



DUKE POWER

April 18, 1990

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

Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/90-19

Gentlemen:

Attached is Licensee Event Report 413/90-19 concerning TECHNICAL SPECIFICATION 3.0.3 ENTERED DUE TO AN INAPPROPRIATE ACTION AND A PROCEDURE DEFICIENCY RESULTING IN TWO INOPERABLE TRAINS OF THE CONTROL ROOM VENTILATION SYSTEM.

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

Very truly yours,

Tony B. Owen
Station Manager

keb\LER-NRC.TBO

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

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

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

American Nuclear Insurers
c/o Dottie Sherman, ANI Library
The Exchange, Suite 245
270 Farmington Avenue
Farmington, CT 06032

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

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

IF22
11

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Catawba Nuclear Station, Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 4 1 3										PAGE (3) 1 OF 07				
TITLE (4) Technical Specification 3.0.3 Entered Due To Two Inoperable Trains Of The Control Room Ventilation System																								
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)										
									CNS, Unit 2					0 5 0 0 0 4 1 4										
0	3	2	3	9	0	9	0	0	0	1	9	0	0	0	4	1	9	9	0	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)																						
5		20.402(b)				20.406(c)				50.73(e)(2)(iv)				73.71(b)										
POWER LEVEL (10)		20.406(a)(1)(i)				50.36(e)(1)				X 50.73(e)(2)(iv)				73.71(c)										
10		20.406(a)(1)(ii)				50.36(e)(2)				50.73(e)(2)(vii)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)										
		20.406(a)(1)(iii)				50.73(e)(2)(i)				50.73(e)(2)(viii)(A)														
		20.406(a)(1)(iv)				50.73(e)(2)(ii)				50.73(e)(2)(viii)(B)														
		20.406(a)(1)(v)				50.73(e)(2)(iii)				50.73(e)(2)(ix)														
LICENSEE CONTACT FOR THIS LER (12)																								
NAME										TELEPHONE NUMBER														
R.M. Glover, Compliance Manager										AREA CODE 810 3 813 11-31216														
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																								
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC														
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 March 23, 1990, at 1443 hours, with Unit 2 at 97% power in Mode 1, Power Operation, and Unit 1 in Mode 5, Cold Shutdown, Operations (OPS) personnel inadvertently pulled a supply power lead to the Control Room Area Ventilation (VC) and Chilled Water (YC) System Train B Chiller package. The supply power to the VC/YC Train A Chiller package had previously been isolated, with the intent of swapping the chiller leads. The OPS individual received second degree burns to the left hand and right thumb when the energized (4160V) lead was pulled. The Technical Specification (T/S) 3.0.3 action statement was entered on Unit 2 due to having both trains of VC/YC out of service. At 1515 hours, with VC/YC Train B returned to service, the action statement was exited. This incident is attributed to Inappropriate Action for entering the incorrect terminal box due to a lack of attention to detail. Also, this event is attributed to a Deficient Procedure in that an independent verification was not required to insure the proper equipment was being affected. Additional tags have been placed on the terminal boxes to identify the related equipment and train. A procedure revision will be initiated to identify special precautions and required independent verification. Procedures requiring similar activities will be reviewed and evaluated for similar actions.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/86

FACILITY NAME (1) Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 4 1 3 9 0	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		0 1 9	0 1 9	0 0	0 2	OF	0 7

TEXT (If more space is required, use additional NRC Form 200A's) (17)

BACKGROUND

The Control Room Area Ventilation [EIIS:UC] (VC) and Chilled Water [EIIS:UE] (YC) Systems combine to form one system which is designed to maintain a suitable environment in the following plant areas at all times: Control Room (C/R), Cable [EIIS:CON] Room, Battery [EIIS:BTRY] Rooms, Switchgear Rooms, Motor [EIIS:MO] Control Center (MCC) Rooms, and the Electrical Penetration [EIIS:PEN] Rooms at elevation 594+0. The VC/YC System is shared between both Units. There are two 100% redundant trains of VC/YC equipment. Each is capable of being powered by Unit 1 or Unit 2 Essential Auxiliary Power, but under normal conditions both trains are aligned to Unit 1. Two Diesel Generators [EIIS:GEN] (D/Gs) are provided per Unit to energize the Essential Auxiliary Power buses during emergency conditions.

