

Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247
402/536-2000

May 18, 1992
LIC-92-136L

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 92-010 for the Fort Calhoun Station

Please find attached Licensee Event Report 92-010 dated May 18, 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,



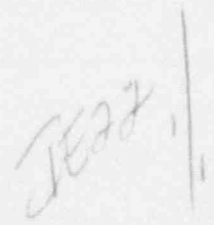
W. G. Gates
Division Manager
Nuclear Operations

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

220067



LICENSEE EVENT REPORT (LER)

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.

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 3		
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TITLE (4)
Lack of Proper Breaker/Fuse Coordination on 125V DC System

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 (8)											
0	4	1	6	9	2	9	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
												N		0	5	0	0	0	0	0	0	0
														0	5	0	0	0	0	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)

<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"/> 50.38(e)(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"/> 50.38(e)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 306A)
<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)(vii)(B)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(viii)	
<input type="checkbox"/> 20.405(a)(1)(vi)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Daniel J. Rosloniec, Shift Technical Advisor	4 0 2 5 3 3 - 6 8 9 9

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

During reconstitution of the design basis of the Fort Calhoun Station (FCS) power distribution overcurrent tripping scheme, it was discovered that six breakers on the 125V DC buses did not properly coordinate with the battery output fuses. Four of these breakers serve Critical Quality Element (CQE) loads and two serve non-CQE loads. This lack of coordination could have resulted in the loss of a DC bus due to a fault on one of the improperly coordinated loads. On April 16, 1992, while the plant was in Mode 5 (Refueling Shutdown), it was concluded that a reportable condition existed.

The safety significance of this incident is considered minimal. In the unlikely event that a non-CQE component on DC Bus 1 had failed in such a way as to disable the bus, a simultaneous and unrelated failure of a CQE component associated with DC Bus 2 would also have had to occur in order to create the potential for unavailability of DC power for equipment required to respond to a postulated accident.

The root cause of this event was determined to have been the unavailability of design basis information and the lack of adequate controls for the evaluation of the effect of load and protection configuration changes made to FCS power systems.

The main DC bus fuses between the batteries and the DC buses were replaced with fuses that have a slower response time and properly coordinate with the present breakers and loads.

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 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	LER NUMBER (5)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 2	- 0 1 0	- 0 0	0 2	OF 0 3

TEXT (If more space is required, use additional NRC Form 368A's)(17)

The Fort Calhoun Station (FCS) Electrical Distribution System incorporates 2 independent 125V DC systems which are designed as the basic sources of energy for plant control and instrumentation during normal plant operation and accident situations.

Each of the two systems includes a multi-cell storage battery, a battery charger, main fuses, a main distribution switchboard with molded-case circuit breakers, local distribution panels, and feeders. A third battery charger is used as a spare for either bus. Battery fuses, main panel supply and feeder circuit breakers, and local panel feeder circuit breakers are intended to provide selective fault protection.

Single failures (which can affect only one of the two DC buses) have no effect on the control of switchgear because each switchgear set or circuit is provided with two power feeds (one from DC Bus 1 and one from DC Bus 2) and a manual transfer switch. Similar provisions are made for important control panels.

During reconstitution of the design basis of the FCS power distribution overcurrent tripping scheme, it was discovered that six breakers on the 125V DC buses did not properly coordinate with the battery output fuses. This lack of coordination could have resulted in the loss of a DC bus due to a fault on one of the improperly coordinated loads. Under certain postulated (although unlikely) scenarios, the short-circuit current could have been such that the battery to bus fuse would have opened prior to the downstream DC load breakers. The associated battery charger fuses could also have opened, disabling the charger.

Of the six breakers identified as lacking proper coordination, four serve Critical Quality Element (CQE) loads and two serve non-CQE loads (CQE is a Quality Assurance Classification which identifies items whose satisfactory performance is required to prevent or mitigate the consequences of postulated accidents). The two improperly coordinated breakers serving non-CQE loads are both associated with DC Bus 1. The lack of proper coordination involving the breakers serving the non-CQE loads created the potential for a failure involving a single non-CQE load to cause the loss of the associated DC bus (i.e., DC Bus 1). The potential for such a failure is not consistent with selective fault protection, particularly with respect to protection of CQE components from a postulated fault involving a non-CQE component.

On April 16, 1992 at 1500, while the plant was in Mode 5 (Refueling Shutdown) it was concluded that a four-hour reportable condition existed. The NRC was notified on April 16, 1992 at 1653, pursuant to 10 CFR 50.72(b)(2)(i). This report is submitted pursuant to 10 CFR 50.73(a)(2)(ii).

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		YEAR 9 2	SEQUENTIAL NUMBER - 0 1 0	REVISION NUMBER - 0 0	0 3	OF 0 3

TEXT (If more space is required, use additional NRC Form 368A's)(17)

An investigation of events associated with this issue found that a 1980 modification (MR-FC-79-03), which replaced the station batteries and installed the main DC bus fuses, did not correctly address fuse/breaker coordination. A 1985 modification (MR-FC-84-119), which implemented several changes to the DC system, resulted in installation of several breakers which were not properly coordinated with the main DC bus fuses.

The safety significance of this incident is considered minimal. While loss of availability of a DC bus due to a postulated fault on an individual load is not consistent with selective fault protection, loss of a single DC bus is an analyzed failure. In order for the availability of both DC buses to have been lost, two unrelated failures (including at least one CQE component failure) would have had to occur. In the unlikely event that a non-CQE component on DC Bus 1 had failed in such a way as to disable the bus, a simultaneous and unrelated failure of a CQE component associated with DC Bus 2 would also have had to occur in order to create the potential for unavailability of DC power for equipment required to respond to a postulated accident.

The root cause of this event was determined to have been the unavailability of design basis information and the lack of adequate controls for the evaluation of the effect of load and protection configuration changes made to FCS power systems.

Availability of design basis information has been addressed by completion of the Breaker/Fuse Coordination Study. Production Engineering Division modification review procedure GEI-3 requires that a breaker/fuse coordination review be completed (per GEI-9) any time new loads are added or modified.

The following corrective action has been completed:

1. The main DC bus fuses between the batteries and the DC buses were replaced during the 1992 Refueling Outage with fuses that have a slower response time and properly coordinate with the present breakers and loads.

LER 91-007 reported deficiencies regarding 480V breaker coordination.