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)
James A. FitzPatrick Nuclear Power Plant	05000333	01 OF 06

TITLE (4)
Incomplete Functional Testing of Carbon Dioxide Fire Suppression 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 NAME	DOCKET NUMBER
										05000
08	12	93	93	018	01	10	01	93	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (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
	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)
Mr. Donald Simpson, Senior Licensing Engineer	(315) 349-6361

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)

The plant was operating at 100 percent power in the Run mode. During the conduct of a Fire Protection test procedure adequacy review on August 12, 1993, it was identified that portions of the Carbon Dioxide Fire Suppression System for the South Emergency Switchgear Room were not being tested by the functional test procedure. Since all Carbon Dioxide systems are similarly tested, they were declared inoperable, and fire watches posted in each affected area. The test procedure was revised and the system restored to an operable condition following satisfactory completion of testing. Evaluation of Carbon Dioxide discharge timer settings determined that the functional test procedure acceptance ranges were inappropriately based on design calculations rather than actual test results. Six timers were found set lower than the time communicated to the NRC in JNRC-78-53. An increase in the Technical Specification minimum level for the three ton Carbon Dioxide storage tank was required for the same reason. These findings are a result of inadequate procedure development and poor administrative controls. Reviews of all Fire Protection functional test procedures will be completed by 12/31/93. This event reports deficiencies similar to the testing procedure weaknesses reported in LER-93-014.

EIIS Codes are in []

Description

The plant was operating at 100 percent power with the reactor mode switch in Run. Fire Protection staff were conducting an adequacy review of the Carbon Dioxide System [KG] [LW] Smoke and Heat Detector Functional Test Procedure [IC] for the South Emergency Switchgear Room.

On August 12, 1993, at 1718 hours, fire protection engineers identified that the functional test procedure did not adequately test all components as required by Technical Specification Table 4.12.2. The test did not verify that the Master and Selector Valves (that must open to discharge Carbon Dioxide into the area) would open from an electrical initiation signal. These valves were being stroked mechanically/pneumatically in accordance with the test procedure. In addition, the Selector Valves were not verified to be closed at system restoration.

All fire areas protected by Carbon Dioxide suppression were declared inoperable and fire watches posted as of 1740 hours on August 12, 1993. A procedure adequacy review which included "red lining" of electrical logic diagrams to verify adequate testing overlap was completed on August 16, 1993. An additional test procedure weakness regarding Carbon Dioxide discharge timer settings was identified. The test procedure acceptance criteria for timer settings (to achieve the required 50 percent Carbon Dioxide concentration) were not consistent with preoperational test values or as-found timer settings.

In August, 1993, all Carbon Dioxide functional test timer settings were compared to design calculations and the timer settings based upon actual testing completed in 1974. In 1978 the Authority transmitted timer settings to the NRC via JNRC-78-53. The following table shows the comparison.

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

	Original Design Calc. Settings	Preop. Testing Final Settings	JNRC-78-53 Committed Settings	Functional Test Accept Range (Prior to 8/21/93)	As Found Settings
Cable Room:	130 sec	130 sec	139 sec	(115-145)	136.5 sec
North Cable Tunnel:	130 sec	128 sec	133 sec	(115-150)	133 sec
South Cable Tunnel:	175 sec	*143 sec	205 sec	(190-205)	201.6 sec
North Emerg. SWGR:	135 sec	132 sec/ 158 sec	158 sec	(120-145)	142 sec
South Emerg. SWGR:	124 sec	121 sec	136 sec	(110-135)	112.4 sec
West Elec. Bay:	130 sec	*123 sec	147 sec	(110-140)	135 sec/ 124 sec
East Elec. Bay:	190 sec	*183 sec	203 sec	(165-200)	194 sec/ 197 sec

* Exceptions were noted during preoperational testing and tests were repeated with revised timer settings, however, the exceptions/changes to timer settings were not noted.

Although all discharge timers were found set within the functional test procedure range, six timer settings were less than the settings required by JNRC-78-53.

Following the functional test procedure adequacy review, the acceptance ranges for the revised functional test procedures were increased to the JNRC-78-53 value plus ten seconds to ensure that the minimum concentration of 50 percent is maintained for the required time without running undue risk of room overpressurization.

All timer settings were then increased to the new values, except for the Relay Room. The Relay Room System was determined to be inoperable since November, 1992 pending completion of modification work and no timer setting adjustment was made. The Relay Room System, although technically inoperable, is available for manual initiation with operator precautions as described in an Abnormal Operating Procedure.