The VC/YC System C/R and C/R Area essential equipment, other than the chiller [EIIS:HX] packages, receive power from 600V Motor Control Centers (MCCs) 1EMXG for Train A and 2EMXH for Train B. To provide the ability to power VC/YC from either Unit, 1EMXG can be energized from Unit 1 Essential Load Center 1ELXA or from Unit 2 Essential Load Center 2ELXA. Likewise, 2EMXH can be energized from Unit 1 Essential Load Center 1ELXB or from Unit 2 Essential Load Center 2ELXB, maintaining train separation. Kirk-key interlocks are provided to ensure both incoming breakers [EIIS:BRK] to the MCCs are not closed at the same time (dead bus transfer), insuring Unit separation. Normal alignment for both A and B Train VC/YC equipment is from Unit 1 power.

The VC/YC Chiller Packages (1CRA-C-1 and 2CRA-C-1) receive 4160V power from essential buses 1(2)ETA and 1(2)ETB. Normal alignment is from 1ETA to 1CRA-C-1 (Train A) and 1ETB to 2CRA-C-1 (Train B). The 3-Phase 4160V, power leads from 1ETA and 2ETA, along with leads to 1CRA-C-1, are located in terminal box 1TBOX0345. The power leads from 1ETB and 2ETB, along with leads to 2CRA-C-1, are located in terminal box 1TBOX0346. Supply power to the chiller package is swapped from Unit 1 to Unit 2 at the terminal boxes by using procedure OP/O/A/6450/11, Control Room Area Ventilation/Chilled Water System, Enclosure 4.8, Shifting Power Supplies on Control Room Area Chillers.

Technical Specification (T/S) 3.7.6 specifies that two independent trains of VC/YC shall be operable during all operational modes. If one train becomes inoperable while either Unit is in Mode 4, Hot Shutdown, or above, the inoperable train must be restored to operability within seven days, or the operating Units must be shutdown. If both Units are below Mode 4 and one train is inoperable, the train must be restored to operability within seven days or the operable train must be operated in the FILTER [EIIS:FLT] mode. Below Mode 4 with both trains inoperable, or with the operable train not capable of being powered by an operable emergency power source, all core alterations and positive

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0101

EXPIRES: 6/31/88

FACILITY NAME (1) Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 4 1 3 9 0	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		0 1 9	0 0	0 3	OF	0 7

TEXT (If more space is required, use additional NRC Form 306A's) (17)

reactivity changes must be suspended on both Units. The requirement for an operable emergency power source is only specifically stated for Units operating below Mode 4. However, the Bases for Technical Specification 3.7.6 states that the operability of VC/YC ensures that ambient air temperature does not exceed allowable limits for equipment and instrumentation, and the Control Room will remain habitable, during and following all credible accident conditions. This implies that an operable emergency power supply should be a prerequisite to VC/YC operability in all modes.

Technical Specification 3.0.3 is required to be entered when the Unit is operating in a condition prohibited 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.

EVENT DESCRIPTION

On March 23, 1990, Unit 1 was in Mode 5, Cold shutdown, and Unit 2 was at 97% power in Mode 1, Power Operation. Non-Licensed Operator (NLO) A was in the process of swapping Train A VC/YC Chiller (1CRA-C-1) from the 2ETA to the 1ETA power supply, using procedure OP/0/A/6450/11 (Enclosure 4.8), in support of the Unit 1 Engineered Safety Features (ESF) Actuation Periodic Test. NLO-A and NLO-B racked out and red tagged 2ETA-17, Control Room Area Chiller A Unit 2 Supply, using Removal and Restoration (R&R) 20-483. Also, NLO-A and NLO-B verified that 1ETA-17, Control Room Area Chiller A Unit 1 Supply, was racked out and red tagged as previously performed during the Unit 1 reduction in power for the refueling outage. NLO-A and NLO-B proceeded to terminal box 1TBOX0345 to swap the Train A VC/YC Chiller leads. Although Procedure OP/0/A/6450/11 clearly identifies the correct terminal box and its location, NLO-A and NLO-B, in error, went to terminal box 1TBOX0346 for the Train B VC/YC Chiller Unit, which was in service. Since the procedure did not require independent verification, the precautionary actions normally taken during an independent verification were not used to verify that the Operators were at the correct terminal box. At 1443 hours, NLO-A pulled the Z-Phase lead in 1TBOX0346 causing an electrical flash and loss of power to the Train B chiller unit. The electrical flash caused second degree burns to NLO-A's right thumb and back of left hand. NLO-A reported to medical and safety to receive medical attention and later returned to work on light duty.

