Omaha Public Power District
1623 Harney Omaha, Nebraska 68102-2247
402/536-4000

February 5, 1990
LIC-90-0042

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 89-024 for the Fort Calhoun Station

Please find attached Licensee Event Report 89-024 dated February 5, 1990. A two week delayed submittal date was agreed upon by T. G. Therkildsen of OPPD and T. F. Westerman of NRC Region IV on January 22, 1990. 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/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

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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 WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), 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 6

TITLE (4)

Potential Use of Containment Spray System 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)
									N	0 5 0 0 0
1 2	2 1	8 9	8 9	0 2 4	0 0	0 2	0 5	9 0		0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	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)	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
David Buell - Shift Technical Advisor	4 0 2 5 3 1 - 1 6 7 4

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
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 4	0 1	9 0

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

An engineering review revealed that the Fort Calhoun Station Containment Spray (CS) pumps and suction header piping were not originally constructed for use as a backup to the Low Pressure Safety Injection (LPSI) system for shutdown cooling. Such use could be outside the pressure and temperature design basis for the CS system. This use was incorporated into Operating Instructions and procedures, as well as Appendix R fire protection commitments. Existing Technical Specification 2.1.1 allows credit for use of the CS system as redundant to the LPSI system for shutdown cooling. Technical Specification 3.16 requires pressure testing of the CS piping to a value which exceeds the original code hydrostatic test of the piping. These conditions were apparently the result of inadequate review of the assumptions and submittals which were incorporated into the Technical Specifications and operating guidance. Interim guidance on proper use of the CS system has been provided to Operations personnel. Appropriate procedures and commitments will be revised to reflect use of the CS system within design parameters. Corresponding proposed Technical Specification changes will be submitted to NRC.

The Containment Spray (CS) system at Fort Calhoun Station Unit No. 1 is designed to limit the containment structure pressure rise thereby reducing the leakage of airborne radioactivity from the containment by providing a means for cooling the containment atmosphere after a Loss of Coolant Accident (LOCA). The system takes suction from two independent headers which extend from the Safety Injection Refueling Water Tank (SIRWT) and the Containment sump to the High Pressure Safety Injection (HPSI) pumps, the Low Pressure Safety Injection (LPSI) pumps, and the Containment Spray pumps. The Updated Safety Analysis Report (USAR) states that the design temperature and pressure of the two suction headers are 300 degrees F and 60 psig. The LPSI pumps, which are identical in design to the Containment Spray pumps, provide the normal means of decay heat removal (shutdown cooling) when the Reactor Coolant System (RCS) is at a temperature and pressure of less than 300 degrees F and 250 psia.

The Fort Calhoun Station Operating Manual contained two Operating Instructions: OI-SC-3, "Alternate Shutdown Cooling Utilizing Containment Spray Pumps", initially approved on Sept. 30, 1974, and OI-SC-4, "Termination of Shutdown Cooling", initially approved on Oct. 4, 1974. These procedures allowed the use of the CS pumps as an alternate means of shutdown cooling and were intended to be used if both LPSI pumps became inoperable. This alternative use of the CS system for shutdown cooling was later incorporated into other operating procedures.

Technical Specification 3.16 requires hydrostatically testing the return lines from the containment to the discharge isolation valves of the LPSI and CS pumps at no less than 100 psig on a refueling interval. This requirement has apparently been included in the Technical Specifications since initial issuance of the operating license.

In May of 1980, the NRC issued IE Bulletin No. 80-12, "Decay Heat Removal System Operability", which required licensees of Pressurized Water Reactor facilities to review and ensure the redundancy of decay heat removal capabilities. As a part of Omaha Public Power District's (OPPD) response to this bulletin, the Containment Spray pumps were identified as an available means of shutdown cooling; however, it was stated that the use of the pumps would be restricted to times when the Reactor Coolant System (RCS) is below 150 psig. IE Bulletin 80-12 and a followup letter from NRC dated June 11, 1980 also requested that Technical Specifications be revised, if necessary, to resolve the stated issues. In response OPPD submitted a proposed Technical Specification revision on November 17, 1980. Facility License Amendment No. 56 was issued by NRC on February 10, 1981. The amendment to Technical Specification section 2.1.1 (3) (a) (iii) and (iv) incorporated the use of the Containment Spray pumps as a means of possible decay heat removal when the reactor is in cold shutdown condition or the RCS cold leg temperature is between 210 and 300 degrees F. The amended Technical Specification did not contain the restriction of using the pumps below 150 psig.

