

**OPPD**

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

October 30, 1995  
LIC-95-0200

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

Reference: Docket No. 50-285

Subject: Licensee Event Report 95-001 revision 01 for the Fort Calhoun  
Station

Please find attached Licensee Event Report 95-001 revision 1 dated October 30, 1995. This revision provides additional information regarding the failure mechanism of the affected relays. Revisions to the Abstract and Text are denoted by vertical lines in the right margin.

This report is being submitted pursuant to 10CFR50.73(a)(2)(vii). If you should have any questions, please contact me.

Sincerely,



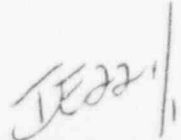
T. L. Patterson  
Division Manager  
Nuclear Operations

TLP/epm

Attachment

c: Winston and Strawn  
L. J. Callan, NRC Regional Administrator, Region IV  
L. R. Wharton, NRC Project Manager  
W. C. Walker, NRC Senior Resident Inspector  
INPO Records Center

9511060232 951030  
PDR ADOCK 05000285  
S PDR



## LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001 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) 05000285		PAGE (3) 1 OF 4		
TITLE (4) Time Delay Relays for Offsite Power Low Signal Found Out of Tolerance														
EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME		DOCKET NUMBER			
03	16	95	95	-- 001 --	01	10	30	95	FACILITY NAME		DOCKET NUMBER			
OPERATING MODE (9) 5			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)											
POWER LEVEL (10) 000			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)			x 50 73(a)(2)(vii)		OTHER			
			20 405(a)(1)(iii)			50 73(a)(2)(i)			50 73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)			
			20 405(a)(1)(iv)			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 Erick P. Matzke, Station Licensing Engineer										TELEPHONE NUMBER (Include Area Code) (402) 533-6855				
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				
X	EB	27	A109	Y										
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)					X NO									

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 16, 1995, with the plant in Refueling Shutdown (Mode 5), a System Engineer reviewing completed Offsite Power Low Signal (OPLS) calibration procedures discovered that the as-found time delays for two of four OPLS actuation relays were outside the time delay range specified in Technical Specification Table 2-1. The maximum allowable time delay is 5.3 seconds (based on the specified range of 4.8 +/- 0.5 seconds). The as-found time delays for the four OPLS actuation relays were 4.94, 5.04, 5.41 and 5.48 seconds. One of the out-of-tolerance relays was subsequently reset, and the other was replaced.

A failure analysis was conducted on the relay that was replaced. There was no absolute conclusive evidence as to the reason for the relay failure. However, the relay remaining energized for 14 continuous months was a probable factor contributing to its failure. The constant heat from the energized coil and prolonged compressed state could have had an adverse effect on the reset spring.

Corrective actions will include re-checking the OPLS actuation relays periodically during plant operation to ensure setpoint stability. Modification 95-020 will replace the four OPLS relays identified.

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 INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Fort Calhoun Station Unit No. 1	05000285	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		95	-- 001 --	01	

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

## BACKGROUND

The Fort Calhoun Station (FCS) Electrical Distribution System is equipped with a degraded voltage protection scheme, referred to as the Offsite Power Low Signal (OPLS), installed on the 4160V Emergency Safeguards Buses (Buses 1A3 and 1A4) to provide protection during accident conditions.

The OPLS degraded voltage relay system provides undervoltage protection in the event of an accident in which Safety Injection is required. The OPLS lock-out relay is armed if the Safety Injection Actuation Signal (SIAS) is actuated. The OPLS scheme is based on a two-out-of-four actuation logic. The OPLS is set to ensure that adequate voltage exists on the 4160V and 480V buses to accelerate and operate safety related loads. FCS Technical Specification (TS) Table 2-1, Items 6.b.(I) and 6.b.(ii) specify setting limits for the degraded voltage function. The limits specified are: greater than or equal to 3988.8 volts with a 4.8 +/- 0.5 second time delay for Bus 1A3, and greater than or equal to 3990.6 volts with a 4.8 +/- 0.5 second time delay for Bus 1A4.