At 1443 hours, when the Train B Chiller Unit lead was pulled, Unit 2 entered T/S 3.0.3 due to the loss of power to VC/YC Train B Chiller and the racked out VC/YC Train A Chiller. Unit 1 being in Mode 5, without core alteration or positive

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/88

FACILITY NAME (1) Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 4 1 3 9 0	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		0 1 9	0 1 9	0 0	0 4	OF 0 7

TEXT (If more space is required, use additional NRC Form 306A's) (17)

reactivity changes occurring, was unaffected by this incident. At 1503 hours, the tag out was removed and 2ETA-17 was racked in returning power to the Train A VC/YC Chiller Unit. At 1515 hours, T/S 3.0.3 was exited, however, the action statement of T/S 3.7.6 was still applicable due to the suspected damage that had occurred to the Train B terminal box, 1TBOX0356. Work Request (W/R) 46385 OPS was issued to investigate and repair any damage that may have occurred to the terminal box due to the electrical flash. W/R 46384 OPS was issued to inspect 2ETB-17 due to its tripped condition which occurred with the electrical flash. At 0115 hours on March 24, inspection of the terminal box was complete and Train B VC/YC was swapped to 1ETB-17 (Unit 1). Train A VC/YC was swapped to 1ETA-17 (Unit 1). With both trains of VC/YC in service with power supplied from Unit 1, system alignment met the requirement to perform the Unit 1 ESF testing.

CONCLUSION

This incident is attributed to an inappropriate action in that the action was incorrect because of a lack of attention to detail. NLO-A was in the process of swapping Unit supply power on the Train A VC/YC Chiller using procedure OP/O/A/6450/11, Enclosure 4.8. NLO-A had one previous opportunity to use this procedure to perform this swap, and expressed a high level of confidence in performing this task. NLO-A proceeded to Load Bus breakers 1ETA-17 (Auxiliary Building [E11S:NF], Elevation 577, Column BB-50) and 2ETA-17 (Auxiliary Building, Elevation 577, Column BB-64) and ensured the breakers were racked out removing power to 1TBOX0345 terminal box (Auxiliary Building Room 570, Elevation 594, Column GG-55). In error, NLO-A went to terminal box 1TBOX0346 (Auxiliary Building Room 560, Elevation 594, Column GG-59). The procedure clearly identified the sequence in performing this activity, including the above locations for the referenced equipment. NLO-A failed to apply the appropriate self checks to insure that he was at the correct equipment. Each terminal box is clearly identified by its number and a 4160V danger tag. Both tags are black, approximately 3/4 inch wide and 4 inches long, with 3/16 inch white letters, located on the front panel of the terminal box just above eye level and could clearly be recognized and read. Internally, the terminal connections are clearly identified as 1ETB-17 and 2ETB-17, identifying it as Train B equipment. To ensure that the terminal box is recognized, additional larger tags have been placed on the front panels identifying the related equipment and train as a result of this incident.

Terminal boxes 1TBOX0345 and 1TBOX0346 are normally maintained shut (unlocked). To further insure the proper equipment is being manipulated, the locks will be used such that a different key will be required for each box to prevent inadvertent entry into the incorrect box.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

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

TEXT (If more space is required, use additional NRC Form 305A's) (17)

The procedure provided sufficient identification of the proper terminal box with the proper box locations. However, this incident is also attributed to a defective procedure due to a lack of procedure precautions in that an independent verification was not required to insure the proper equipment was being affected. Operations Management Procedure (OMP) 1-5, Independent Verification, requires that all breakers considered "ESSENTIAL TO SAFETY" require independent verification. Terminal boxes 1TBOX0345 and 1TBOX0346 are not physically breakers, but are located between essential (1E) breakers and their loads. Since these terminal box connections can be procedurally swapped, the OMP 1-5 requirements for independent verification should be applied to insure the correct box is being entered. A revision to the procedure is in progress to add this independent verification in addition to precautionary notes to insure protective equipment is used.

Protective electrical gloves were not worn by NLO-A during this incident. Protective hard hat and glasses were worn, and provided some protection to NLO-A's eyes. Second degree burns were received to NLO-A's left hand and right thumb. The additional protective equipment could have prevented or reduced the extent of the burns.

