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FACIL:50-269 Oconee Nuclear Station, Unit 1, Duke Power Co. 05000269
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SUBJECT: LER 95-006-00:on 950724,low pressure injection sys was technically inoperable due to design deficiency.Identified critical valves in accident mitigation flow paths.W/950823 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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PRIORITY 1 DOCUMENT

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DUKE POWER

August 23, 1995

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
LER 269/95-06

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report (LER) 269/95-06, concerning the technical inoperability of the Low Pressure Injection system.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(v). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

J. W. Hampton
Vice President

/ftr

Attachment

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IE22

NRC FORM 366 (5-92)

NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Oconee Nuclear Station, Unit 1	05000 269	1 OF 5

TITLE (4)
Low Pressure Injection System Technically Inoperable Due To Design Deficiency

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
07	24	95	95	-- 06 --	00	08	23	95	Oconee, Unit 2	05000 270
									FACILITY NAME: Oconee, Unit 3	DOCKET NUMBER: 05000 287

OPERATING MODE (9)	N
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

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
20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
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 (Include Area Code)
Lanny V. Wilkie, Safety Review Manager	(803) 885-3518

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				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On June 21, 1995, during testing, technicians observed that the Low Pressure Injection (LPI) header A and B throttle valves had different stroke lengths and informed the Component Engineer (CE). During the evaluation of this problem Duke Power discovered that the correct flow coefficient of the two valves was not used in the LPI System Pump Runout analysis. The analysis was performed again using the correct data and it was concluded that during a Loss of Coolant Accident/Loss of Offsite Power event, the LPI pumps could experience runout. On July 24, 1995, with Units 1 and 2 at 100 % full power and Unit 3 at 73 % full power, Engineering concluded that the LPI System for all three units were currently operable, but had been technically inoperable in the past. The root cause of this event was determined to be a Design Deficiency, deficient documentation. Corrective actions include identifying critical valves in accident mitigation flow paths that may have similar problems and ensuring that proper flow coefficients have been determined.

BACKGROUND

The Low Pressure Injection (LPI) [EIIS:BP] System is an Engineered Safeguard System (ES) [EIIS:JE] designed to maintain core cooling for large break Loss of Coolant Accidents. Low pressure injection is accomplished through two separate flow paths. Each header includes one pump, one heat exchanger, associated piping, valves, and instrumentation and terminates directly in the reactor vessel through nozzles located on opposite sides of the vessel. A third pump (Non ES) which can be shared by both headers is also available. The LPI System is also used to remove decay heat during normal shutdowns.

EVENT DESCRIPTION

On June 21, 1995, it was discovered during testing that 3LP-14 ("A" Low Pressure Injection Cooler Outlet Valve) had a shorter stroke than 3LP-12 ("B" Low Pressure Injection Cooler Outlet Valve). Technicians informed the Component Engineer (CE) of this problem. The CE was concerned that the shorter stroke may adversely affect Low Pressure Injection (LPI) flow. As a result, the CE contacted the valve vendor for additional information. During the conversation it was realized that the flow coefficient (Cv) for the longer stroke length valve was 650 rather than 439 as used in Duke Power calculations.

On June 22, 1995, Engineering generated a Problem Investigation Process (PIP) to evaluate the potential that LPI flow could increase beyond what was previously analyzed. It was confirmed that valves 1LP-12, 1LP-14, 2LP-12, and 2LP-14 had the same stroke length as found on 3LP-12.

On July 11, 1995, Engineering completed the present operability evaluation of the LPI system. Calculations indicated that flow could exceed the limit for LPI Pump runout. The evaluation also considered the suitability of operator response. It was concluded that the LPI System was presently operable due to the following facts:

- flow instruments are Reg. Guide 1.97 Type A Instruments
- the Emergency Operating Procedure instructs the operator to limit LPI flow to less than 3000 GPM
- LP-12 and LP-14 on all three Units have safety related power
- LP-12 and LP-14 are operable from the control room

Therefore, adequate means are presently available to the operator to prevent LPI pump runout.

