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April 23, 1990

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

Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/90-20

Gentlemen:

Attached is Licensee Event Report 413/90-20 concerning TECHNICAL SPECIFICATION VIOLATION DUE TO A MISSED FIRE WATCH.

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

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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 1	0 5 0 0 0 4 1 3	1 OF 0 7

TITLE (4): Technical Specification Violation Due to a Missed Fire Watch

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 3	2 4	9 0	9 0	0 2 0	0 0	0 4	2 3	9 0	N/A	0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	5
POWER LEVEL (10)	0

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
R.M. Glover, Compliance Manager	AREA CODE: 8 0 3 — 8 3 1 — 3 2 3 6

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 fifteen single-space typewritten lines) (16)

On March 24, 1990, at 0111 hours, with Unit 1 in Mode 5, Cold Shutdown, a non-licensed Operator (NLO), during performance of Turbine Building rounds, noted a low pressure indication on the Cardox carbon dioxide (CO_2) storage unit. This unit provides fire protection for both Unit 1 Diesel Generators (D/Gs). The NLO immediately contacted the Security Shift Lieutenant (SSL) to initiate the fire watch required by Technical Specifications. The NLO also immediately initiated a high priority work request to investigate the indication. The SSL instructed a Security Shift Sergeant (SSS) to initiate a continuous fire watch on D/G 1A, which was required to be established by 0211 hours. This fire watch was not established until approximately 0315 hours. Further investigation on March 24 revealed that the CO_2 storage unit had been filled at approximately 1710 hours on March 23. Re-establishing normal pressure usually takes several hours. This incident is attributed to an inappropriate action, because the SSS did not establish the required fire watch. The importance of establishing timely fire watches will be discussed during crew meetings for all Security shifts. This incident is also attributed to a defective procedure, which did not ensure that adequate CO_2 tank pressure was maintained. This procedure will be revised.

BACKGROUND

Technical Specification 3.7.10.3 requires both high and low pressure carbon dioxide (CO2) systems to be operable whenever equipment protected by the CO2 systems is required to be operable. The low pressure CO2 system, which uses a Cardox CO2 storage tank located in each Turbine [EIIS:TRB] Building, provides fire protection for the Diesel Generator (D/G) [EIIS:GEN] rooms. The high pressure CO2 system, which uses several CO2 bottles located in the Auxiliary Feedwater [EIIS:BA] (CA) Pump [EIIS:P] rooms, provides fire protection for the CA Pump Rooms. With a CO2 system inoperable, within one hour a continuous fire watch for affected areas where redundant equipment is located must be established. For other affected areas, an hourly fire watch must be established. Surveillance Requirement 4.7.10.3.2a requires that CO2 Storage Tank level be verified to be greater than 44% capacity at least once per 7 days. A Surveillance Requirement is not included for CO2 Storage Tank pressure.

Operations Management Procedure 2-19, Round Sheets, defines the system used to monitor plant equipment. The non-licensed Operator (NLO) assigned as the "rounds person" is required to inform the Control Room Operator of any abnormal condition. The normal operating range for Cardox CO2 storage tank pressure, listed on the Turbine Building round sheet, is 290 to 310 psig.

PT/1/A/4450/10B, Unit 1 D/G CO2 Weekly Test, is performed by Operations to verify the proper valve [EIIS:V] lineup, Cardox CO2 storage tank pressure and level, and associated system indications in compliance with Technical Specification 3.7.10.3. Verification of tank pressure is not specified in Technical Specifications, but is recorded weekly in PT/1/A/4450/10B by observation of 1RFPG-5710, LP CO2 Tank Pressure. While the acceptance criteria range is 290 to 310 psig, the procedure states that acceptance criteria are satisfied for readings between 265 and 341 psig, as long as a work request has been initiated to investigate the reason for abnormal pressure.

