Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247
402/636-2000

May 29, 1990
LIC-90-0399

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

Reference: Docket No. 50-285

Gentlemen:

Subject: Licensee Event Report 90-14 for the Fort Calhoun Station

Please find attached Licensee Event Report 90-14 dated May 29, 1990. This report is being submitted pursuant to requirements of 10 CFR 50.73(a)(2)(ii)(B).

If you should have any questions, please contact me.

Sincerely,

W. G. Gates

W. G. Gates
Division Manager
Nuclear Operations

WGG/tcm

Attachment

c: R. D. Martin, NRC Regional Administrator
A. Bournia, NRC Project Manager
P. H. Harrell, NRC Senior Resident Inspector
INPO Records Center
American Nuclear Insurers

IE22
1/1

NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Fort Calhoun Station Unit No. 1	0 5 0 0 0 2 8 5	1 OF 0 4

TITLE (4): Component Cooling Water Containment Isolation Valves Outside Design Basis

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)
0 4	2 7	9 0	9 0	0 1 4	0 0	0 5	2 9	9 0	N	0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9): 5

POWER LEVEL (10): 0 0 0

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

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	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)	X 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 (AREA CODE)
Larry Lehman, Shift Technical Advisor	4 0 2 5 3 3 - 6 8 2 9

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
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 8	1 5	9 0

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

Omaha Public Power District (OPPD) initiated an investigation of the Component Cooling Water (CCW) lines penetrating the containment wall in response to concerns recognized in NRC Information Notice 89-055. The results of this investigation revealed that the CCW piping to the Reactor Coolant Pump seal coolers could be targets of a High Energy Line Break (HELB) on the Reactor Coolant System hot leg. A HELB inside containment could negate one containment isolation barrier, leaving only the outboard containment isolation valve to mitigate potential radiological releases and thus susceptible to single failure. This is a condition outside the plant design basis.

The problem was reported to the NRC pursuant to 10 CFR 50.72(b)(2)(i) at 1627 on April 27, 1990.

Short term corrective action was completion of a Safety Analysis for Operability to justify operation. Resolution of Unresolved Safety Issue A-2 responses is expected to allow the CCW valves and piping to be exempted from HELB targeting.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	PAGE (3)
Fort Calhoun Station Unit No. 1	0 5 0 0 0 2 8 5	9 0	— 0 1 4	— 0 0	0 2 OF 0 4

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

Fort Calhoun Station Reactor Coolant Pumps utilize Component Cooling Water (CCW) as a heat sink for cooling the pump seals and lubricating oil. The CCW piping is neither part of the Reactor Coolant Pressure Boundary nor does it communicate with the containment atmosphere; therefore, it is classified as a closed system. The CCW piping inside and outside containment was designed to the requirements of ANSI B31.7, Class I Seismic.

The CCW lines to and from the Reactor Coolant Pumps penetrate the containment wall. The two CCW lines are isolated by containment isolation valves, HCV-438A and HCV-438C on the inboard side and HCV-438B and HCV-438D on the outboard side. Each of these valves fail in the open position to prevent a loss of cooling to the Reactor Coolant Pump seals should valve failure occur. The outboard valves (HCV-438B and D) each have a 1000 hour nitrogen backup to maintain closure of the valves during a LOCA with a loss of Instrument Air. The closed system classification defined in 10 CFR 50 Appendix A, Criterion 57, allows the inboard containment isolation valves to be replaced by closed barrier piping, provided that it is protected from Loss of Coolant Accident (LOCA) conditions and its dynamic effects.

Omaha Public Power District (OPPD) initiated an investigation of the CCW lines penetrating the containment wall in response to NRC Information Notice 89-55. Design Engineering personnel walked down the CCW lines during the 1990 refueling outage to determine if any of the piping might be affected by a LOCA. The results of this investigation revealed that the CCW piping to the Reactor Coolant Pump seal coolers could be targets of the dynamic effects (missiles, whip, jets) of a High Energy Line Break (HELB) of the Reactor Coolant System hot leg. The HELB scenario assumes that targeting will affect all components within 10 pipe diameters of the RCS hot leg (320 inches). The CCW lines to the Reactor Coolant Pump seals run within 48 inches of the RCS hot leg. A HELB inside containment causing the failure of CCW piping would negate one containment isolation barrier and leave the system with only the outboard containment isolation valve to mitigate potential radiological releases.