The Human Performance Enhancement System (HPES) was used to evaluate underlying circumstances affecting NLO-A's ability to perform his assigned task. This incident is best described as a role-based mistake by the Human Performance Questionnaire (Appendix B, HPES Manual). This indicates that the skills and knowledge required to perform this task were possessed by NLO-A and that the error occurred in execution. The analysis of behavioral and causal factors revealed that potential deficiencies that led to the inappropriate actions were in the area of verbal communication, equipment interface, and training. Since indications are that adequate skills and knowledge were possessed by NLO-A, recommendations have not been made to improve the training program. Since verbal communication was not involved, recommendations have been made to improve written communication by requiring an independent verification in the task procedure. The additional equipment and train identification signs improved on equipment interface in that the correct equipment can be more easily recognized. Additional improvement in equipment interface could be achieved by replacing the locks and adding the energized indicating light.

Review of the Operating Experience Program (OEP) database for the past 24 months identified one previous incident where incorrect equipment was disconnected due to inappropriate action and not performing an independent verification (LER 413/88-018), meeting the Duke Power Company definition of a recurring problem. On April 13, 1988, Instrument and Electrical (IAE) personnel installed a jumper

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1) Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 4 1 3 9 0	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		01	19	00	06	OF	07

TEXT (If more space is required, use additional NRC Form 300A's) (17)

and defeated interlocks on the Nuclear Service Water [EIIS:BI] (RN) System pit level instrumentation 1RNLT7370, but mistakenly disconnected 2RNLT7370 resulting in an ESF actuation signal to start all idle RN pumps [EIIS:P] and closed all train separation valves [EIIS:V]. Document revision and a procedure upgrade emphasizing the requirements of independent verification have improved upon and prevented excessive recurrence. The actions taken as a result of this incident will further enhance and improve this program.

CORRECTIVE ACTIONSUBSEQUENT

- 1) VC/YC Train A was returned to service with supply power from 2ETA.
- 2) Work Request 46385 OPS inspected terminal box 1TBOX0346, and insured it was operational.
- 3) Work Request 46384 OPS replaced the 2ETB-17 breaker with a spare.
- 4) VC/YC Trains A and B were swapped to their Unit 1 supply power to support ESF testing.
- 5) Additional tags were placed on terminal boxes 1TBOX0345 and 1TBOX0346 front panels to insure the related equipment and train can be identified.
- 6) The procedure for manipulation of VC/YC chiller power supplies has been revised to:
 - * add the requirement to wear the proper protective equipment (gloves) prior to entering the terminal box.
 - * add an independent verification that the correct terminal box is being entered.

PLANNED

- 1) The locks on terminal boxes 1TBOX0345 and 1TBOX0346 will be used such that different keys will be required for each box to prevent inadvertent entry into the incorrect box. (Work Request 52942 OPS).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 6/31/88

FACILITY NAME (1) Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 4 1 3 9 0 -	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		0 1 9 -	0 0	0 7	OF	0 7

TEXT (If more space is required, use additional NRC Form 386A's) (17)

- 2) Operating procedures will be reviewed for similar activities where electrical leads are being disconnected or swapped. Procedures will be revised to include proper safety precautions and appropriate independent verifications to ensure the proper equipment is being entered. The personnel safety significance related to disconnecting electrical leads in potentially energized equipment will be evaluated to determine if additional safety precautions can be applied. This evaluation will identify additional safety measures that could be applied to prevent the cause and consequences of pulling an energized electrical lead when all administrative controls fail.
3. Station management will evaluate the present approach in executing similar work activities (i.e. disconnecting high voltage leads). This evaluation will consider the group responsible for execution and the support required from other station groups (for example Transmission or IAE) to safely complete similar activities or take necessary precautions as recommended by these groups.

SAFETY ANALYSIS

When the VC/YC Train B Chiller power supply was lost due to disconnecting the supply power leads, VC/YC Train A Chiller had been racked out at 2ETA-17. Power was restored to Train A Chiller within 32 minutes on the loss of the Train B Chiller. The T/S 3.0.3 Action requirement was met by returning an operable train to service within one hour. The probability of an accident occurring during the period of VC/YC inoperability is approximately $1.6E-10$. The need for action to restore power to a train of VC/YC was known and efforts were underway. C/R habitability was maintained during this incident. C/R personnel and equipment were unaffected.

The health and safety of the public were maintained during this incident.