NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 2	0 5 0 0 0 4 1 4	1 OF 0 7

TITLE (4) Unusual Event Declared Because Of Unisolable Containment Valve Due To A Management Deficiency

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(S)
0 8	0 7	8 7	8 7	0 2 3	0 2	0 2	0 1	8 8	N/A	0 5 0 0 0
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OPERATING MODE (9): 1
POWER LEVEL (10): 0 8 5

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

[ ] 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 Abstract below and in Text, NRC Form 366A)
[ ] 20.405(a)(1)(iii)	[X] 50.73(a)(2)(i)	[ ] 50.73(a)(2)(viii)(A)	
[ ] 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	TELEPHONE NUMBER
Julio G. Torre, Assistant Engineer - Licensing	AREA CODE 7 0 4 3 7 3 - 8 0 2 9

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
E	B A	V	B 3 5 0	Y					

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)

On August 7, 1987, at 0340 hours, with Unit 2 at 85% power, a Unit shutdown was commenced per Technical Specifications when one of the Steam Generator (S/G) Main Feedwater Bypass to Auxiliary Feedwater (CA) Nozzle valves was discovered partially open and unisolable while performing the retest for the Turbine Driven CA Pump Discharge Check valve to S/G 2B. Duke Power station personnel declared the valve inoperable, commenced Unit Shutdown, and declared an Unusual Event as required by Technical Specifications. The Unit entered Mode 3, Hot Standby, at 0735 hours. The valve was repaired and successfully retested at 1854 hours. The station was secured from the Unusual Event at 1915 hours. Duke power personnel had originated a work request on September 9, 1986, at 1500 hours to investigate/repair 2CA150 passing approximately 300 gpm while indicating close. The unit was in Mode 5, Cold Shutdown, at the time and the valve was not required to be operable. This work request was scheduled for completion during the unit's first refueling outage. This incident is attributed to a management deficiency. The failure of the valve was due to the improper setting of the air actuator following maintenance activity. Duke Power personnel who had performed maintenance activities on the valve in December 1985, had not received adequate training to accomplish valve maintenance and had not been qualified to perform the procedure. Additionally, the procedure used to perform the maintenance was confusing and contributed to the event. On approximately August 13, 1986, Duke Power technicians began performing qualification activities in certain areas to move towards full ETQS qualification. Also, the subject maintenance procedure was later revised. The health and safety of the public were unaffected by this event.

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BACKGROUND:

The Auxiliary Feedwater (EIIS:BA) (CA) System assures sufficient feedwater supply to the Steam Generators (EIIS:SG) (S/G) in the event of loss of the Condensate (EIIS:SD)/Feedwater (EIIS:SJ) System, to remove primary coolant stored and residual core energy. Each CA pump (EIIS:P) discharge line is provided with a motor operated isolation valve (EIIS:V), an air operated fail-open control valve, and a check valve.

Feedwater (CF) Isolation is automatically initiated by a Safety Injection signal, S/G High-High Level, or a Reactor (EIIS:RCT) Trip coincident with low Reactor Coolant average temperature. A CF Isolation signal closes the CF Isolation valves (2CF33, 42, 51, 60), CF Purge valves (2CF 87, 88, 89, 90), CF Control Valves (2CF28, 37, 46, 55), CF Bypass Control Valves (2CF30, 39, 48, 57), CF Bypass to CA Nozzle Valves (2CA149, 150, 151, 152), and CA Nozzle Tempering Isolation valves (CA185, 186, 187, 188).

All of these valves are listed as Containment Isolation valves under Technical Specification 3.6.3 except the CF Control valves and CF Bypass Control valves. Technical Specification 3.6.3 specifies that these valves close on a Phase A Containment Isolation signal within 5 seconds. In actuality, the Phase A Containment Isolation signal does not close these valves, but the CF Isolation signal is always present when Phase A Isolation is initiated automatically (by a Safety Injection signal).

Technical Specification 3.6.3 specifies that with one or more Containment Isolation valves inoperable in Mode 1, Power Operation, Mode 2, Startup, Mode 3, Hot Standby, or Mode 4, Hot Shutdown, maintain at least one isolation valve OPERABLE in each affected penetration that is open and:

(a) Restore the inoperable valve(s) to OPERABLE status within 4 hours, or

(b) Isolate each affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or

(c) Isolate each affected penetration within 4 hours by use of at least one closed manual valve or blind flange, or

(d) Be in at least Mode 3 within the next 6 hours and in Mode 5 within the following 30 hours.