Since no documentation exists indicating that the lines have been designed to withstand a HELB, failure of the CCW lines is assumed to occur during a LOCA/HELB due to pipe whip. The CCW lines at this point would no longer be considered part of a closed system. Hence, the containment isolation valves must comply with 10 CFR 50 Appendix A, Criterion 56. This means that both inside valves HCV-438B and D must fail in the closed position or be maintained in the closed position during a LOCA to provide containment isolation and prevent containment bypass due to a single failure. Because these valves do not presently meet Criterion 56, they are considered to be outside the design basis for containment isolation valves in open systems. Investigation of the effects of a LOCA on other closed system piping in containment is ongoing.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	PAGE (3)
Fort Calhoun Station Unit No. 1	0 5 0 0 0 2 8 5	9 0	— 0 1 4 —	0 0	0 3 OF 0 4

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

Fort Calhoun Station was in Refueling Shutdown (Mode 5) when the CCW valves were determined to be outside the design basis at 1445 hours on April 27, 1990. The problem was reported as "degraded while shutdown" to the NRC pursuant to 10 CFR 50.72(b)(2)(i) at 1627 on April 27, 1990. This LER is submitted pursuant to 10 CFR 50.73(a)(2)(ii)(B).

The potential impact on safety is a possible breach of containment as a result of a LOCA concurrent with a loss of DC Bus 2 or Instrument Air (IA). The radiological consequences of such a potential breach could be in excess of 10 CFR 100 guidelines. For this reason a probabilistic argument was completed to determine the probability of containment bypass via the CCW lines as a result of the LOCA dynamic impact. The event considered as models the failure of IA, DC Buses, backup nitrogen supply to HCV-438B and D, solenoid valves, regulators, autoclose signals, manual closure by control switches, and local manual closure of HCV-438B and D. The probabilistic argument is specific for this scenario. It is not indicative of core damage or radiological release frequency.

The conclusion of the analysis is a 1.51E-8 per year event probability of containment bypass via the CCW lines initiated by LOCA. This is only the probability that containment bypass will occur and does not include conditions that would cause severe core damage and fuel failure. A severe accident assumes gross failure of fuel. The screening criterion for Generic Letter 88-20 states that a probability of 1E-8 per year is acceptable for severe accidents. For the breach of CCW line event, the probability of additional failures that cause containment bypass to be classified as a severe accident would reduce the 1.51E-8 per year probability to around 1E-11 per year, a significant margin from the Generic Letter screening value.

Therefore, the issue of a potential bypass in the CCW system concurrent with LOCA and failures as modeled in the probabilistic based argument was found to be of a sufficiently low frequency such that it is not considered a significant concern. Safety Analysis for Operability (SAO) 90-08, approved on May 12, 1990, addresses the safety significance of this problem and provides justification for the operability of the CCW piping and valves throughout the upcoming fuel cycle.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	PAGE (3)
Fort Calhoun Station Unit No.1	0 5 0 0 0 2 8 5	9 0	0 1 4	0 0	0 4 OF 0 4

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

As corrective action, OPPD plans to finalize resolution of Unresolved Safety Issue (USI) A-2 by utilizing Leak Before Break (LBB) methodology as per Generic Letter 84-04. This resolution is expected to eliminate the requirement for the RCS HELB postulation and the resultant dynamic effects. Acceptance by the NRC of this resolution will allow the CCW valves and piping to be exempted from consideration as a HELB target. When this occurs, the plant design basis in the USAR will be appropriately revised in the 1991 annual update.

Additional review into the reason for this condition will be conducted. A Root Cause Analysis will be performed and the results will be submitted in a supplement to this LER.

Other Licensee Event Reports which have been submitted addressing design deficiencies are LER's 90-003, 90-005, 90-007, 90-009, 89-007, 89-009, 89-014, 89-015, 89-024, 88-009, 88-019, 88-020, 88-032, 88-033, 87-018, and 79-021.