On February 24, 1992, while in a cold shutdown condition for refueling, it was determined that the normal closed position of RHR/LPCI [BO] pump minimum flow valves 10MOV-16A&B could result in failure of an RHR/LPCI pump under certain conditions. The specific set of circumstances which could cause the failure is a postulated failure of one safety division of electrical power coincident with the conditions that cause an RHR/LPCI pump start. This would result in only 1 of 4 RHR/LPCI pumps being capable of injection to the reactor vessel. While this specific scenario was not considered as part of the Emergency Core Cooling system analysis requirement of 10CFR50, appendix K, other more limiting events were considered. The valve position will be changed to normal open.

DESCRIPTION

On February 24, 1992, it was determined that the normal closed position of RHR/LPCI [BO] pump minimum flow valves 10MOV-16A&B could result in failure of an RHR/LPCI pump under certain conditions. The specific set of circumstances which could cause failure of an RHR/LPCI pump were not considered in the Loss of Coolant Accident (LOCA) analyses conducted to satisfy the requirement of 10CFR50, appendix K.

The RHR system is an integral part of the Emergency Core Cooling systems (ECCS). The system consists of two independent loops, each containing a heat exchanger, two parallel centrifugal RHR pumps, associated controls and instrumentation, and the piping to physically separate the two loops. Physical separation minimizes the possibility of a single failure event causing the loss of both loops.

The RHR system has five major modes of operation which include low pressure coolant injection (LPCI), containment spray, suppression chamber cooling, steam condensing and shutdown cooling. During normal plant operations the system is in a standby lineup ready to start in the LPCI mode on either a vessel low water level or high drywell pressure signal.

Each RHR loop has minimum flow bypass lines which run from the discharge piping of each RHR pump to a common header which contains a minimum flow isolation valve (10MOV-16A&B). Downstream of the valve, the line penetrates the primary containment [NH] and discharges below the surface of the pressure suppression pool. Each RHR loop contains a flow measuring device (10DPIS-125A&B) which provides an automatic control feature to the minimum flow valve logic circuit. The minimum flow valve automatic open feature protects the pump from damage due to continuous operation at shutoff head. The valve automatically closes to prevent diversion of flow away from the LPCI flowpath when RHR system flow is adequate for pump cooling. The automatic valve response utilizes a pump running signal so the valve is capable of remote manual operation with RHR pumps secured.

The minimum flow lines do not communicate with the reactor vessel, but they do penetrate the primary containment and discharge below the pressure suppression pool surface. Each line is required to have a designated containment isolation valve capable of remote manual operation outside the containment. The minimum flow valves (10MOV-16A&B) provide this function and are therefore listed as containment isolation valves in Section 7.3 of the Final Safety Analysis Report (FSAR) and AP 1.16 Component Listing Related to Technical Specifications. The FSAR and AP 1.16 list the normal valve position as closed.

A potential failure of one RHR loop exists with the minimum flow valves maintained normally closed. A plant transient which causes an automatic start of the RHR pumps coupled with an event resulting in the loss of an emergency bus would leave one pump operating in a loop without minimum flow protection. Pump operation at shutoff head would eventually cause pump failure and render the entire loop inoperable. For example:

> RHR loop A contains pumps 10P-3A and 10P-3C powered from 4KV emergency buses 71SWGR-10500 (Class IE Safety Related) [EB] and 71SWGR-10600 (Class IE Safety Related) [EB], respectively. The minimum flow valve in the loop (10MOV-16A) is powered from 71SWGR-10500. Loss of bus 71SWGR-10500 and a system initiation would leave the 10P-3C pump running at shutoff head.

Maintaining the RHR pump minimum flow valves in the open position during a LOCA event coupled with a failure of the valve operator power supply results in a single RHR pump providing reactor makeup water through the LPCI flowpath while simultaneously pumping a small volume of water to the pressure suppression pool through the open minimum flow line.

The RHR minimum flow line restricting orifice limits the RHR minimum flow while the pump discharge piping restricting orifice limits system flow. A safety evaluation is being conducted utilizing predicted system flowrates after replacement of the pump discharge orifices in the 1992 refueling outage. The safety evaluation has determined that the diversion of the small flow volume in the LPCI mode would not cause the RHR pump to go into a runout condition or prevent it from meeting the injection flowrate required by technical specifications 4.5.A.3 or 4.5.F.1.

CAUSE OF THE EVENT

A review of General Electric original design documents determined the valves were designed to be maintained normally open. A review of plant drawing changes determined that the valve normal position was changed to closed in 1978. The exact reason for the change is not clear, but it is believed that the change was made to prevent draining from the reactor to the suppression pool when operating in the shutdown cooling mode.

ANALYSIS

The event is reportable under 10CFR50.73(a)(2)(v)(B) and (D), that is, a condition that could have prevented the fulfillment of the safety function of the RHR system to remove residual heat and mitigate the consequences of an accident.

CORRECTIVE ACTION

1. The RHR/LPCI minimum flow valves will be repositioned to the open position as the normal standby valve position prior to plant startup.

2. The FSAR section 7.3, AP-1.16 Component Listing Related to Technical Specifications, and applicable operating and surveillance procedures will be changed to reflect this positioning prior to startup.

3. A completion of changes to plant drawings to denote the normal standby position of RHR/LPCI minimum flow valves as open will be completed prior to startup.

4. A cooperative effort to prepare a containment isolation design basis document. The action is being performed by the New York Power Authority, General Electric (NSSS supplier) and Stone & Webster with scheduled completion in the first quarter of 1993.

ADDITIONAL INFORMATION

Failed Components: None

Previous similar events: LER 91-026 and 92-005 describe events in which primary containment isolation valves were found with control circuit designs that were not consistent with the design requirements.