The low pressure CO2 storage units were manufactured by the Cardox Division of Chemetron Corporation. Each unit consists of a pressure vessel [EIIS:VSL], a refrigeration system, gauges, an alarm system, and a safety vent assembly. The refrigeration system automatically maintains the CO2 in the pressure vessel at zero degrees F, and at 300 psig by using an expansion valve. Liquid CO2 exists only under pressure. The normal operating pressure as specified in the vendor manual, is between 290 and 310 psig. The lowest tank pressure at which operability can be maintained, given the application of the low pressure CO2 systems at Catawba, is 265 psig. The minimum value is based on minimum required discharge nozzle pressures in the D/G rooms.

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

The CO2 storage tanks must be filled periodically, approximately once per two months, due to system leakage. The CO2 required to fill the storage units is supplied and delivered by National Welders, Inc. Tank pressures at the time of delivery range from 200 to 240 psig, depending on when the delivery tanks were filled, and on whether or not previous deliveries were made en route. When filling a storage unit, system pressure is equalized with delivery tank pressure in order to fill the tank. Following the completion of tank fill, it normally takes several hours before tank pressure reaches the normal operating range (as the CO2 temperature increases).

The Cardox CO2 Storage Tanks are filled using procedures OP/1,2/6450/19, Cardox Fire Protection System, Enclosure 4.3, Filling the CO2 Tank. In this enclosure, hoses are connected from the delivery tank to the CO2 system fill and equlizing connections. After fill and equalizing line isolation valves are opened, the delivery tank and the CO2 Storage Tank pressures are allowed to equalize. The fill isolation valve is then opened, and the CO2 is then pumped into the CO2 Storage Tank. CO2 Storage Tank level is monitored as the tank is filled. After filling the tank and realigning the equalizing and fill line isolation valves, the CO2 Storage Tank is returned to normal alignment per Enclosure 4.2, Valve Checklist. If the CO2 System was in operation prior to filling the tank, then Enclosure 4.1, Placing the D/G CO2 Protection System in Standby, is performed. Enclosure 4.1 verifies the proper alignment of switches [EIIS:XIS] and indicating lights [EIIS:XI], verifies that the refrigeration system is running if CO2 Storage Tank pressure is greater than or equal to 305 psig, and has a note stating that the refrigeration system automatically cycles to maintain CO2 Storage Tank pressure between 295 and 305 psig. A precaution is included in OP/1,2/A/6450/19 to ensure that CO2 Storage Tank level is maintained at a level greater the 44%, per Technical Specification 3.7.10.3. A precaution is not included to ensure that CO2 Storage Tank pressure is maintained at greater than or equal to 265 psig.

Technical Specification 3.8.1.2 requires at least one D/G to be operable in Modes 5, Cold Shutdown, and 6 Refueling. With neither D/G operable, all operations involving core alterations, positive reactivity changes, movement of irradiated fuel, or crane operation with loads over the fuel storage pool must be suspended, and within 8 hours, the Reactor Coolant [EIIS:AB] (NC) System must be depressurized and vented through at least a 4.5 square inch vent.

Technical Specification 3.4.1.4.1 requires at least one Residual Heat Removal [EIIS:BP] (ND) loop to be operable in Mode 5, with Reactor Coolant loops filled. With no ND loop in operation, all operations involving a reduction in boron concentration of the NC System must be suspended, and corrective action to must be immediately initiated to return the required ND loop to operation.

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

EVENT DESCRIPTION

On March 23, 1990, the Unit 1 Cardox low pressure CO2 storage tank was filled to approximately 100% level per OP/1/A/6450/19, Enclosure 4.3, Delivery and Storage Tank pressures were equalized between 1710 and 1714 hours, and the fill was completed by 1745 hours. Fill and equalization line isolation valves were closed by 1752 hours.

