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**DUKE POWER**

June 9, 1997

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

Subject: Catawba Nuclear Station  
Docket No. 50-413  
LER 413/97-002

Gentlemen:

Attached is Licensee Event Report 413/97-002 concerning  
Feedwater Containment Isolation Valve Inoperable.

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

Cordially,

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 Record Center  
700 Galleria Place  
Atlanta, GA 30339-5957

Mr. T. S. Tam  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, DC 20555

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301 Tresser Blvd.  
Stamford, CT 06904

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

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9706170074 970609  
PDR ADOCK 05000413  
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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.

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1)

Catawba Nuclear Station

DOCKET NUMBER (2)

05000413

PAGE (3)

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TITLE (4)

Feedwater Containment Isolation Valve Inoperable

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)
04	03	97	97	002	00	06	09	97	N/A	

OPERATING MODE (9)

1

POWER

100

LEVEL (10)

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

20.402(b)

20.405(a)(1)(i)

20.405(a)(1)(ii)

20.405(a)(1)(iii)

20.405(a)(1)(iv)

20.405(a)(1)(v)

20.405(c)

50.36(c)(1)

50.36(c)(2)

X

50.73(a)(2)(i)

50.73(a)(2)(ii)

50.73(a)(2)(iii)

50.73(a)(2)(iv)

50.73(a)(2)(v)

50.73(a)(2)(vi)

50.73(a)(2)(vii)(A)

50.73(a)(2)(vii)(B)

50.73(a)(2)(viii)

73.71(b)

73.71(c)

OTHER (Specify in Abstract below and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

NAME

D. P. Kimball, Safety Review Group Manager

TELEPHONE NUMBER

AREA CODE

(803)

831-3743

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)

YES (If yes, complete EXPECTED SUBMISSION DATE)

X

NO

EXPECTED SUBMISSION DATE (15)

MONTH

DAY

YEAR

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

Unit Status: Unit 1- mode 1, power operation, 100% power.

Event Description: On 05/06/97 Engineering determined that Feedwater Containment Isolation valve 1CF-51 was inoperable on 04/03/97 from 0608 to 2318 due to actuator low nitrogen pressure. Technical Specification 3.6.3 allowable action times for that inoperability were exceeded.

Root Cause: The Operator Aid Computer (OAC) Alarm Response information was inadequate, because the need for immediate action was not identified. A contributing factor was the close proximity of the alarm value (2080 psig) to the minimum allowed operability pressure (2050 psig).

Corrective Action: Nitrogen pressure was restored to an operable value. The OAC Alarm Response has been revised to require determination of the nitrogen pressure within 4 hours of the alarm. Planned Corrective Actions are to determine if there are other OAC Technical Specifications alarm responses that need enhancement and correct as needed. The low nitrogen pressure alarm setpoint will be evaluated to determine if the setpoint should be increased.

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**Background:**

Each Steam Generator [EIIS:SG] Feedwater [EIIS:SJ] Containment Isolation Valve [EIIS:ISV] is a pneumatic-hydraulic controlled gate valve [EIIS:V] whose safety related function is to terminate flow in either direction. Automatic closure of the valve will occur upon a feedwater isolation signal, transfer of control to the auxiliary shutdown panel [EIIS:PL], or an inboard doghouse Hi-Hi water level signal.

The valve actuator is a Borg Warner #37981 that uses nitrogen (N2) [EIIS:LK] pressure to close the valve. Per the Borg Warner instruction manual the valve is inoperable when nitrogen pressure is below 2050 psig decreasing signal. The alarm pressure switch [EIIS:PS] setpoint is calibrated at 2100 psig (+ or - 50 psig) and provides alarm indication through the Operator Aid Computer (OAC).

The annunciator response given by the OAC [EIIS:ID] for valve 1CF-51 low nitrogen pressure, is the following: 1) Notify Shift Work Manager, and 2) Issue Work Order for Maintenance Instrumentation and Electrical (IAE) personnel to measure pressure and recharge the accumulator [EIIS:ACC].

Technical Specification 3.6.3, Containment Isolation Valves, Action requires the inoperable valve(s) to be restored to operable status within 4 hours, or place the unit in at least hot standby within the next 6 hours.

**EVENT DESCRIPTION:**

04/03/97 0608	Received OAC alarm, set at 2080 psig, for low nitrogen pressure on valve 1CF51. The Operations Shift Manager and Shift Work Manager were notified.
0700	A work order to investigate the low N2 pressure alarm was issued and placed on schedule to be performed following completion of other Technical Specification related work.
2300	Maintenance IAE determined 1CF-51 nitrogen pressure was 2000 psig, which was below the operability limit of 2050 psig.
2319	1CF-51 nitrogen pressure was increased to 2765 psig, restoring 1CF-51 to operable status.

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05/06/97

Engineering determined that on 04/03/97 between the hours of 0608 and 2319, valve 1CF-51 was inoperable due to low nitrogen pressure. This inoperability time exceeded the 10 hour time limit allowed by Technical Specifications. The exact time at which the nitrogen pressure dropped below the Technical Specification limit could not be determined, so the valve was conservatively determined to be inoperable when the alarm was received.