On July 24, 1995, Engineering completed the past operability evaluation of the LPI System. The LPI System Pump Runout Analysis was revised using the correct flow coefficient data for LP-12 and LP-14. The revised analysis concluded that during a Large Break Loss of Coolant Accident coincident with a Loss of Offsite Power (LOOP) event, the LPI pumps will run out, assuming no operator action. However, prior to the installation of safety related power to the valves in question, the valves would have been inoperable from the control room during a LOOP. Operators would need to be dispatched to throttle the valves manually in a timely manner. Because the available time was not documented, it cannot be assured that timely action would have occurred. Therefore, the LPI System for all three units was considered to have been technically inoperable. Power for LP-12 and LP-14 was upgraded to a non-loadshed safety related power source previously (Unit 2 was upgraded in 1993, Unit 1 and 3 were upgraded in 1994).

An investigation into the event revealed that a Nuclear Station Modification was implemented in 1977 to correct cavitation problems for valves LP-12 and LP-14 on all three units. Valves 1LP-12, 1LP-14, 2LP-12, and 2LP-14 were changed out in 1977, and 3LP-12 and 3LP-14 were changed out in 1978. The valve drawing did not indicate the flow coefficient. The System Engineer who performed the calculation utilized the Cv from a Vendor valve catalog data sheet. The data sheet indicated that this type valve's Cv was 439. During the follow-up of the valve stroke length discrepancy, the Vendor indicated that the correct Cv for this valve was 650.

CONCLUSIONS

The root cause of this event is determined to be a Design Deficiency, deficient documentation. The vendor did not include flow coefficient information on the valve drawing. When the analysis (LPI System Pump Runout Analysis) was performed, the vendor valve catalog data was utilized and assumed to be accurate. If an analysis had identified any operator response times, they were not documented in the design package or the Operations procedures. Therefore, it is concluded that if the valve drawing had included the correct flow coefficient or the valve catalog data had been applicable to these valves, this event may have been prevented.

A review of LERs written within the last two years revealed that no similar events have occurred which involved deficient documentation. Therefore, this event is considered not to be recurring.

This event did not involve an equipment failure and therefore was not NPRDS reportable. There were no radiological overexposures, radioactive releases or personnel injuries associated with this event.

CORRECTIVE ACTIONS

Immediate

None

Subsequent

None

Planned

1. Revise drawing OM 251-0260-001 for LP-12 and LP-14 to show the correct flow coefficient curve.

2. Identify critical valves in accident mitigation flow paths that may have a similar problem as identified in the Low Pressure Injection system.

3. Investigate each valve identified in the above corrective action and ensure that the proper flow coefficient has been determined.

4. Verify the proper flow coefficient has been utilized in applicable calculations.

5. Perform a Low Pressure Injection pump runout flow test.

SAFETY ANALYSIS

The Low Pressure Injection (LPI) System provides emergency coolant injection which is necessary during a Design Basis Accident. It also provides suction to the High Pressure Injection (HPI) [EIIS:BG] System after the Borated Water Storage Tank (BWST) is depleted and the Reactor Building (RB) emergency sump becomes the long-term suction supply for cooling the core. The Emergency Operating Procedure (EOP) directs the operator to limit total LPI flow to ≤ 3000 GPM/pump. Due to the fact that the operator would not have been able to throttle flow from the Control Room (prior to the installation of safety related power) and time restraints existed on manually throttling flow, it was possible that the LPI pump runout flow limit may be exceeded. If this persisted long enough to damage the pumps, it could result in the loss of long term core cooling. An evaluation of the safety significance of this situation follows.

If a Loss of Coolant Accident (LOCA) had occurred, power was available and the Operator would have been able to throttle LPI flow from the Control Room. As a result, LPI flow would have been limited to ≤ 3000 gpm.

Currently, valves have safety related power following a Loss of Offsite Power (LOOP) event. However, prior to the installation of safety related power to the throttle valves, these valves were loadshed following a LOOP event. Therefore, in the event of a LOCA\LOOP, the Operators would not have been able to throttle LPI flow from the Control Room. If flow began to approach pump runout conditions, a pump Delta p alarm should occur to warn the Operators. In accordance with the Alarm Response Manual, the Operator would attempt to manually reduce flow sufficiently to clear the alarm. However, radiation levels may increase after the Borated Water Storage Tank is depleted and LPI suction is swapped to the Reactor Building Emergency Sump. This could prevent entry into the area where the throttle valve is located. As a result, total flow could exceed the runout limit of the LPI pumps. Therefore, the loss of long term core cooling was possible.

However, the probability of a LOCA/LOOP occurring simultaneously is very low. During the period of time that the LPI system was technically inoperable, no event occurred which required long term core cooling. Therefore, the health and safety of the public was not affected by this event.