On March 24, at 0111 hours, with Unit 1 in Mode 5 and the NC loops filled, an NLO noted during Turbine Building rounds that the Unit 1 Cardox low pressure CO2 storage tank was indicating abnormally low (250 psig). The NLO, acting as the Fire Panel Console Operator, immediately notified the Security Shift Lieutenant to initiate a fire watch, and initiated high priority work request 52931 OPS. The Unit 1 Low Pressure CO2 System was declared inoperable at 0111 hours, as a result of low Cardox tank pressure. The Lieutenant instructed the Security Shift Sergeant to establish a continuous fire watch on D/G 1A, and an hourly fire watch on D/G 1B. The Sergeant established an hourly fire watch on D/G 1B, but did not notify any Security Officers to perform the continuous fire watch on D/G 1A. At 0300 hours, during a discussion with the Lieutenant, the Sergeant realized that the continuous fire watch had not been established, and took immediate action to do so. The fire watch was established by 0315 hours, and Operations was notified. At approximately 0315 hours, Operations personnel declared D/G 1A inoperable per Technical Specification 3.8.1.2 and ND Train 1A inoperable per Technical Specification 3.4.1.1, as of 0211 hours due to not establishing a fire watch within the action time (1 hour) of Technical Specification 3.7.10.3 for CO2 System inoperability. Technical Specification 3.7.10.3 was violated due to not establishing the required fire watch when the Unit 1 D/G low pressure CO2 System was inoperable. At 0320 hours, D/G 1A and ND Train 1A were restored to operability due to performance of the required fire watches.

Operations personnel realized, on March 24, that the CO2 storage tank had been recently filled, and that the low pressure indication on 1RFPG-5710 was a result of adding colder CO2. Instrumentation and Electrical (IAE) Technicians discussed the situation with Operations and determined that no work was necessary under work request 52931 OPS, since pressure indication reflected present plant conditions. By approximately 1749 hours, pressure indication was determined to be acceptable. The fire watch was terminated, and the Unit 1 Low Pressure CO2 System was declared operable. At 2040 hours, Operations completed PT/1/A/4450/10B, in which the Unit 1 D/G Low Pressure CO2 Systems was verified to be operable. Pressure was recorded to be 269 psig.

CONCLUSION

This incident is attributed to an inappropriate action, due to a lack of attention to detail. Verbal instructions were not given as needed to establish the required fire watch. The need to establish a fire watch was adequately communicated from the NLO to the Security Lieutenant, and from the Lieutenant to the Sergeant. However, the Sergeant did not follow through and communicate this requirement to the Security Officers. Corrective actions included discussions with those involved. The importance of establishing timely fire watches will be discussed during crew meetings with all Security shifts. As a result of a previous fire watch incident, documented in LER 413/90-021, training is being provided to Station personnel during safety meetings on fire watch responsibilities. As an interim measure, personnel are currently required to obtain Fire Watch Verification Forms from the Shift Manager, to provide enhanced control over fire watches.

This incident is also attributed to a defective procedure. It is likely that CO2 Storage Tank pressure was less than 265 psig since approximately 1710 hours, on March 23. A procedural precaution is not provided in OP/1,2/A/6450/19 to ensure that CO2 Storage Tank pressure does not fall below 265 psig, or provide compensatory measures to be taken if pressure does fall below 265 psig during and after the fill process. A period of approximately 8 hours elapsed between pressure equalization and when it was noted, during rounds, that pressure was low. OP/1,2/A/6450/19 will be revised to monitor CO2 Storage Tank during, and following, the fill process to ensure that pressure is at least 265 psig. These procedures will also require the necessary fire watches be established on the D/G rooms as long as pressure is below 265 psig.

Operations personnel will pursue measures, with National Welders, Inc., to ensure that CO2 is delivered to Catawba at higher pressures. These measures could include filling the delivery tank in advance of making deliveries, and ensuring that Catawba is first on the delivery route.

During the course of this incident, Train 1B of the ND System was inoperable due to the replacement of 1ND038, ND Pump 1B Suct From NC Loop C Hdr Relief Valve. Although both ND loops were inoperable, no operations involving a reduction in boron concentration of the NC System were in progress. Upon realization that fire protection for D/G 1A was inoperable, and that a fire watch had not been established, corrective action was immediately initiated to return ND Train 1A to operability. This corrective action consisted of establishing the required fire watch.