On October 17, 1988 the NRC issued Generic Letter 88-17, Loss of Decay Heat Removal, which discussed the consequences of losing decay heat removal during nonpower operation. Various actions and enhancements were recommended by this letter, which superseded Generic Letter 88-12. OPPD responded to GL 88-17 by letters dated January 4 and February 10, 1989. Included in the actions taken was implementation of procedural requirements to have a CS pump available with a backup power source when shutdown cooling is required to be operable.

On November 1, 1989, the NRC issued Information Notice No. 89-73 titled "Potential Overpressurization of Low Pressure Systems" which described an overpressurization event during a surveillance test being performed on a residual heat removal system. During a Licensing review of this Notice, a concern was presented to System Engineering personnel as to whether the design parameters of the two suction headers from the SIRWT and Containment Sump to the Safety Injection and Containment Spray pumps would be exceeded when utilizing the Containment Spray pumps as a means of shutdown cooling.

Investigation into the design pressure and temperature limits revealed that the CS suction piping was originally designed for 350 degrees F and 66 psig, which indicated that the piping was not intended for unrestricted use as an alternate means of shutdown cooling. These values were taken from original construction documents of the piping and are slightly higher than the USAR values of 300 degrees F and 60 psig which conservatively must consider the various flow configurations and thermal transients. After further investigation of design documentation and available calculations, Design Engineering confirmed the conclusion that the CS suction header piping were not intended for unrestricted use in shutdown cooling. The conclusion was made at 1650 hours on December 21, 1989 that the use of Operating Instructions OI-SC-3, OI-SC-4 to implement the reliance on the Containment Spray pumps in Technical Specification 2.1.1 (3) (a) (iii) and (iv) would be contrary to the design basis of the system as defined in the USAR. A notification to NRC was made at 1740 hours on December 21 pursuant to 10 CFR 50.72(b)(1)(ii)(B). This written report is being submitted pursuant to 10 CFR 50.73(a)(2)(ii)(B).

A review of the history of Operating Instructions OI-SC-3 and OI-SC-4 showed that these two procedures were written and approved shortly after initial commercial operation of the facility in 1973. A search of existing files revealed no documentation of a 10CFR50.59 safety evaluation or other technical analysis to justify using the CS system in this configuration. The apparent cause of this event was an inadequate review of the design basis and safety implications for unrestricted use of the Containment Spray system for shutdown cooling requirements. This deficiency was compounded when Technical Specification Amendment No. 56 was reviewed and approved without identifying that the potential for operating the system outside the design basis already existed.

A review of the analysis for Amendment No. 56 revealed no documentation that identified this condition. Additionally, the Technical Specification was amended without adding the restriction to limit the use of the pumps to times when the RCS was less than 150 psig, a limitation that was identified in the response to NRC IE Bulletin 80-12. Finally, the actions taken in response to Generic Letter 88-17 did not include appropriate restrictions on use of the CS system for shutdown cooling.

Following the conclusion that the Containment Spray pumps should not be used as an unrestricted alternate means of shutdown cooling, an extensive review of the Plant Outage Reports and Control Room Logs from August 25, 1973 to the present was conducted to identify occurrences when the pumps were used for alternate shutdown cooling. The review identified two time periods when the pumps were used in this configuration and sufficient detail exists in the logs to verify that the design pressure of 66 psig was not exceeded. Both of these occurrences were during refueling outages when the RCS was either vented to the atmosphere or pressure retaining components were disassembled for maintenance. Although the potential existed for the plant to use the Containment Spray pumps as alternate means of shutdown cooling by having an approved operating instruction and a Technical Specification which allowed this configuration, based on the review of logs and operating history of the system it was determined that the system was not operated outside of the original design basis.

Additional review revealed that Technical Specification 3.16 (1) b, Surveillance Requirements - Recirculation Heat Removal System Integrity Testing, specifies that the two suction headers be hydrostatically tested to no less than 100 psig during each refueling outage. Surveillance Test ST-RHRS-1 which satisfies this Technical Specification has been performed each refueling outage; the test has subjected the two suction headers to pressures which are above the original code hydrostatic test values of the piping. OPPD Design Engineering has performed a preliminary analysis to verify that the 100 psig test versus an original hydrostatic test of approximately 88 psig (per the piping code-USAS B31.7-1968) has not damaged the piping.