DESCRIPTION OF INCIDENT:

On October 5, 1985, at 0600 hours, Duke Power station personnel originated a Work Request to investigate 2CA150, Steam Generator (S/G) 2B CF Bypass to CA Nozzle valve, not opening. Duke Power technicians discovered no problems with the valve actuator, and on October 9, 1985, at 1400 hours, they originated a supplemental Work Request to have Duke Power maintenance personnel mechanically open the valve. The valve stem was uncoupled from the actuator and it mechanically opened the valve. The valve was recoupled but it would not cycle. Due to various problems in repairing the valve, different Duke Power station personnel worked on it several times. In December 1985, personnel recoupled the valve, set up the air actuator, and observed the valve being cycled. The work request was then turned over to have the functional verification performed. On January 2, 1986, the functional verification was performed by Duke Power personnel while a technician observed the valve, which appeared to cycle properly. On February 11, 1986, the work request was completed.

On September 9, 1986, at 1500 hours, Duke Power station personnel originated a Work Request to investigate/repair 2CA150 passing approximately 300 gpm while indicating closed. The Unit was in Mode 5, Cold Shutdown, at the time, and the valve was not required to be operable. However, the work request did not indicate that the valve was Technical Specification related and was required to be operble prior to Mode 4. On December 1, 1986, Duke Power technicians contacted station personnel to have the valve cycled under the September 9, 1986 Work Request, but Unit status would not permit cycling of the valve. The work request was changed to Priority 5B (Outage) and a supplemental Work Request was originated to have the valve investigated. This work request was scheduled for the Unit 2 First Refueling Outage which is currently scheduled to start in January, 1988.

On August 3, 1987, a Duke Power engineer originated a Work Request to investigate/repair 2CA-53, CA Pump No. 2 Discharge to S/G 2B Check valve, excessive backleakage. On August 5, 1987, Duke Power station personnel completed repairs on 2CA53. On August 6, 1987, at 2130 hours, Control Room personnel began decreasing power to perform the retest for 2CA53, which could not be performed at full power. At 2310 hours, power decrease was halted at 85%. On August 7, 1987, at 0002 hours, Control Room personnel began to retest 2CA53 by verifying flow through the valve using the Turbine Driven CA Pump per the CA Valve Inservice Test procedure. Control Room personnel attempted to close 2CA150 to align flow for the 2CA53 retest, but 2CA150 would not close completely. At approximately 0230 hours, Duke Power station personnel locally bled-off air from the actuator. The valve appeared to close, but flow only decreased to approximately 500 gpm. Control Room personnel then closed 2CA52, CA Pump No. 2 Flow to S/G 2B valve, and 2CA54B, CA Pump No. 2 Discharge to S/G 2B Isolation valve, in an attempt to stop flow. However, flow remained constant. At 0300 hours, a Work Request was originated to have 2CA150 failure to fully close investigated by Duke Power Instrumentation and Electrical (IAE) personnel. Duke Power technicians attempted to close 2CA150, however, flow remained at approximately 500 gpm with the valve indicating closed.

At 0340 hours, the Shift Supervisor declared 2CA150 inoperable and commenced Unit shutdown per Technical Specifications. Another work request was originated at this time to have the failure of 2CA150 investigated/repaired by Duke Power maintenance personnel. At 0355 hours, an Unusual Event was declared due to 2CA150 being partially open and unisolable. The proper notifications were made. At 0735 hours, the Unit entered Mode 3 as required.

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

At approximately 0900 hours, appropriate Duke Power personnel were notified of the problem with 2CA150 passing flow. A decision was made to cycle the valve to visually observe the process. As the valve was cycled, Duke Power personnel noticed that the valve appeared to cycle too easily for a gate valve.Maintenance personnel determined the valve actuator was incorrectly set up, which allowed the valve to remain open while the actuator indicated closed.

Maintenance repaired the valve and at 1642 hours, the Unit entered Mode 4. At 1724 hours, Duke Power personnel began to retest 2CA150 and the retest was satisfactorily completed at 1854 hours. At 1915 hours, the unit was secured from the Unusual Event. The work request originated at 340 hours on August 7, 1986, was completed at 2001 hours later on the same day.

CONCLUSION:

This incident is attributed to a management deficiency. The failure of 2CA150 to fully close was due to improper setting of the air actuator. The air cylinder was reaching the fully closed position before the valve disc was into the valve seat. The work request history for this valve revealed that was the actuator was removed from the valve only one time. This work took place under a work requested initiated on October 5, 1985, which was previously referenced. The personnel who performed the work indicated that they believe they used the proper technique in setting the gap for the air actuator. The work request history for the valve did not show another opportunity for the actuator to have been improperly set.