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

Missed fire watches are a recurring problem at Catawba. A review of previous incidents shows that there have been three previous Licensee Event Reports due to missed fire watches during the previous 27 months involving human performance problems (see LERs 413/88-001, 414/89-008, and 413/90-021). LER 413/88-001 documented cases in which hourly fire watches were started late because Construction and Maintenance Department (CMD) Supervisors did not remember to assign personnel to the tasks. Corrective actions were to discuss the incident with appropriate personnel, and to provide training to CMD Supervisors/work crews, with access to the restricted area, stressing the importance of maintaining fire watches and the Technical Specification significance of not performing required fire watches. These corrective actions did not prevent the current incident, since they applied to CMD personnel. LER 414/89-008 describes a case in which CMD personnel removed a hydro hose from a firestop penetration [EIIS:PEN] without a procedure, and did not reseal the penetration. As a result, CMD Management emphasized, to appropriate personnel, the need to contact the proper individuals and/or use approved procedures when work involves removing or disturbing fire barriers. This corrective action could not have prevented the current incident. LER 413/90-021 describes an incident in which hourly fire watch intervals exceeded 60 minutes. One of the corrective actions for this incident, to provide training to Station personnel on the importance of fire watch responsibilities, should help prevent the recurrence of missed fire watches. This training is being provided to all Station personnel during scheduled safety meetings. In addition, all Security shifts will receive training on the importance of timely fire watches during crew meetings. These extensive training measures should prevent recurrence. As a temporary, interim measure, Fire Watch Verification Forms must be obtained through the Shift Manager, adding more control to the process. Permanent measures will be discussed among appropriate groups. Options include discussing each fire watch with the Control Room Senior Reactor Operator, and the establishment of a feedback mechanism to ensure that a fire watch has been established in a timely manner. These permanent changes would be enhancements to Station Directive 2.12.7, Fire Detection and Protection, which describes fire watch policy.

CORRECTIVE ACTION

SUBSEQUENT

1) Fire watches were established for D/G Rooms 1A and 1B, until Unit 1 CO2 Storage Tank pressure reached an acceptable level.

2) A work request was initiated, and the low pressure indication was investigated and found to be the result of tank depressurization while filling it.

3) PT/1/A/4450/10B was successfully performed, verifying operability of the Unit 1 CO2 Storage Tank. PT/2/A/4450/10B was successfully performed on March 24, verifying operability of the Unit 2 CO2 Storage Tank.

4) As a temporary, interim measure, a policy was implemented requiring fire watches to be handled through the Shift Manager.

5) The incident was discussed with persons involved.

PLANNED

1) Operations procedures will be revised to ensure that CO2 Storage Tank pressure is maintained greater than or equal to 265 psig, and to ensure that appropriate fire watches are established when pressure is less than 265 psig, during and following tank fills.

2) Measures will be pursued, with National Welders, Inc., to ensure that CO2 is delivered at higher pressures.

3) Training will be provided to all Security shifts on the importance of timely fire watches.

4) Long term measures, to prevent future missed fire watches, will be discussed among appropriate Station management. This report will be revised pending the results of this discussion.

5) Training on fire watch responsibilities will be provided during scheduled Safety Meetings.

SAFETY ANALYSIS

During the course of this event, one loop of ND remained in operation, and no operations occurred involving a reduction in boron concentration of the NC System.

The Unit 1 D/G Low Pressure CO2 System was inoperable between approximately 1710 hours, on March 23, and 0315 hours, on March 24, witnout the fire watches required by Technical Specification 3.7.10.3. During this time, fire detection equipment in the D/G rooms was operable, and would have promptly alerted the Control Room Operators of a fire by means of Diesel room 1A and 1B CO2 System Alarm annunciators. In addition, fire panel alarms for zones near the D/G rooms, such as the Switchgear Equipment Room, Electrical Penetration Room, and Diesel Tunnels, would have sounded.

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