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**DUKE POWER**

January 28, 1997

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Subject: Catawba Nuclear Station  
Docket No. 50-413  
LER 413/96-014

Gentlemen:

Attached is Licensee Event Report **Technical Specification Required Unit Shutdown Due to Equipment Failure.**

This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

WR McCollum / *[Signature]*

W. R. McCollum, Jr.

Attachment

cc: Mr. L.A. Reyes  
Administrator, Region II  
U.S. Nuclear Regulatory Commission  
101 Marietta St., NW, Suite 2900  
Atlanta, GA 30323

INPO Records Center  
700 Galleria Place  
Atlanta, GA 30339-5957

Mr. P.S. Tam  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, D.C. 20555

Mr. John Hoffman  
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Stamford, CT 06904

Mr. R. J. Freudenberger  
NRC Resident Inspector  
Catawba Nuclear Station

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9702070108 970128  
PDR ADOCK 05000413  
S PDR

## LICENSEE EVENT REPORT (LER)

APPROVED OMD NO. 3150-0104

EXPIRES: 04/30/98

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 (MNB 7716), 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)  
Catawba Nuclear Station

DOCKET NUMBER (2)

05000413

PAGE (3)

1 of 5

TITLE (4)  
Technical Specification Required Unit Shutdown Due to Equipment Failure

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 NAME	DOCKET NUMBER(S)
									None	05000414
'2	30	96	96	- 14	- 00	01	28	97		05000
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)		100	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
			20.405(a)(1)(iii)		X	50.73(a)(2)(i)			50.73(a)(2)(viii)(A)	Abstract below and
			20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)	in Text, NRC Form
			20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(k)	366A)

### LICENSEE CONTACT FOR THIS LER (12)

NAME  
D. P. Kimball, Safety Review Group Manager

TELEPHONE NUMBER

AREA CODE

(803)

831- 61

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRCDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRCDS
F	JE	RLY	W120	Y					

### SUPPLEMENTAL REPORT EXPECTED (14)

YES (if yes, complete EXPECTED SUBMISSION DATE)	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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### ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines) (16)

**Unit Status:** Unit 1 was in Mode 1, Power Operation, at 100 percent power.

**Event Description:** On December 30, 1996, at 1237 hours, solid state protection system (SSPS) train B relay K616 properly actuated, but failed to latch in the tripped position during periodic main steam line isolation testing. Failure of the relay to latch does not affect the safety operation of the valves actuated by relay K616. However, the requirements of Updated Final Safety Analysis Report section 7.3.1.1 were not met in that a two step operator action would not be necessary to regain normal control of the valves in question. The failure analysis, planning, and replacement of relay K616 could not be performed within the time frame permitted by Technical Specification (T/S) 3.3.2.4.b, thus Unit 1 was shut down to Mode 3, Hot Standby, as directed by the T/S. Unit 1 operated within and complied with Technical Specifications throughout this event.

**Root Cause:** The root cause of this event is attributed to equipment failure.

**Corrective Action:** SSPS train B relay K616 was replaced, successfully retested and declared operable. Planned corrective action includes failure analysis of the relay which did not latch.

**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

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Catawba Nuclear Station, Unit 1	05000413	96	14	00	2 OF 5

BACKGROUND

The primary purpose of the Main Steam (SM) [EIIS:SB] system is to convey steam from the four steam generators [EIIS:SG] to the high pressure turbine [EIIS:TRB]. Each SM line is supplied with a main steam isolation valve (MSIV) [EIIS:ISV]. MSIVs are normally open, pneumatically controlled, fail closed valves [EIIS:V].

Each SM line is also provided a steam generator (S/G) power operated relief valve (PORV) [EIIS:RV] upstream of the MSIV. The S/G PORVs are part of the SM Vent to Atmosphere (SV) system [EIIS:SA] and are normally closed. These valves have a pneumatic operator and a manual handwheel. The safety grade mode of operation is provided by the use of a nitrogen control system.

MSIVs and S/G PORVs receive a signal to close and remain closed following a main steam line isolation signal to prevent uncontrolled steam flow from the steam generators to the environment in the event of a high energy line break.

PT/1/A/4200/09A, Auxiliary Safeguards Test Cabinet [EIIS:CB] Periodic Test, is a quarterly surveillance performed per the requirements of Technical Specification 3.3.2 and tests that part of the Engineered Safety Features Activation System [EIIS:JE] from the point at which the solid state protection system testing is stopped to the actual operation of the final output device. One test cabinet is provided for each of the two protection trains, designated train A and train B. Several final devices which cannot be operated during plant operation without disturbing the plant or causing equipment damage are provided with blocking relays [EIIS:RLY] to block final actuation of the device.

Enclosure 13.4 to PT/1/A/4200/09A is used to perform train B steam line isolation testing. Solid state protection system (SSPS) relay K616 transmits steam line isolation signals to all four MSIVs and all four S/G PORVs.