At the time this work was performed, the involved technicians had not received adequate training to perform the appropriate valve maintenance or to perform the associated procedure. On approximately August 13, 1986, qualification of appropriate technicians began with both on-the-job and procedural orientation in certain areas. This orientation was the beginning of the move towards full ETQS qualification for appropriate maintenance technicians.

A defective procedure also contributed to this incident. The procedure used to perform corrective maintenance on 2CA150 under the Work Request initiated on October 5, 1985 addressed three types of gate valves (hand wheel operated, air operated, and motor operated) and had 18 changes which were attached but not incorporated. The non-related steps as well as the attached changes added confusion to the procedure. Subsequent to this work and as a result of the two year procedure review program, the procedure was split into three separate procedures. The procedure for 2CA150 currently only addresses air actuated gate valves and is easier to follow.

At the time Operations originated Priority 2 Work Request 34293 OPS, the Unit was in Mode 5, Cold Shutdown, and 2CA150 was not required to be operable. Currently, Station Directive 3.3.7, Work Request Preparation, requires that work requests written for Technical Specification equipment not required in the current mode, but required at some point during the Unit startup, shall be assigned the correct priority 5. This ensures that Integrated scheduling will schedule the work request to be worked prior to entering the required mode so that Technical

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

Specifications will not be violated. In a situation where component inoperability immediately precludes changing modes, Priority 5F (Outage-Highest Priority) is now required by the Station Directive. The Directive also requires that the mode in which the component is required to be operable shall be written on the work request. At the time Work Request 34293 OPS was originated, Station Directive 3.3.7 was in the process of being revised to include these requirements for the first time. The revision resulted from an incident in May, 1986, when Operations initiated two work requests on Technical Specification equipment using Station Directive guidelines (see LER 414/86-25). This resulted in two Technical Specification violations due to missed retests. The revised Station Directive was signed by the Station Manager on September 6, 1986, however it was not sent out by Catawba Nuclear Station Document Control until September 11, 1986. Work Request 34293 OPS was originated on September 9, 1986. The current controls on Technical Specification work requests should be sufficient to ensure that future work requests are assigned correct priorities during outages.

Design Engineering has evaluated the consequences of 2CA150 not fully closing with respect to CA System operability, potential for increased energy input into Containment, and Containment isolation concerns (see Duke Power Problem Investigation Report 2-C87-0223). The Design study concluded that 2CA150 failing to close did not significantly affect any of the above.

The Unit Shutdown was commenced because 2CA150 was partially open and unisolable and was listed in Technical Specification 3.6.3 as a Containment Isolation valve. This valve does not close on a Phase A Containment Isolation signal as listed in the Technical Specification, but it closes on the CF Isolation signal. Duke Power Compliance personnel submitted a request to have all CF Isolation valve removed from Technical Specification 3.6.3 since their purpose is to isolate CF flow to the S/Gs and not to prevent leakage out of containment.

The failure of 2CA150 to completely isolate as required is NPRDS reportable. 2CA150 is a 4 inch Borg Warner air actuated gate valve and has Borg Warner part number 436JAB4-001. There were no failures reported due to a valve being out of mechanical adjustment in 59 data base entries of Borg Warner air actuated gate valves.

There has been two previous occurrences in which Duke Power maintenance personnel had not been properly oriented to Station Directives and Management Procedures (see LER 414/86-25-04). As a result of that incident, Duke Power began developing and implementing a program to ensure that all appropriate personnel performing maintenance activities on station systems and components shall have documented training.

There has been one previous incident involving an inoperable containment isolation valve due to a defective procedure (see LER 413/86-36). This incident involved incorrect torque settings for Rotork valve actuators being included in the Certification of Rotork Valve Actuators procedure. Duke Power personnel modified the procedure to include the manufacturer's torque setting data sheets.

CORRECTIVE ACTION:

SUBSEQUENT

(1) A Work Request was originated on August 7, 1987 to have valve 2CA150 investigated.

(2) A Work Request was originated on August 7, 1987 at 0340 hours to have Duke Power maintenance personnel investigate valve 2CA150.

(3) 2CA150 was declared inoperable and Unit shutdown was initiated.

(4) Maintenance repaired 2CA150.

(5) Design Engineering performed an operability evaluation based upon 2CA150 leaking since September 1986. Issues addressed were CA System operability, Containment isolation concerns, and potential for increased energy input to Containment (see Duke Power Problem Investigation Report 2-C87-0223).

