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May 26, 1994

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

Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/94-005

Gentlemen:

Attached is Licensee Event Report 413/94-005 concerning TECHNICAL SPECIFICATION 3.7.6 LIMITS EXCEEDED DUE TO PROCEDURE PROBLEMS.

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

Very truly yours,

Mark E. Patrick for

D. L. Rehn

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

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)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 1	05000413	1 OF 07

TITLE (4)
Technical Specification 3.7.6 Limits Exceeded Due To Procedure Problems

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									CNS, Unit 2	05000414
04	25	94	94	-- 005 --	00	05	26	94	FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (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
		20.405(a)(1)(iii)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
		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 (Include Area Code)
Z. L. Taylor, Compliance Manager	(803) 831-3812

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)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On April 25, 1994 at 0300 hours, with Units 1 and 2 in Mode 1, Power Operation, at 100% power, the Limiting Condition for Operation for Technical Specification (T/S) 3.7.6 Action Statement for Mode 1 operation was exceeded due to the 'A' Train Control Room Area Ventilation System being inoperable for greater than seven days. While performing routine maintenance, technicians found a damaged microswitch in the chiller's program timer. The microswitch was replaced. Upon completion of maintenance, a functional test of the chiller was performed. Due to the unique functional characteristics of the timer, the scope of the testing was inadequate to ensure that the program timer would perform all of its intended functions. Later it was discovered that the oil pump was running with the chiller off. Technicians found the program timer was not in its expected position due to the recently installed microswitch being misaligned. The program timer was reset, properly aligned the microswitch, and performed an appropriate functional verification. This event is attributed to specific procedures not being provided to perform maintenance and testing on the program timer. A contributing cause was that an intended continuity verification was not performed. Corrective actions include changes to the troubleshooting procedure, evaluation of the need for other procedures for the chiller's control circuit, development of procedures for the chiller's control circuit, including the program timer and changes to the System Directive for Post Maintenance Test.

BACKGROUND

The Control Room (C/R) Area Ventilation [EIIS:UC] (VC) System operates in conjunction with the Control Room Chilled Water [EIIS:UE] (YC) System to maintain conditions in the C/R area that are suitable for personnel and equipment. The VC/YC System is also designed to maintain a suitable environment in the following areas of the plant at all times: 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 and consists of two 100% capacity redundant trains of equipment. Each train is capable of being powered by Unit 1 or Unit 2 4.16 KV Essential Auxiliary Power [EIIS:EB] (EPC), 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 operates prior to, during, and after a Loss of Coolant Accident (LOCA) or Blackout (B/O).

The YC portion of the VC/YC System supplies chilled water to all of the air handling units [EIIS:BLO] (AHU) serving the C/R, C/R area, and Switchgear Rooms. It consists of two 100% capacity chillers and two 100% capacity chilled water pumps [EIIS:P]. Train separation provides that one chiller and associated pump be designated Train "A" and the other be Train "B" with each serving their respective VC air handling unit.

The program timer controls the chiller start and stop sequences and provides proper pre-lube and post-lube times for the compressor motor assembly. When the chiller unit is shutdown, the program timer is designed to return to its "zero" position. This position ensures that upon any subsequent chiller start signal the program timer will properly sequence to start the chiller.

T/S 3.7.6 specifies that two independent Control Room Area Ventilation Systems 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 returned to operability within seven days or the operating Units must be in at least Mode 3, Hot Standby, within the next six hours and in Mode 5, Cold Shutdown, within the following thirty hours.

EVENT DESCRIPTION

On April 18, 1994, at 0300 hours, with Units 1 and 2 in Mode 1, Power Operation, at 100% power, Train 'A' VC/YC was made inoperable for routine surveillance and maintenance on both

the ventilation and chilled water portions of the system. Appropriate entries were made in the Technical Specification Action Item Log (TSAIL) for the planned activities.

On April 20, 1994, while engaged in activities that provided support for the maintenance activities, technician "A" noticed that one of the microswitches on the chiller unit's program timer was cracked. The technician wrote a corrective work order to investigate and repair the microswitch. The technician replaced the microswitch. Due to other ongoing maintenance activities, no functional test could be performed at this time.

On April 22, 1994, at 1030 hours, Operations lifted the safety tags on the oil heater [EIIS:HTR] breaker [EIIS:52] and the oil pump motor breaker in order to allow the oil to heatup in preparation for the chiller unit startup. The oil pump started unexpectedly when the oil pump motor breaker was closed. The breaker was opened and technician "B" was called in to investigate why the oil pump motor started. The technician's investigation revealed that the program timer was not in its expected "zero" position. The technician suspected that the program timer had been moved during the microswitch replacement; therefore, he manually rotated the program timer to its "zero" position. The breaker for the oil pump motor was then closed in and as expected, the oil pump did not start.

On April 23, 1994, at approximately 1630 hours, Operations began clearing safety tags and performing system restoration in preparation for performance testing pursuant to declaring Train "A" VC/YC operable. At approximately 1800 hours, the Train "A" VC/YC chiller was started. The chiller performance test was satisfactorily completed. During the performance test, the technicians performed a functional verification of the program timer, that they felt was adequate, based on the successful start of the oil pump, followed by the successful start of the chiller unit.

On April 24, 1994, at 0320 hours, Operations declared "A" VC/YC operable and cleared the TSAIL entries.

On April 26, 1994, at 0405 hours, Operations swapped to the Train "B" VC/YC chiller and the Train "A" VC/YC chiller was then shutdown. At 0427 hours, "A" VC/YC was declared inoperable for planned maintenance on electrical support systems. At approximately 1000 hours, Maintenance found the Train "A" VC/YC chiller's oil pump was running continuously with the chiller shutdown.

