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

November 22, 1991
LIC-91-0095L

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 91-10, Revision 1, for the Fort Calhoun Station

Please find attached Licensee Event Report 91-10, Revision 1, dated November 22, 1991. This report provides revisions to the long term corrective actions as previously submitted. These revisions are identified by a vertical bar in the right margin. This report is being submitted pursuant to 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/rkj

Attachment

c: R. D. Martin, NRC Regional Administrator
D. L. Wigginton, NRC Project Manager
R. P. Mullikin, NRC Senior Resident Inspector
INPO Records Center

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NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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.

LICENSEE EVENT REPORT (LER)

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) Auxiliary Steam Piping in Room 57 Outside Design Basis (HELB)

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

OPERATING MODE (9): 1

POWER LEVEL (10): 0 7 5

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
K. A. Voss, Shift Technical Advisor	AREA CODE 4 0 2 5 3 3 - 6 9 3 1

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): YES (If yes, complete EXPECTED SUBMISSION DATE) | X NO

EXPECTED SUBMISSION DATE (15): MONTH | DAY | YEAR

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

On May 17, 1991, at 1120 hours, plant management determined that Room 57 (the Upper Electrical Penetration Room), was outside the design basis of the plant as a result of discovering the presence of high energy Auxiliary Steam (AS) piping in the room. This piping had not been identified during the initial plant High Energy Line Break (HELB) evaluation. The major concern for this condition is the impact on the operability of safety related electrical equipment in the high humidity/temperature environment that would occur based on a critical crack in the two-inch Auxiliary Steam line in Room 57.

The cause for this concern was the lack of attention to detail during original drawing review and physical walkdowns prior to performing the plant HELB evaluation in 1973. This resulted in failure to identify the subject piping and to take proper corrective actions. The immediate action taken was to isolate the redundant trains of equipment by closing the normally-open fire dampers between those areas and Room 57, then to isolate the steam supply to the AS piping in the affected room. Long term corrective actions included completion of an engineering analysis to evaluate the remainder of the AS system for similar HELB concerns and isolation of AS supply piping to the diesel generator rooms prior to energizing the AS header to the Auxiliary Building.

Appendix M requires that any system with a design pressure that exceeds 275 psig or a design temperature that exceeds 200 degrees F be considered a high energy system. If the system is not pressurized, then it is not considered a high energy system even if it normally meets the design pressure/temperature criteria. There are two different types of high energy evaluations which may result. If the system meets either the temperature or the pressure criterion, then it must be evaluated for a critical crack. The size of the critical crack assumed, per Appendix M of the USAR, is one-half the pipe diameter in length and one-half the wall thickness in width. If the system meets both temperature and pressure criteria, then a complete pipe rupture must be assumed for the evaluation.

Auxiliary Steam is used, in part, to heat the plant work spaces in cold weather. It has a design temperature that exceeds 200 degrees F, but its design pressure is less than 275 psig. Therefore, only a critical crack has to be evaluated for this system.

The piping run that supplies Auxiliary Steam to the Diesel Generator rooms and Equipment Hatch area heaters goes through the floor of Room 81 (Emergency Feedwater Storage Tank Room) into Room 57 (Upper Electrical Penetration Area) then to Room 64 (Diesel Generator 2 Room.) The pipe run in Room 57 is very short, as the lines come through the ceiling and immediately turn to enter and pass through the wall of Room 64. However, both sections of pipe (a 2 inch auxiliary steam line and a 1 inch auxiliary steam line) are not encased in guard pipes and there are no installed spray shields. The recent critical crack analysis performed for this configuration was completed for the 2 inch pipe only. This would cause the fastest temperature and humidity rise of the two pipes in question.

Room 57 (Upper Electrical Penetration Area) houses various safety related equipment, including three 480 Volt Motor Control Centers for one train of safety related components and the panels to support alternate shutdown, Auxiliary Feedwater (AI-185 and AI-179) capabilities. Room 57 was originally designed to house both trains of safety related Motor Control Centers. A modification had previously been completed which installed a wall between the two redundant trains of safety related equipment. The two rooms (Rooms 57 and 57 East) are separated by a normally open fire damper. Room 57 East houses the motor control centers for the safety related equipment redundant to that found in room 57.

Room 20 (Lower Electrical Penetration Room) is directly below room 57 and does not contain any motor control centers, but does contain the Reactor Coolant System Temperature Processing Panels for channels A and B. The other two channels (C and D) are located in room 57. The separation between Rooms 20 and 57 contains a normally open fire damper.

The fusible links on the installed fire dampers would hold the dampers open until the room temperature reached 165 degrees F, which exceeds the environmental qualification limit for the affected electrical equipment.