The SSPS design is such that a safeguards actuation signal does not remain after the trip condition clears. Instead, the SSPS actuating relay(s) latch in their tripped position. The actuating relay(s) must be unlatched (reset) by the operator before the actuated components can be moved from their safety-related position, meeting the IEEE 279 requirements for deliberate operator action to regain normal control. When the actuating relay(s) are unlatched (reset), the actuated equipment will not move from its safety-related position without further operator action, meeting the requirements of IEB 80-06.

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Updated Final Safety Analysis Report (UFSAR) section 7.3.1.1 states "All safety-related equipment remains in its emergency mode upon reset of the Engineered Safety Features actuation signal. A second operator action is needed to return each device from its emergency mode to its normal mode. Therefore, Catawba Nuclear Station is in compliance with IE Bulletin 80-06, Engineered Safety Features reset controls, actions 1-4 as required."

Technical Specification (T/S) 3.3.2.4.b, Steam Line Isolation Automatic Isolation and Actuation Relays, requires that with the number of operable channels one less than the minimum channels operable requirement, restore the inoperable channel to operable status within 6 hours or be in at least Mode 3, hot shutdown, within the following 6 hours.

EVENT DESCRIPTION

December 30, 1996

1237 hours

SSPS train B relay K616 actuated, but failed to latch in the actuated position, during steam line isolation testing per PT/1/A/4200/09A, enclosure 13.4.

The relay was declared inoperable per the requirements of T/S 3.3.2.4.b.

1700 hours

Investigation and additional testing of K616 was unable to duplicate the event or identify a failure mechanism. K616 replacement activities continued.

2129 hours

Operations was notified that K616 replacement would not be completed prior to 0037 hours on December 31, 1996.

Operations commenced a T/S required shutdown of Unit 1 per AP/1/A/5500/09, Rapid Downpower. Appropriate notifications were made.

2353 hours

Unit 1 entered Mode 3.

December 31, 1996

0105 hours

Relay K616 was replaced, successfully tested, and declared operable.

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CONCLUSION

The root cause of this event is attributed to equipment failure. The latching mechanism to SSPS train B relay K616 did not latch when the relay actuated. Planned corrective action will be to perform analysis of the failed relay to determine the failure mechanism. Engineering will review the failure analysis results to determine if additional action is warranted.

There is no manufacturer recommended maintenance for this relay or latch mechanism. Trending of the entire set of latching relays shows no trend to failure and does not predict any age at which failures are significantly more likely. The failure of relay K616 to latch upon actuation is reportable to NPRDS.

A review of the operating experience database for the twenty four months prior to this event did not identify any similar reportable events. This event is not considered recurring.

A similar occurrence in 1994, though not requiring a unit shutdown nor involving the same relay, received extensive Engineering evaluation and failure analysis. The failure could not be attributed to any specific failure mechanism. This evaluation did not identify a specific need for periodic relay replacement except for relay K629 which is used in a normally energized application. K616 is not in a normally energized application.

CORRECTIVE ACTIONSUBSEQUENT

- 1) Unit 1 was placed in Mode 3 per Technical Specifications.
- 2) SSPS train B relay K616 was replaced per work order 96103096 01. The replacement relay was successfully tested.

PLANNED

- 1) The failed relay will be analyzed to determine the failure mechanism. Engineering will review the failure analysis results to determine if additional action is warranted.



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SAFETY ANALYSIS

This event involved an occurrence in which SSPS train B latching relay K616 actuated, but failed to latch in the actuated position, during steam line isolation testing per PT/1/A/4200/09A.

The failure of train B relay K616 to latch meant that no reset would be required to regain normal B train control of the MSIVs and PORVs activated by this relay in the event of a main steam line isolation. Thus, the deliberate two step process specified in UFSAR section 7.3.1.1 for returning safety-related components from their emergency mode to the normal mode following receipt of an engineered safeguards feature actuation signal was not met.

During this event, the SSPS train A latching relay K616 was fully operable and would have latched in the actuated position; thus, providing the necessary two step process for returning the MSIVs and PORVs from their safety-related to normal mode.

However, in the event that a main steam isolation signal occurred in concurrence with a failure of train A, the testing per PT/1/A/4200/09A demonstrated that train B latching relay K616 would have actuated as designed. The result of this actuation would be the automatic closure of the MSIVs and S/G PORVs. Per system design these valves would remain in their safety position.

Emergency procedure EP/1/A/5000/E-0, Reactor Trip or Safety Injection, would be entered in an event involving main steam line isolation. This procedure provides a symptomatic and systematic approach to assessing plant conditions and identifies the proper procedures for recovery. The guidance provided by the station emergency operating procedures ensures that operators verify plant parameters are acceptable prior to moving the MSIVs and S/G PORVs from their safety positions.

Unit 1 operated within and complied with all Technical Specifications throughout this event.

The health and safety of the public were not affected by this event.