**CONCLUSIONS:**

The root cause of this event was inadequate information in the OAC Alarm Response. The Alarm Response did not indicate the need for immediate action and did not include setpoint information that would have led the operators to recognize the close proximity of the alarm setpoint to the minimum allowed nitrogen pressure for valve operability. The alarm only alerted the operators to decaying pressure in the 1CF-51 Nitrogen Accumulators. In previous operating experience with decaying pressure in the CF Isolation Valve Nitrogen Accumulators, the rate of decay of the nitrogen pressure had allowed at least 24 hours to respond to the alarm before approaching the operability limit. When the 1CF-51 low nitrogen pressure alarm was received, there was unrelated Technical Specification 72 hour action time work in progress. Higher priority was placed on the 72 hour action statement related work. If the Alarm Response had required the nitrogen pressure to be checked within 4 hours after the alarm, the pressure would have been restored before exceeding the Technical Specification action time limit.

A contributing factor to this event was the close proximity of the alarm setpoint to the minimum allowable operable nitrogen pressure for the accumulator. The most recent calibration of the pressure switch associated with the 1CF-51 Nitrogen Accumulator occurred on 11-13-96. The pressure switch was calibrated to a value of 2080 psig at that time, which was within the allowable value of 2100 psig, + or - 50 psig. Using the allowed calibration values, the nitrogen pressure could decay to an inoperable value before the alarm is received.

There are no NPRDS reportable equipment failures associated with this event.

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A review of the Problem Investigation Process for the past 24 months revealed no reportable events involving the Feedwater Containment Isolation Valves. The same review revealed no reportable events involving annunciator response procedures or prioritization of work. Therefore, this is not a recurring event.

**CORRECTIVE ACTIONS:****IMMEDIATE:**

The Shift Work Manager and Operations Shift Manager were notified of the OAC alarm on 1CF-51 low nitrogen pressure.

**SUBSEQUENT:**

- 1) A Work Order was issued for Instrumentation and Electrical Maintenance to determine nitrogen pressure for valve 1CF51.
- 2) Nitrogen pressure was restored to 2765 psig.
- 3) Operation crews were instructed to take prompt action in response to low nitrogen pressure alarms for the CF Containment Isolation Valves.
- 4) The Alarm Response has been revised to have the nitrogen pressure checked within 4 hours of the alarm.

**PLANNED:**

- 1) Operations will review all OAC analog/digital set points, related to Technical Specifications, that do not have other indications i.e., Control Board Annunciators, local indication, etc. The purpose of this review is to ensure response guidelines properly refer to Technical Specifications and any associated action items for operability determination.
- 2) Engineering will evaluate the CF Isolation Valve Low Nitrogen Pressure alarm setpoint to determine if the setpoint can be increased to provide more margin between the alarm setpoint and the inoperable pressure limit.



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**SAFETY ANALYSIS:**

Section 10.4.7.1 of the UFSAR states that the safety related portions of the CF system are designed such that a failure of a feedwater isolation supply line coincident with a single active failure will not prevent safe shutdown of the reactor.

To meet the single failure criteria and mitigate the consequences of a failure of a CF isolation valve to close, Westinghouse design criteria required that the Feedwater Control Valves and Feedwater Control Bypass Valves be designed to close on the same signals as the CF containment isolation valves. In addition, the CF pumps trip on Steam generator Hi-Hi level signal and Doghouse Hi-Hi level to further ensure that flow is terminated to the S/G's or the doghouses. The CF system is designed with feedwater isolation check valves to prevent multiple steam generator blowdown in the event of a Feedwater line break or Steam system piping failure and a single failure of the feedwater isolation valve to close.

During the time 1CF-51 was inoperable due to low nitrogen pressure the Feedwater Control Valves and Feedwater Control Bypass Valves were operable and capable of terminating flow to the steam generators and interior doghouse in the event 1CF-51 would not close. In addition, the Feedwater Isolation Check Valve, 1CF-49, was operable and capable of preventing the 1C steam generator from blowing down in the event of a Main Steam or Feedwater system piping failure on another S/G coincident with 1CF-51 failure to close. Therefore, the CF system was capable of meeting the single failure criteria for secondary system pipe breaks while 1CF-51 was inoperable.

Section 15.1.2 of the UFSAR analyzes a feedwater malfunction that causes an increase in feedwater flow. This accident is caused by the Feedwater Control Valves. In this accident, the excessive feedwater flow is terminated by the automatic feedwater isolation on Hi-Hi S/G level. In this accident, if the Feedwater Control Valves and 1CF-51 did not close, the CF pumps automatically trip and steam generator pressure would remain high enough to effectively terminate CF flow. Therefore, the feedwater system would have still been capable of performing its design function in the event of a feedwater control malfunction.

1CF-51 also closes on transfer to the Auxiliary Shutdown Panel (ASP). The CF control valves do not receive a signal to close on transfer to the ASP as is the case with the other automatic signals. The AP/1/A/5500/17, Loss of

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Control Room, provides a diverse means of terminating the feedwater flow by directing the operators to trip the feedwater pumps from the control room or locally. Therefore in the event of a Loss of Control room diverse means of terminating feedwater to the 1C steam generator was available.

Based on the previous discussion, the CF system was capable of mitigating all the design accidents that 1CF-51 is designed to mitigate during the 17 hour period when 1CF-51 was inoperable.

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