Operations manually shutdown the oil pump by opening the motor's supply breaker. At the request of Maintenance, the oil pump motor's supply breaker was reclosed to see if the start

circuit had cleared. The oil pump immediately started and the breaker was then reopened. A corrective maintenance work order was issued for investigation and repair of the oil pump. During the ensuing investigation, technician "B" found the chiller's program timer stopped at a position other than the expected "zero" position. Upon closer examination, the technician discovered that the "follower arm" of the recently replaced microswitch was not riding on its respective "cam lobe" with proper contact to ensure that the microswitch would change electrical contact state during cam rotation. The technician adjusted the microswitch to ensure proper "follower arm" to "cam lobe" contact, and ensured the program timer was at its "zero" position.

On April 27, 1994, at approximately 2000 hours, a functional test developed by the Engineering Group was conducted jointly by Operations, Engineering, and the technicians. The functional test required that the chiller unit be started, stopped, and then restarted. The program timer was observed during this sequence to ensure that the program timer completed a full cycle, thus ensuring its operability.

On April 28, 1994, at 0250 hours, Train "A" of the VC/YC system was declared operable in all respects.

CONCLUSION

This event has been attributed to not having specific procedural guidance. The microswitch on the chiller's program timer was replaced using IP/0/A/3890/01, Controlling Procedure for Troubleshooting and Corrective Maintenance. This activity took place during the timeframe that the chiller unit was undergoing extensive maintenance. The procedure used for replacement of the microswitch provided no specific guidance for the maintenance of the program timer. Resultant from this lack of guidance for maintenance was the omission of specific functional testing requirements for this unique component. Contributing to the event was the failure to detect the error by performing an intended verification, in that a complete electrical continuity check was not done for each possible position of the microswitch prior to energizing the circuit. The troubleshooting procedure did not state the expectation that satisfactory electrical continuity checks are to be performed.

The technician assigned to investigate concluded that during the two days that the chiller unit had been running following maintenance, the program timer had been running continuously. When the chiller was shutdown, the program timer stopped at a position which satisfied the logic for the oil pump to continue running. The microswitch "follower arm" was not making proper

contact with the "cam lobe". As a result, the microswitch could not change electrical contact state and stop at the expected position in its complete cycle.

Had the normal expected response occurred, the program timer would have been stopped during the chiller unit's operation and would have restarted when the chiller unit was shutdown. This would have resulted in a normal "post-lube" run of the oil pump, followed by shutdown of the oil pump, and immediate stopping of the program timer at its "zero" position. Evaluate the need the develop a procedure for corrective maintenance and functional testing of chiller control circuits including the program timer.

The only application of a program timer of the type referenced in this LER in any safety related system is for the two chiller units in the Control Room Area Ventilation System. Therefore, there are no generic applicability concerns associated with this event.

A review of the Operating Experience Program (OEP) database for the previous 24 months prior to this incident revealed no Licensee Event Reports (LERs) which involved exceeding the Limiting Conditions for Operation for T/S 3.7.6 based on a single train of the VC/YC system being inoperable. The review did however reveal for the same 24 month period, four LERs (413/92-002, 413/92-013, 413/93-001, and 413/93-009) which involved entry into T/S 3.0.3 due to both trains of the VC/YC system being declared inoperable.

The root cause of this event is different from any of the causes identified in the four LERs listed above. Therefore, this is not a recurring problem.

CORRECTIVE ACTIONS

SUBSEQUENT

1) Corrective work order #94032848-01 was issued to determine why the oil pump ran continuously after the chiller was shutdown, and the technicians adjusted the microswitch on the program timer.

2) A functional test, developed by Engineering, was performed with acceptable results.

PLANNED

1) Evaluate the need for procedures to perform corrective maintenance and functional testing on chiller control circuits, including the program timer.

2) Make changes to IP/0/A/3890/01, Controlling Procedure for Troubleshooting and Corrective Maintenance, that provide for complete electrical continuity checks on repaired circuits prior to energizing the circuit.

3) Review the System Directive for Post Maintenance Test to ensure sufficient guidance is provided for development of adequate test plans.

SAFETY ANALYSIS

The YC chillers function to remove heat from the Control Room and the Control Room Area in order to maintain a habitable environment for the Control Room Operators and to maintain temperatures within the environmental qualification limits for the equipment located in the area.

The VC system supplies filtered air to pressurize the Control Room in order to maintain a habitable environment for the Control Room Operators. Pressurizing the Control Room prevents the in-leakage of unfiltered air, thus reducing the thyroid and skin doses in the Control Room.

The Control Room temperature is to be maintained at less than or equal to 90°F per the surveillance requirements of Technical Specification 3.7.6.

During this event the A-Train YC chiller was unknowingly inoperable for more than the 7 days allowed by Technical Specification 3.7.6. The inoperability was due to the fact that the chiller could not be relied upon to auto start in the event of a Blackout. Even though the A-Train chiller may have not auto started, it was capable of being started by depressing the "Start" button on the chiller control panel. Upon notification of the appropriate personnel the A-Train chiller could have been started, thus providing the necessary cooling to the Control Room and Control Room Area. The A-Train chiller would only be needed if the B-Train chiller was unavailable. The B-Train chiller was available and operable throughout this event.

It should be noted that the A-Train chiller was not unknowingly inoperable during the entire event. During portions of the event the A-Train chiller was declared inoperable due to modification work being performed in the area of the chiller. During these times that A-Train

was declared inoperable, Operations personnel had a heightened awareness for the importance of maintaining B-Train VC/YC operable. B-Train VC/YC was indeed operable throughout this event.

During this event there were no incidents which required pressurization of the Control Room. Even though the VC system is declared inoperable when its chiller is inoperable, the VC system was functional and would have performed its design function of pressurizing the Control Room.

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