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 1	— 0 1 0 —	0 1	0 3 OF 0 4

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

In early 1991, Omaha Public Power District (OPPD) was reviewing information regarding High Energy Line Breaks in order to compile more detailed information than is in Appendix M of the USAR. During this effort, an indication of a potentially reportable condition was identified and Fort Calhoun Station Engineering was notified, by letter, of the situation on March 20, 1991. Design Engineering issued the notification so that precautionary actions could be put in place while analysis of the problem was completed. Preliminary calculations showed that Room 57 could reach 100 percent humidity, at 80 to 85 degrees F, in about 10 minutes assuming a critical crack in the 2 inch Auxiliary Steam pipe. On March 22, plant Operations personnel closed the fire dampers between Rooms 57 and 57E and Rooms 57 and 20 (FD-72 & FD-85). This isolated the potential effects of a High Energy Line Break to Room 57 only. On May 16, the Auxiliary Steam header isolation valve (AS-112) that feeds both pipes was closed. The header also has a normally closed bypass valve (AS-189). With both valves closed, Auxiliary Steam is isolated; therefore, a High Energy Line Break in this room is not a concern. However, this problem must be resolved before Auxiliary Steam is needed for cold weather operations.

On May 17, 1991, Design Engineering completed the final analysis. The calculations performed by Design Engineering indicate that a critical crack in the 2 inch Auxiliary Steam line in Room 57 would result in that room reaching 100 percent relative humidity (at 80-85 degrees F) in approximately 5 minutes. Approximately 15 minutes after that (about 20 minutes total) the room conditions would be 100 percent relative humidity and 120 degrees F. Plant management classified this condition (Room 57 environment that has not been analyzed for High Energy Line Break concerns) as being outside the design basis of the plant. The NRC Senior Resident Inspector was notified of the problem and a one hour report was completed at 1420 on May 17, 1991 pursuant to the requirements of 10 CFR 50.72(b)(1)(ii)(B). This condition is also reportable pursuant to 10 CFR 50.73(a)(2)(ii)(B). An extension to July 5, 1991, for submitting Revision 0 to this report was granted by the appropriate NRC Region IV personnel on June 17, 1991.

The major concern for this condition is the impact on the operability of safety related equipment in the high humidity/temperature environment that would occur based on a critical crack in the 2 inch Auxiliary Steam line in Room 57. At the time of initial discovery of the problem, the potential high humidity/ temperature environment would include rooms 57, 57E and 20. Rooms 57 and 57E have redundant trains of safety related equipment that are separated by a fire wall, but air flow was allowed through normally open fire dampers. The dampers close at 165 degrees F. The environmental qualification limit for the motor control centers is 120 degrees F. Therefore, with the fire dampers open, both channels of safety related equipment would have been affected and could have impacted the safe shutdown capability of the plant. The USAR HELB analysis performed for Auxiliary Steam states that the postulated crack of an Auxiliary Steam line would not adversely affect the safe shutdown of the facility.

The HELB analysis for the electrical penetration area states that the only potential sources of damage to the area are the Main Steam and Feedwater lines in Room 81. There is no mention of the Auxiliary Steam line in Room 57 in the analysis.

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Fort Calhoun Station Unit No. 1	0 5 0 0 0 2 8 5	9 1	0 1 0	0 1	0 4 OF 0 4

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

The root cause for this event is lack of attention to detail during original drawing review and physical walkdowns prior to performing the HELB evaluation in 1973. This resulted in failure to identify the affected piping and take proper corrective actions. It is speculated that the existence of this piping was overlooked due to composite drawings not showing the piping and the fact that the piping is not readily visible from the floor level in Room 57. A contributing factor is that the plant was designed and built prior to NRC issuance of the HELB criteria.

This appears to be an isolated case, based upon walkdowns performed to date on the AS system, and it is not suspected that unidentified HELB sources are located in safety related areas previously determined to be free of HELB sources. Therefore, this incident has no generic implications. An engineering analysis to evaluate the remainder of the AS system for similar HELB concerns has been completed for the Auxiliary Building. (See long term corrective action (1) below).

The following short term corrective actions were completed:

(1) The fire dampers between Room 57 and Room 57E and between Room 57 and Room 20 were closed.

(2) The Auxiliary Steam header isolation and bypass valves to the Auxiliary Building were closed. This eliminates the HELB concern for this area as long as both the valves are closed.

The following long term corrective actions were completed:

(1) An Engineering Analysis (EA-FC-91-031) to evaluate the remainder of the Auxiliary Steam system for similar HELB concerns has been completed. This analysis concluded that the portion of the AS system needed for building heat could be safely returned to service. This conclusion was based on the provision that the isolation valves AS-594 and AS-596 are closed to eliminate HELB concerns in downstream AS piping not needed for building heat. The associated maintenance for this provision has been completed.

(2) The AS supply piping to the diesel generator rooms (routed through Room 57) has been isolated to resolve the identified problem. This was completed prior to energizing the AS header to the Auxiliary Building. This is addressed in Abbreviated Modification Design Package MR-FC-91-027, "High Energy Line Break in Room 57, Part 1".

The previous LERs dealing with HELB concerns are 90-07 and 89-07. Other LERs concerning conditions outside design basis are 91-03, 91-04, 90-03, 90-05, 90-09, 90-16, 90-20, 90-23, 90-25, 89-09, 89-14, 89-15, 89-17, 89-24, 88-09, 88-19, 88-20, 88-32 and 88-33.