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December 17, 1993
JAFF-93-0673

United States Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, D.C. 20555


SUBJECT: DOCKET NO. 50-333
LICENSEE EVENT REPORT: 93-014-01- Incomplete Logic
System Functional
Testing

Dear Sir:

This supplementary report is submitted in accordance with 10CFR50.73(a)(2)(i)(B). The purpose of this supplement is to provide the results of the Logic System Functional Test Procedure Adequacy reviews completed to date. This supplement also revises our commitment date for completion of surveillance procedure review to December 31, 1994.

Questions concerning this update may be addressed to Mr. Donald F. Simpson at (315) 349-6361.

Very truly yours,


HARRY P. SALMON, JR.

HPS:DEB:tlc
Enclosure

cc: USNRC, Region 1
USNRC Resident Inspector
INPO Records Center

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LICENSEE EVENT REPORT (LER)

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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 (MNB 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.

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05000333

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TITLE (4)
Incomplete Logic System Functional Testing

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 - N/A	DOCKET NUMBER
05	29	93	93	014	01	12	17	93	FACILITY NAME - N/A	05000
									FACILITY NAME - N/A	DOCKET NUMBER 05000

OPERATING MODE (9)	N	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)		
POWER LEVEL (10)	15	20.405(a)(1)(i)		50.36(c)(1)		X 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
Mr. Donald F. Simpson, Senior Licensing Engineer

TELEPHONE NUMBER (Include Area Code)
(315) 349-6361

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NWRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NWRDS

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

UPDATE REPORT - Previous Report Dated 6/25/93

The plant was at approximately 15 percent power in the RUN mode during a normal startup power ascension. On May 29, 1993, it was determined that portions of the High Pressure Coolant Injection (HPCI) [BJ] actuation logic [JE] had not been periodically tested as a result of procedure deficiencies. LER-93-009 reported the initial identification of one logic test omission in the HPCI system and committed to conduct a detailed review of the HPCI logic testing as part of the corrective action. The results of the detailed review were reported in LER-93-014-00. Procedure changes were made and surveillance testing was completed in order to test all portions of the HPCI logic. Testing was completed with satisfactory results. LER-92-032, 90-007, 90-015 and 89-008 describe similar cases where surveillance testing was incomplete or missed. This supplement describes the results of test reviews conducted over the past several months and revises the surveillance procedure review schedule completion date, from December 31, 1993, (as committed to in LER-92-032), to December 31, 1994.

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

UPDATE REPORT - Previous Report Date 6/25/93

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Event Description

A plant startup was in progress with the reactor mode switch in run and reactor power approximately 15 percent. A detailed evaluation of the High Pressure Coolant Injection System (HPCI) [BJ] actuation logic [JE] was being performed following identification of incomplete logic testing on the HPCI injection valve, 23MOV-19 which was initially reported in LER-93-009.

At 1845 hours on May 29, 1993, the detailed evaluation of HPCI Actuation Logic surveillance testing was complete. The results identified additional potential weaknesses in the approved surveillance test procedures. Based upon a conservative interpretation of Technical Specification Section 4.5.C.1 which requires, in part, functional testing of the actuation logic, the HPCI system was declared inoperable in accordance with Technical Specification Action Statement 4.5.C.1.a.

In addition to incomplete logic testing of the 23MOV-19 valve, the detailed evaluation identified the following test procedure weaknesses:

- Within the HPCI initiation logic on low reactor (RPV) water level, relay 23A-K2 or 23A-K3 was not being tested on 23MOV-14, 23MOV-16, 23MOV-17, 23MOV-20, 23MOV-21 or 23MOV-24.
- Logic testing did not demonstrate that the HPCI inboard steam supply isolation valve, 23MOV-15, or the pump suction valve, 23MOV-17, would open on a high primary containment [NH] drywell pressure or low RPV water level signal. Although normally open, a design feature enables the valves to automatically reposition to the injection path line-up if out of the normal position.
- The manual push button steam isolation logic for HPCI was not being tested.

Temporary procedure changes were initiated and approved for each of the identified weaknesses. Testing was performed with satisfactory results in each case. HPCI was declared operable following completion of additional testing at 1405 hours on May 30, 1993.

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A review of HPCI logic surveillance testing indicates that these weaknesses have existed since the initial licensing of the plant.