If voltage falls below the OPLS setpoint concurrent with an SIAS, offsite power is tripped and the automatic actions necessary to allow the emergency diesel generators to re-energize the safeguards loads are initiated. When the diesel generator has accelerated to full speed and energized the bus, the sequencers automatically load all necessary safeguards loads to maintain the reactor in a safe shutdown condition.

## EVENT DESCRIPTION

On March 16, 1995, with the plant in Refueling Shutdown (Mode 5), a System Engineer reviewing completed OPLS calibration procedures discovered that the as-found time delays for two of four OPLS actuation relays were outside the time delay range specified in TS Table 2-1. The maximum allowable time delay is 5.3 seconds (i.e., 4.8 + 0.5 seconds). The relays and as-found values are listed in the table below.

OPLS Actuation Relay	As-Found Time Delay
27-T1/OPLS-A	4.94 seconds
27-T1/OPLS-B	5.41 seconds
27-T1/OPLS-C	5.04 seconds
27-T1/OPLS-D	5.48 seconds

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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Fort Calhoun Station Unit No. 1	05000285	95	-- 001 --	01	3 OF 4

TEXT (if more space is required, use additional copies of NRC Form 366A) (17)

The maximum time delay allowed by the calibration procedures is 5.25 seconds (which is more restrictive than the maximum allowed by TS's). In response to the out-of-tolerance time delay, Relay 27-T1/OPLS-B was reset to a value within the range allowed by the calibration procedure and successfully re-checked. An attempt was made to reset Relay 27-T1/OPLS-D, but the relay would not perform consistently. As a result, the relay was replaced under Maintenance Work Order (MW0) 950846.

This report is being submitted pursuant to 10 CFR 50.73(a)(2)(vii).

## SAFETY ASSESSMENT

This event is not considered to have been significant with regard to nuclear safety. Assuming a single failure of the relay with the shortest as-found time delay (i.e., 27-T1/OPLS-A), OPLS could have been expected to actuate (on two-out-of-four logic) after a time delay of 5.41 seconds. This delay is 0.11 seconds greater than the maximum TS allowed time delay of 5.3 seconds.

The OPLS circuit is designed to trip the offsite power and place the diesel generators in service in the event of a degraded voltage condition. During the fixed time delay between initial degradation of voltage and actuation of OPLS, the engineered safeguards motors can be exposed to degraded voltages. An engineering evaluation, based on motor acceleration time and thermal capability, has concluded that the additional time delay (i.e., 0.11 seconds) would not have caused motor damage. In addition, the engineering evaluation concluded that a time delay of up to six seconds would be acceptable with respect to response time of safeguards equipment.

## CONCLUSIONS

A failure analysis has been conducted on the relay that failed. There was no absolute conclusive evidence as to the reason for the relay failure. It was concluded that the setpoint drift of the relays (27-T1/OPLS-B and 27-T1/OPLS-D) was most probably caused by the relays remaining energized for 14 continuous months. The constant heat from the energized coil and prolonged compressed state could have had an adverse effect on the reset spring.

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 INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Fort Calhoun Station Unit No. 1	05000285	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
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TEXT (if more space is required, use additional copies of NRC Form 366A) (17)

## CORRECTIVE ACTIONS

The following corrective actions have been or will be completed:

1. The existing relays (27-T1/OPLS-A, 27-T1/OPLS-B, 27-T1/OPLS-C and 27-T1/OPLS-D) will be periodically re-checked during plant operation to ensure setpoint stability.
2. The existing relays (27-T1/OPLS-A, 27-T1/OPLS-B, 27-T1/OPLS-C and 27-T1/OPLS-D) have be evaluated to determine whether replacement with more accurate relays is appropriate.
3. A failure analysis was performed on the relay that was replaced (27-T1/OPLS-D) in an effort to determine the cause of failure. This revised LER is being submitted to provide information regarding the results of the failure analysis.
4. The existing relays (27-T1/OPLS-A, 27-T1/OPLS-B, 27-T1/OPLS-C and 27-T1/OPLS-D) will be replaced under modification MR-FC-95-020. The new relays will be installed by the end of the 1996 refueling outage.

## PREVIOUS SIMILAR EVENTS

LER 93-017 reported a previous event involving out-of-tolerance OPLS relay time delay settings.