(6) Compliance submitted a request to change Technical Specification 3.6.3 to remove all valves which close only on a CF Isolation signal from Table 3.6-2.

PLANNED

The air actuator group responsibilities and procedures will be evaluated to determine the need for further action.

SAFETY ANALYSIS:

The CF Bypass to CA Nozzle valve for S/G 2B was incapable of closing completely during this incident due to its actuator being improperly set. In the event of a CF Isolation signal followed by a CA autostart, the CA System would be capable of supplying flow to S/G 2B regardless of 2CA150 position. Check valves upstream of 2CA150 as well as the other CF Isolation valves would prevent any diversion of S/G 2B CA flow back through the CF System. In the event of a single pipe failure in the CF System upstream of 2CA150, the resultant diversion of CA flow would always be less than analyzed in FSAR Chapter 15, Feedwater System Pipe Break. In this analysis, the 1[illegible] inch Main Feedwater line between a S/G and its Feedwater Inlet Check valve is assumed to fail in a double ended break. Turbine Driven CA Pump No. 2 is assumed to fail, and Motor Driven CA Pump 2A is assumed to spill all its flow out the break. Since the largest line size between 2CA150 and the check valves upstream of it is 4 inches, the consequences of a break in this line are bounded by the FSAR. If the worst case Feedwater System Pipe Break were to occur on another S/G, leakage through 2CA150 would result in a slightly higher initial inventory for S/G 2B which would have a favorable effect on the transient.

In the event of a steam line or feed line break inside the containment, the contents of the affected S/G shell side would blow down into the building, as would the contents of any unisolated secondary side piping. The inability of 2CA150 to fully close does not compromise the ability to isolate S/G 2B from the other three generators on a CF Isolation signal due to the auto-closure of 2CF37, 2CF39, and 2CA186. With 2CA150 unable to fully close, an additional line volume is available to blow down into Containment. The additional volume is the CF line between 2CF42 and 2CF37, as well as all headers and connecting lines directly associated with the main feed line. The effect of this additional line volume on Containment pressure and temperature has been analyzed in Section 6.2.1.4 of the FSAR for a series of steam line breaks. The mass and energy releases are still well below those of the Loss of Coolant Accident (LOCA) which is the limiting transient in terms of peak Containment pressure. Therefore, this incident is bounded by Loss of Coolant Accident as analyzed in the FSAR with respect to Containment pressure. The peak Containment temperature during a steam line break accident would actually be lower with 2CA150 not fully closed. the additional line volume would delay uncovering of the S/G tubes allowing the Reactor Coolant (NC) System more time to cool down before steam began to be superheated. The amount of superheat would be less due to the cooler NC System temperature. Therefore, the peak Containment temperature would be slightly lower.

2CA150 is identified as a Containment Isolation valve in Table 3.6-2 of Technical Specification 3.6.3. However, Table 6.2.4-1 of the FSAR shows that 2CA150 does not require leakage testing since, in the event of a LOCA, the CA and CF System pressures will become greater than the NC System pressure. Therefore, any leakage between the primary and secondary sides of the S/G is directed inward to the Containment. In addition, the check valves and other CF Isolation valves upstream of 2CA150 are available to stop any back flow through the CA nozzle and out of Containment. A break in the four inch line between 2CA150 and the check valves upstream of it would have to occur coincident with the failure of Motor Driven CA Pump 2A and Turbine Driven CA Pump No. 2 in order for back flow to be possible. Even if back flow did occur through the CA nozzle, only secondary side steam and feedwater would be involved unless a S/G tube failure occurred at the same time. Therefore, the inability to close 2CA150 is not a concern for isolation of Containment.

The ability of a CF Isolation signal to terminate all CF flow to S/G 2B was not affected by 2CA150 inability to fully close due to the auto-closure capability of valves 2CF37, 2CF39, and 2CF186. This protected against potential excessive cooldown in the Reactor Coolant System and water induction into the Main Turbine.

This incident is reportable pursuant to 10 CFR 50.73, Section (a)(2)(i)(A).

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

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February 1, 1988

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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Catawba Nuclear Station, Unit 2
Docket No. 50-414
LER 414/87-23 (Revision 2)

Gentlemen:

Pursuant to 10 CFR 50.73 Section (a) (1) and (d), attached is Revision 2 to Licensee Event Report 414/87-23 concerning an Unusual Event declared because of an unisolable Containment Isolation Valve due to a management deficiency. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

JGT/1298/sbn

Attachment

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