The South Cable Tunnel System timer setting was found to have been set at approximately 195 seconds from September, 1980 until April, 1993. This setting was contrary to the setting specified in JNRC-78-53. The error was apparently made in 1980 when additional testing was performed. In April, 1993, an editorial error was made during a procedure revision which resulted in the timer acceptance range being inappropriately changed to a range of 115 to 150 seconds and the timer setting was decreased to fall within the lower range. This timer setting was increased to the 205 second time as noted above.

Both the review of design calculations and the current Fire Protection design basis reconstitution indicated that the current Technical Specification minimum three ton Carbon Dioxide storage tank level (45 percent) was not adequate to ensure a single full discharge into the North Emergency Switchgear Room. The current Specification appears to be based on the system design drawing calculation timer setting versus the JNRC-78-53 required setting. Administrative controls for storage tank level were revised immediately to ensure tank level is maintained above the level calculated to be able to provide full discharge, that is, 55 percent.

The Test Procedure weaknesses identified through this review have existed since the original issue of the procedures.

A review of Carbon Dioxide System Functional Test Procedures was initiated. All procedures, with the exception of the Relay Room, were revised, new procedures were developed, reviewed, approved and were issued on August 20, 1993.

Cause

The test procedure weaknesses resulted from inadequate procedure development. The author(s) of the original test procedure misinterpreted the Technical Specification requirement for a simulated automatic and manual "puff test" to require only a manual, mechanical opening of the valves. This error was not recognized through the review and approval process in place at the time.

The current Technical Specification minimum level for the three ton Carbon Dioxide storage tank appears to be based upon the system design drawing calculation versus final JNRC-78-53 timer settings. Because the North Emergency Switch gear Room timer setting was increased during actual testing, the calculated basis for minimum tank level was no longer accurate. The need for a higher minimum level for the storage tank base on the increased discharge time was not recognized. This is a result of poor administrative control of testing and setpoints.

Discharge Timer setting errors were caused by poor administrative control of setpoints and poor communication of commitments. The South Cable Tunnel timer setpoint error was made more significant when an editorial error was made in April, 1993 and the error was not detected and corrected through the review and approval process. Current modification control and post-work testing processes would preclude setpoint errors of this nature from recurring.

Analysis

The failure to test all components in the Carbon Dioxide system functional test is a violation of Technical Specification Table 4.12.2. As a result, the event requires a report under 10CFR50.73(a)(2)(i)(B).

The procedure deficiencies that resulted in incomplete testing could have resulted in a condition where inoperability of these components would not have been detected and could have resulted in the failure of one or more of the Carbon Dioxide suppression systems to operate as designed in the event of a fire. If the three ton Carbon Dioxide storage tank had been at its Technical Specification minimum level, a full discharge to achieve 50 percent concentration could not have been assured in the North Emergency Switchgear Room. A sampling of log readings over the past six months indicate that the storage tank was maintained greater than 80 percent which would have mitigated this error.

The FitzPatrick safe shutdown analysis assumes a complete loss of equipment in the fire affected area, therefore, the safety significance of a Carbon Dioxide suppression system failure to operate as designed was low. Detection systems within the Carbon Dioxide protected areas were operable and had been appropriately tested since installation thereby assuring timely fire detection. Testing of the Carbon Dioxide suppression systems was satisfactorily completed using the revised test procedures. The master and selector valves functioned properly.

In the event of a failure of any installed Carbon Dioxide suppression system, continuous fire detection was available and portable wheeled Carbon Dioxide fire extinguishers were available as backup devices for the installed systems.

Based upon the continuous availability of fire detection systems in the affected areas, the availability of backup suppression devices, and the on-site fire brigade expected response. The safety consequences of this event was minimal.

Corrective Actions

1. All Carbon Dioxide system functional test procedures, with the exception of the Relay Room, were reviewed, revised and the systems satisfactorily tested.

2. The Administrative controls for procedure development and review were improved in June, 1993.

3. Interim administrative controls were put in place to maintain the three ton Carbon Dioxide storage tank level above 55 percent.

4. A Technical Specification change request was initiated to correct the inaccurate minimum 3 ton storage tank level specification.

5. An adequacy review of all Fire Protection functional test procedures is scheduled to be completed by December 31, 1993.

6. The 205 Second discharge timer setpoint for the South Cable Tunnel will be identified as a commitment through revision of the functional test procedure by October 31, 1993.

Additional Information

Failed Components: None

Similar Events: LER-93-014 and LER-92-032 describe similar cases of incomplete or missed surveillance testing.

Reason for Update: Revision 1 of this LER is submitted to correct minor editorial errors, provide information concerning the three ton Carbon Dioxide storage tank minimum level setpoint error and to provide a more complete description of the discharge timer setpoint errors.