

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

April 20, 1992  
LIC-92-131L

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 92-011 for the Fort Calhoun Station

Please find attached Licensee Event Report 92-011 dated April 20, 1992. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(ii). If you should have any questions, please contact me.

Sincerely,

*W. G. Gates*

W. G. Gates  
Division Manager  
Nuclear Operations

WGG/lah

Attachment

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

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE IS 30 MINUTES. PLEASE FORWARD COMMENTS REGARDING BURDEN OF THIS REPORT TO THE RECORDS AND REPORTS MANAGEMENT SECTION, 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) Fort Calhoun Station Unit No. 1

DOCKET NUMBER (2) 0 | 5 | 0 | 0 | 0 | 2 | 8 | 5

PAGE (3) 1 OF 0 | 4

TITLE (4) Unacceptable Valve Arrangement for Service Air System Containment Penetration M-74

EVENT DATE (6)			LER NUMBER (8)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (9)																	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)															
0	3	2	0	9	2	9	2	0	1	1	0	0	0	4	2	0	9	2	N	0	5	0	0	0		

OPERATING MODE (5) 5

POWER LEVEL (10) 0 | 0 | 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.73. Check one or more of the following (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.405(a)(1)(iv)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(E)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: James R. Geschwender, Station Licensing Engineer

TELEPHONE NUMBER: 4 | 0 | 2 | 5 | 3 | 3 | - | 6 | 8 | 5 | 7

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED SUBMISSION DATE (15)

YES (if yes, complete EXPECTED SUBMISSION DATE)  NO

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

On March 20, 1992 at 1550 CST, it was determined that the valve arrangement for Service Air System Containment Penetration M-74 did not meet isolation criteria required for a containment atmosphere exposed system. The Fort Calhoun Station (FCS) Updated Safety Analysis Report (USAR) indicates that in general, two containment isolation valves were provided for such systems. USAR Figure 5.9-13, Sheet 45, depicts valve HCV-1749 (a normally closed/fail closed, air operated valve) as the only isolation valve for Penetration M-74. A note on the Figure indicates that "line pressure is greater than containment design pressure at all normal and postulated accident conditions," however, because the air compressors are not automatically sequenced to the emergency diesel generators during an accident, this condition is not met.

An evaluation using Probabilistic Safety Assessment methodology found the impact of this event upon overall risk to be very small. The root cause of the unacceptable valve arrangement was determined to be failure to determine and address the effect on the Service Air System of an August 1971 Supplement to the FCS Final Safety Analysis Report which changed the air compressors from auto-sequenced to non-sequenced loads.

Corrective actions include installing a blank flange on the Service Air line inside containment (which will later be replaced with a qualified isolation valve) and verifying the valve arrangements of other containment piping penetrations.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

TEXT (If more space is required, use additional NRC Form 888A's)(17)

The Fort Calhoun Station (FCS) Unit 1 Compressed Air System provides compressed air to the Instrument Air header for pneumatic control and the actuation of valves, dampers and similar devices and to the Service Air System for portable maintenance tools, the fuel handling machine in the Containment and other uses. The Service Air System enters Containment through Penetration M-74. The Containment Service Air Header Outboard Isolation Valve (HCV-1749) is a Safety Class 2 air operated valve which is normally closed and fails closed. Inside containment is a manually operated non-class isolation valve (CA-555) which has been maintained as normally open.

The FCS Updated Safety Analysis Report (USAR) Section 5.9.5, "Containment Isolation System", defines four system categories for classification of containment isolation valve arrangements. The Service Air System is classified as a "Containment Atmosphere Exposed System". The description of Containment Atmosphere Exposed Systems in USAR Section 5.9.5 and USAR Appendix G, "Responses to 70 Criteria", Criterion 53, "Containment Isolation Valves", indicates that for a single containment isolation valve to be acceptable, the operating pressure of the system is to be greater than containment design pressure under all modes of plant operation and postulated accident conditions. USAR Figure 5.9-13, Sheet 45, "Penetration M-74 Service Air Supply" depicts HCV-1749 as the only isolation valve for the penetration (CA-555 is not shown). Note 1 on this drawing indicates that "line pressure is greater than containment design pressure at all normal and postulated accident conditions."

In January 1992, Engineering Assistance Request (EAR) 92-016, "HCV-1749 Containment Isolation Valve", was initiated by System Engineering to evaluate the adequacy of Containment Isolation Actuation Signal (CIAS) logic for HCV-1749. An investigation by Design Engineering Nuclear conducted in response to this EAR determined that Penetration M-74 did not meet isolation criteria required for a containment atmosphere exposed system, with only one Safety Class 2 valve (i.e. HCV-1749) available to meet containment isolation requirements. It was determined that the USAR conditions under which a single isolation valve is acceptable were not met, in that the Service Air System would not be maintained above containment design pressure under all postulated accident conditions. On March 20, 1992, at 1550 CST, with FCS in Mode 5 (refueling shutdown), it was concluded that a reportable condition existed. The NRC was notified on March 20, 1992, at 1640 CST, pursuant to 10 CFR 50.72(b)(2)(i). This written report is submitted pursuant to 10 CFR 50.73(a)(2)(ii).

