Duke Power Company
Catawba Nuclear Station
P.O. Box 256
Clover, SC 29710

(803)831-3000

DUKE POWER

May 9, 1991

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

Subject: Catawba Nuclear Station
Docket No. 50-414
LER 414/91-04

Gentlemen:

Attached is Licensee Event Report 414/91-04, concerning TECHNICAL SPECIFICATION 3.0.3 ENTERED FOR BOTH TRAINS OF CONTAINMENT VALVE INJECTION WATER SYSTEM BEING INOPERABLE DUE TO INAPPROPRIATE ACTION.

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

Very truly yours,

J. W. Hampton
Station Manager

ken:LER-NRC.JWH

xc: Mr. S. D. Ebneter
Regional Administrator, Region II
U. S. Nuclear Regulator Commission
101 Marietta Street, NW, Suite 2900
Atlanta, GA 30323

R. E. Martin
U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

M & M Nuclear Insurers
1221 Avenues of the Americas
New York, NY 10020

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, GA 30339

IE22
1/1

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

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 6

TITLE (4) Technical Specification 3.0.3 Entered for Both Trains of Containment Valve Injection Water System Being Inoperable Due to Inappropriate Action

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)
										N/A	0 5 0 0 0
0 4	1 0	9 1	9 1	—	0 0 4	— 0 0	0 5	0 9	9 1		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
1 0 0		20.405(a)(1)(ii)	50.36(c)(2)	X 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	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
	AREA CODE
C. L. Hartzell, Compliance Manager	8 0 3 8 3 1 - 3 6 6 5

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	J M	V L V	V 0 3 0	N							

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 fifteen single-space typewritten lines) (16)

On April 10, 1991, at 1755 hours, with Unit 2 in Mode 1 at 100% power, Power Operation, the "B" Train of Containment Valve Injection Water (NW) System was declared inoperable due to the Seal Water to Liquid Radwaste (WL) valve, 2NW68B, failing to open. The NW System "A" Train was also inoperable at this time due to Nuclear Service Water (RN) "A" Train being out of service in support of Unit 1 outage work. Since both trains of the NW system were inoperable, Unit 2 entered Technical Specification 3.0.3. Maintenance work on valve 2NW68B was previously completed on March 2, 1991 on Work Request (W/R) 481180PS, after the valve failed to open during the Auxiliary Safeguards Test Cabinet Periodic Test, PT/2/A/4200/009A. On April 10, 1991, during a failure analysis and trending review of the subject W/R, the Maintenance Engineering Services (MES) System Engineer determined that the corrective maintenance performed on valve 2NW68B was inadequate and had reservations as to its operability. The MES Engineer requested Operations to perform a test to verify valve operability. The subsequent test determined that the valve was inoperable. During the verification test, the Seal Water to Nuclear Service Water (RN) valve, 2NW146B, which is located within the same circuit, also failed to open. W/R's were initiated to return these valves to service and a Technical Specification Operability Notification Sheet was originated by the MES Engineer. This event is attributed to an Inappropriate Action in that improper action was taken in signing off a W/R without correcting the root cause of the failure. A program has been developed to notify MES Engineers when a work item requires Staff Engineering support.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Catawba Nuclear Station, Unit 2	0 5 0 0 0 4 1 4	9 1	— 0 0 4	— 0 0	0 2 OF 0 6

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

BACKGROUND

The Containment Valve Injection Water [EIIS:JM] (NW) System is a safety related system designed to inject water between the two seating surfaces of selected gate valves [EIIS:V] used for Containment isolation. The injection pressure is higher than Containment design peak pressure during a Loss of Coolant Accident (LOCA). The injection prevents leakage of the Containment atmosphere through the gate valves, thereby reducing the potential offsite dose following an accident.

Each train of the NW System includes a water filled surge chamber pressurized with nitrogen. Makeup water is provided from the Demineralized Water Storage Tank for testing and and surge chamber makeup during normal plant operation. Assured 30 day makeup water is provided from the Nuclear Service Water [EIIS:BI] (RN) System essential header. The surge chamber receives automatic RN makeup through NW System isolation solenoid valves 1NW8A and 1NW61B for Surge Chambers 1A and 1B respectively. These valves open either when the respective surge chamber water level drops below the low-low level or if the surge chamber nitrogen pressure drops below the low-low pressure setpoint, coincidental with a Containment Phase A Isolation signal. RN assured makeup is supplied at a pressure such that injection water pressure at the Containment Isolation Valves is greater than 110% of the peak Containment pressure. The assured makeup supply line is also equipped with manual isolation valves 1RN494 and 1RN493 for A and B trains upstream of the solenoid valves.