A review of prior commitments involving the availability of Containment Spray pumps for shutdown cooling was conducted. The review identified a commitment made to the NRC in Licensing memorandum LIC-84-338, 10 CFR 50 Appendix R Exemption Request Revisions, dated January 9, 1985. The commitment involved providing a written procedure (SP-SI-5) and readily available equipment to perform emergency repairs to Containment Spray pump SI-3C to restore the pump for shutdown cooling requirements. The emergency repairs would be required in the event of a worst case fire in Fire Area 6 (Corridor 4, 989' elevation of the Auxiliary Building) which could disable power and control cables for LPSI and Containment Spray pumps. Since temperature and pressure entry conditions for shutdown cooling after a fire would exceed the original design basis of the CS system, the aforementioned commitment cannot be satisfied. OPPD informed the NRC of this condition in a supplemental telephone notification on January 19, 1990. Corrective actions are noted later in this report.

The safety evaluation process per 10 CFR 50.59 has been significantly improved at Fort Calhoun Station during the plant operating history and involves a thorough review of potential reductions in the margin of safety provided by the Technical Specifications and a review of how the proposed change will affect the USAR and previously analyzed accidents.

The following corrective actions have been completed in response to this event:

(1) Operating Instructions OI-SC-3 and OI-SC-4 have been deleted from the Fort Calhoun Operating Manual.

(2) Operations Memorandum 89-05 was issued on December 22, 1989 to provide guidance to the operating crews that the Containment Spray pumps are not available for shutdown cooling as allowed in Technical Specification 2.1.1 (3), although the pumps may be used per Technical Specification 2.1.1 (4) when the RCS is in refueling or shutdown conditions only when the RCS is below 120 degrees F and vented to the atmosphere.

(3) A preliminary engineering analysis has been performed which verified that the CS piping system has not and would not be adversely affected by the 100 psig pressure test required by Technical Specification 3.16.

(4) An hourly firewatch was established in Fire Area 6 as a compensatory measure since no credit can be taken for repair and use of a CS train following an Appendix R worst case fire.

(5) Safety Analysis for Operation (SAO) 90-01-00 was implemented to justify continued plant operation with the compensatory action noted above.

The following corrective actions will be completed in response to this event:

(1) Abnormal Operating Procedure AOP-19, Loss of Shutdown Cooling, which allows the use of a Containment Spray pump if both LPSI pumps are inoperable, will be revised to limit the conditions for use of the pumps. This action will be completed before initiation of shutdown cooling during the scheduled 1990 refueling outage.

(2) Emergency Operating Procedures and other appropriate operational guidance will be revised to limit the conditions for use of a Containment Spray pump in the event both LPSI pumps are inoperable. These procedures will be revised prior to Cycle 13 initial criticality.

(3) An application to amend appropriate Technical Specifications will be submitted which will limit the conditions for use of the Containment Spray pumps as an alternate means of decay heat removal. A schedule for submittal of this application will be provided in a supplement to this LER by April 1, 1990.

(4) An application to amend Technical Specification 3.16 will be submitted to lower the hydrostatic test pressure from 100 psig to a pressure consistent with code pressure test requirements on the suction header piping from the containment to the shutdown cooling system. A schedule for submittal of this application will be provided in a supplement to this LER by April 1, 1990. ST-RHRS-1 will be revised to reduce the hydrostatic test pressure following approval of the revised Technical Specification.

(5) The Repair Procedure, SP-SI-5, will be deleted from the Operating Manuals and a new procedure will be provided as an attachment to Abnormal Operating Procedure AOP-6, Fire Emergency. The new procedure will provide for the repair of LPSI pump SI-1B for shutdown cooling following a fire in Fire Area 6. The required materials and tools will be procured and maintained dedicated for this repair work only on site. These actions will be completed by May 1, 1990.

(6) A request will be submitted to NRC to revise the Appendix R commitments and design basis relative to use of the Containment Spray system for shutdown cooling following a fire. This will be completed by June 1, 1990.

(7) The OPPD responses to Generic Letter 88-17 and Bulletin 80-12 will be supplemented to reflect the procedure changes noted in Corrective Actions (1) and (2) above. This will be completed by June 1, 1990.

LER 89-22 also involved potential operation outside design basis partially attributable to inadequate safety evaluation.