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		9   2	—   0   1   1	—   0   0	0   3	OF 0   4

TEXT (If more space is required, use additional NRC Form 305A's)(17)

Isolation valve HCV-1749 is leak tested every refueling outage (review of the Type C leak rate testing history of Penetration M-74 has found minimal previous leakage from HCV-1749) and is a fail closed valve. Also, this valve receives a closure signal from CIAS and is normally maintained in the closed position during power operation. Probabilistic Safety Assessment methodology was used to evaluate the probability of a release (of any size) given that valve CA-555 was open. This evaluation encompassed a broad scope of failure mechanisms including internal, external, and human failure events. The analysis produced more than 200 failure sequences. The results indicate that the probability of core damage with containment leakage through Penetration M-74 is an order of magnitude below the sequence selection (reporting) criterion in Generic Letter 88-20. This is true even with the conservative assumption that any size leak constitutes a bypass. Therefore, using the Generic Letter criterion as a point of reference, the impact of this event upon overall risk is very small.

A Root Cause Analysis (RCA) was initiated to further investigate this issue. A review was conducted of historical documents, including the FCS "Facility Description and Safety Analysis Report" (also referred to as the Preliminary Safety Analysis Report or PSAR), the FCS "Final Safety Analysis Report" (FSAR) and their respective supplements. The review found a list of penetrations in a PSAR supplement identifying the Service Air Inlet as a Category V, "Closed System" penetration requiring only a single valve for isolation. The original version of the FSAR (1969) included a Section 5.9.5, "Containment Isolation System", which identified four categories of containment isolation valve arrangements. Table 5.9-1 and Figure 5.9-11, identified Penetration M-74 under the category "Containment Atmosphere Exposed System" with a notation that line pressure is greater than containment design pressure at all normal and postulated accident conditions.

Figures 8.4-1 and 8.4-2 of the original FSAR indicated that one air compressor would be started by each sequencer in the third load group. Therefore, air compressors would be automatically started during an accident condition. FSAR Supplement 11, dated August 1971, included a revised Figure 8.4-1 which indicated that the air compressors were deselected via a key switch from sequence starting controls. Without automatic backup emergency diesel power, the Compressed Air System cannot be relied upon to maintain pressure greater than containment design pressure under all postulated accident conditions.

The RCA concluded that the root cause of the unacceptable valve arrangement was failure to determine and address the effect that revising the FSAR from the 1969 edition to the August 1971 edition would have on the Service Air System.



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		YEAR 9   2	SEQUENTIAL NUMBER -   0   1   1	REVISION NUMBER -   0   0	0   4	OF 0   4

TEXT (If more space is required, use additional NRC Form 388A's)(17)

In 1988, LER 88-004 reported a problem in which it was determined that Instrument Air Containment Penetration M-73 did not meet USAR Containment Isolation Criteria. A review of other recent documents identified a Design Basis Reconstitution Project Open Item related to Penetration M-74. This Open Item resulted in a December 1990 recommendation that CA-555 be designated as a normally closed, administratively controlled, containment isolation valve. As open items from the Design Basis Reconstitution Project were identified, they were assessed and assigned to one of several categories, depending on the nature of the item. This Open Item had originally been assigned to Category 2 due to conflicting requirements and/or missing documentation relating to the significance of the item. After a review and evaluation, this Open Item was re-categorized to Category 6 pending recommended changes to the USAR, design basis documents and operating procedures, which have not been implemented. Category 6 is for those Open Items for which the appropriate paperwork has been initiated to resolve/closeout the condition. The item in question remains open. The situation involving LER 88-004, the Design Basis Open Item, and other related instances were found to represent missed opportunities to identify and correct the problem with Penetration M-74.

The following corrective actions will be completed:

1. All other containment piping penetration valve arrangements have been reviewed and found acceptable in establishing containment isolation. This review will be documented by May 15, 1992.
2. Design Basis Open Items which were originally classified as Category 1 or 2 and were subsequently reclassified as a lower priority will be reviewed by August 1, 1992 to verify reclassification was appropriate.
3. Valve CA-555 will be removed from the system and a blank flange installed prior to the end of the 1992 Refueling Outage.
4. A modification will be performed at the next refueling outage to install a Safety Class 2 inboard isolation valve.

LERs 88-004 and 91-003 document previous events involving design/testing of containment piping penetrations.