The two NW valves which were inoperable, 2NW68B and 2NW146B, in total, rendered four of twenty three Containment Isolation Valves without water injection. These valves are the Seal Water to Liquid Radwaste valve and the Seal Water to Nuclear Service Water valve respectively. Due to the design of the NW System with some valves inoperable, the others may not lose their operability function. These particular valves open and close on demand as required depending upon the positioning of the Containment Isolation Valve(s) positions.

Technical Specification (T/S) 3.6.6 states that both trains of the NW System are to be operable in Modes 1, Power Operation, Mode 2, Startup, Mode 3, Hot Standby, and Mode 4, Hot Shutdown. System operability requires the availability of the RN System to maintain the necessary system pressure for at least 30 days. With both Trains of NW inoperable, the Unit is required to enter T/S 3.0.3.

T/S 3.0.3 is required to be entered when the Unit is operating in a condition not permitted by Technical Specifications. This condition exists when a Limiting Condition for Operation is not met except as provided in the associated Action Requirements. It requires that within one hour, action shall be initiated to place the Unit in a Mode in which the specification does not apply by placing it, as applicable, in:

a) At least Hot Standby in the next 6 hours,

b) At least Hot Shutdown within the following 6 hours, and

c) At least Cold Shutdown within the subsequent 24 hours.

The Catawba Nuclear Station T/S interpretation for T/S 3.0.3 states that the purpose of the one hour is to allow for preparation of an orderly shutdown before initiating a change in plant operation. It further states that if the equipment problem can be resolved within three hours, no load reduction is necessary. The remaining four hours leaves sufficient time to shutdown in a controlled and orderly manner, and well within the maximum cooldown rate and within the cooldown capabilities of the facility assuming only the minimum required equipment is operable. The Compliance Duty Engineer (or alternate) is to be notified about the situation such that he will understand why T/S 3.0.3 was entered and power was not reduced, so the NRC Resident Inspectors can be informed of the situation. This discussion with the Compliance Duty Engineer is in addition to the normal discussions with the Station Manager/Duty Station Manager.

EVENT DESCRIPTION

On February 28, 1991, during the Auxiliary Safeguards Test Cabinet Periodic Test, PT/2/A/4200/009A, Operations found that valve 2NW68B failed to open. Work Request (W/R) 481180PS was written at that time to investigate and repair the valve. This W/R was entered into the Technical Specification (T/S) Log as item number 439, and required completion by March 8, 1991. The W/R was subsequently completed and signed off by the job supervisor and Operations on March 2, 1991. At that time, Unit 2 exited the Action Statement as set forth in T/S 3.6.6.

On April 7, 1991, Nuclear Service Water (RN) "A" Train was isolated to support the Unit 1 outage. This action also renders the "A" Train on the Unit 2 NW System inoperable since the 30 day assured make up water is not available.

On April 10, 1991, during a routine failure analysis and trending review of W/R 481180PS, the Maintenance Engineering Services (MES) System Engineer determined that the corrective maintenance performed on valve 2NW68B was inadequate and was concerned as to the operability of the valve. The System Engineer immediately contacted the Control Room and expressed concerns about 2NW68B operability, and requested that Operations test the valve to see if it would operate. Operations concurred, and removed power to the circuit which should open the valve. The valve did not open as required. Also, valve 2NW146B, located within the same circuit, failed to open. At 1755 hours Operations declared the NW System "B" Train inoperable. Since the "A" Train of the NW System was removed from service, and therefore inoperable, Unit 2 was required to enter T/S 3.0.3.

Operations immediately wrote 482910PS and 482920PS W/R's, for 2NW68B and 2NW146B respectively, to investigate and repair the valves. The valve body on each valve was mechanically agitated and stroked at least 3 times by Operations. The Shift Supervisor wrote an increased surveillance requirement to stroke test each valve every 4 hours when the valves were in the closed position. The system Engineer wrote an Operability Statement which also required the 4 hour increased surveillance criteria and also required each valve to pass the Valve Inservice Test (IWV) retest requirements upon completion of its respective W/R.

At 2200 hours on April 10, 1991, the W/R's and retests were completed which returned NW "B" Train to service. At that time Unit 2 exited T/S 3.0.3.

CONCLUSION

This event is attributed to an Inappropriate Action in that improper action was taken in signing off a W/R without correcting the root cause of the failure. The Maintenance Technicians documented in Section 5 of 481180PS W/R that the W/R should be routed to the MES System Engineer for further evaluation. This action was not taken by the job supervisor. Ideally, a Supplemental W/R should have been issued to replace the valve. In addition, the Operations Shift Supervisor signed off the W/R without properly evaluating the corrective action taken.

Usually, when valves of this type fail to operate, they are replaced and not repaired by Maintenance. The vendor recommended that MES return these valves to be rebuilt due to the very stringent tolerances that are required. Replacing these valves is a relatively simple task since they are installed with compression type fittings. A spare valve was in stock at the time of failure.

Action was taken by the MES System Engineer to quickly resolve the problem; however, 40 days had elapsed since the original W/R was signed off. To avoid problems similar to this event in the future, Catawba Maintenance Department has developed a plan to ensure proper feedback is provided to MES System Engineers and Projects Engineers in order to resolve problem areas which may arise during W/R implementation activities. When it is determined that a work item needs MES Staff support, the work execution group should first contact the appropriate MES Staff Engineer. The Staff Engineer will then resolve the problem so that work may continue. This activity is documented on the "Notification of Incomplete Work Request Activity Sheet".

A search through the Nuclear Plant Reliability Data System (NPRDS) as well as interviews with MES Engineers at Catawba, found no problems in the past that were similar in nature to the failures experienced by these two valves. Almost all failures with this type of valve involved leakage by the seat. To further understand the unique failures these valves experienced, MES Engineers will disassemble one of the failed valves during the Unit 1 outage. This should provide some insight as to the nature of the valves failure. One valve, 2MW68B, will be removed and replaced during the time when RN "B" Train is removed from

service in support of the Unit 1 outage. Only one spare valve of this type was in stock; therefore, the other failed valve will remain intact and operate under the Operability Statement until it too can be replaced.

Maintenance Staff has instructed all Instrument and Electrical Supervisors and Technicians the importance of performing corrective maintenance and signing off work requests that have focused on the root cause of failure.

Signing off a W/R without correcting the root cause of failure has not resulted in any other incidents within the past two years. Therefore, this event is not considered to be a recurring problem.

CORRECTIVE ACTION

SUBSEQUENT

1) Operations issued W/Rs 482910PS and 482920PS to repair the NW valves.

2) Operations Shift Supervisor wrote an increased surveillance requirement to stroke test each valve every four hours when they were required to be in the closed position.

3) MES System Engineer prepared a Technical Specification Operability Notification Sheet.

4) Maintenance staff has instructed all IAE Supervisors and technicians the importance of correcting the root cause of component failures.

PLANNED

1) Valve 2NW68B will be replaced during the Unit 1 outage when the RN "B" Train is removed from service.

2) Valve 2NW146B will remain in service and operate under the increased surveillance criteria and the Technical specification Operability Statement.

3) Valve 2NW146B will be replaced as soon as "B" Train RN is secured and another spare valve is obtained.

4) Valve 2NW68B, which will be removed, will be disassembled to investigate the cause of failure.

5) "Notification of Incomplete Work Request Activity Sheet" has been developed to assure MES staff is included as required to resolve problems with work requests.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Catawba Nuclear Station, Unit 2	0 5 0 0 0 4 1 4	9 1	— 0 0 4	— 0 0	0 6 OF 0 6

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

SAFETY ANALYSIS

Should Containment pressure increase and initiate a Phase B (Sp), Containment Isolation Signal, Operations could take compensatory actions within one hour to open the NW valves. These valves can each be monitored in the Control Room on the valve status panel board. In the event Operations failed to complete the compensatory actions to open the valves, an analysis has been performed to assess the effects of the subject potential containment isolation failure due to the NW System being inoperable. The design basis for the offsite dose is described in Chapter 15 of the Catawba Final Safety Analysis Report (FSAR). The primary concern, relating to the safety significance associated with this event, is the potential for offsite dosage.

The leak path affects the calculated design basis offsite dose primarily in two ways:

(1) Since the overall design basis post Loss of Coolant Accident (LOCA) containment leakage increases, the calculated Design Base Accident (DBA) activity release to the environment is greater.

(2) The containment bypass constituent of the containment leakage increases, which prevents the annulus and the Annulus Ventilation [EIIS:VD] (VE) System from being as effective for accident mitigation.

The unisolated leak path would have increased the design basis containment leakage of 0.3% per day by approximately 2.36% or, to 0.307% per day. Since all of the added leakage bypasses the Annulus, the overall bypass leakage component increases from the current assumed 7% to 9.1%. The design basis ofisite dose calculation was reanalyzed assuming the revised containment leakage values of 0.307% per day total leakage and 9.1% bypass leakage. The calculated design basis offsite dose results remain within the 10CFR100 guideline values of 25 Rem whole body and 300 Rem thyroid.

A similar analysis was performed using the most recent Unit 2 Integrated Leak Rate Test (ILRT) results of 0.0239% per day, and a measured bypass leakage value of 3.1%. The isolation failure would have increased the values to 0.245% per day total leakage and 5.3% bypass leakage. The calculated offsite results are substantially less that the design basis results documented in Chapter 15 of the Catawba FSAR. Further the Limiting Condition for Operation (LCO) for Technical Specification 3.6.1.2, (Containment Leakage) was not violated during the time that the potential unisolated leak path existed.

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