A systematic review of selected FitzPatrick surveillance test procedures important to safety was performed in order to verify or ensure that each Logic System Functional Test (LSFT) adequately implemented the applicable Technical Specification requirement. This review was undertaken as a part of the FitzPatrick Surveillance Test Improvement Program and was conducted using upgraded administrative controls designed to provide uniform surveillance program implementation across functional areas and to provide effective management oversight of the surveillance program. LSFT reviews have been completed on the following systems:

- Residual Heat Removal - Low Pressure Coolant Injection Mode [BO]
- Residual Heat Removal - Containment Cooling Mode
- Automatic Depressurization [SB]
- Primary Containment Isolation (PCIS) [JM]
- ATWS - Recirculation Pump Trip [AD]
- Reactor Core Isolation Cooling [BN]
- Emergency Diesel Generators [EK] (no Technical Specification LSFT required) - An independent review as described in LER-93-017 was completed

The LSFT review team assessed the overall adequacy of the tests reviewed by evaluating the extent and significance of identified discrepancies resulting from their review. This assessment concluded that with certain exceptions identified in the PCIS review, the surveillance test procedures adequately test the system logics, as required by the Technical Specifications. The review did identify discrepancies which consisted of either a lack of individual contact testing where the relays and switches were tested for other functions; or where circuitry is not tested that demonstrates functionality of design features but could be incorporated into the test program as procedure enhancements. In the latter case, the untested design features were not required safety functions.

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The exceptions noted in the PCIS review had to do with the failure to test certain containment isolation signal contact operations. The following test omissions were the result of an improperly revised test procedure (personnel error) in August, 1992, and consisted of the following:

Contacts and relay operation for high drywell pressure isolation (signal) to the inboard and outboard drywell vent and purge valves were not tested.

The containment radiation monitor inoperable trip (signal) to the inboard and outboard drywell vent and purge valves were not tested.

The test procedure was revised and testing completed on 10/15/93, with satisfactory results. The procedure writer responsible for the error reviewed other test procedures he had revised to ensure similar errors had not been made.

Another exception, also found in the PCIS review, was that the main steam line high radiation trip (signal) to the reactor water sample valves was not being tested. This omission had existed since original procedure implementation. Because this test could not be performed during plant operation, the appropriate LCO action was taken. The test procedure was revised and testing satisfactorily completed on 11/18/93 (during a maintenance outage).

The procedure validation and adequacy review process now in use will prevent future occurrences of this type.

Cause

The incomplete logic testing was a result of test procedure deficiencies. In each case, the surveillance procedures did not test the entire logic circuit, from sensor, through, and including, the actuated component either through omission of parallel paths in the logic circuitry or due to missed relay contact points resulting from insufficient overlap between different tests. The cause was inadequate administrative controls for development or revision of surveillance test procedures.

Analysis

The failure to test all of the HPCI and PCIS actuation logic is a violation of Technical Specification Section 4.5.C.1. As a result, the event requires a report under 10CFR50.73(a)(2)(i)(B).

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The procedure deficiencies that resulted in incomplete logic system functional testing could have resulted in a condition where inoperability of that portion of the logic circuit would not have been detected and could have resulted in the failure of the HPCI system or the Primary Containment Isolation System to operate as designed. As a result, the event requires a report under 10CFR50.73(a)(2)(v)(D).

- The HPCI turbine steam supply valve, 23MOV-14, and the HPCI steam supply outboard containment isolation valve 23MOV-16, are both normally closed. Logic testing verified that these valves would open on receipt of a high drywell pressure initiation signal but did not verify the same condition on receipt of an RPV low level initiation signal. Part of the logic that provides an open signal had not been tested. Testing proved the circuit was functional. Therefore, the safety significance was low.
- The inboard and outboard drywell vent and purge valves are normally closed during power operation. The failure to test the complete logic circuit for the valves had low safety significance because of their normally closed position. Testing conducted subsequent to the discovery of the testing of omissions confirmed operability of these valves for all isolation signals.
- The normally open HPCI inboard steam supply containment isolation valve, 23MOV-15, was not tested to demonstrate that, if out of the normal position, it would open on high drywell pressure or low RPV water level. Since a design feature provides the capability for the valve to auto-reposition to the injection path line up, the HPCI system could have failed to operate as designed if the valve were out of its normally open position at the time of an initiation signal due to an undetected logic circuit fault. This is not a design safety requirement. Testing demonstrated the circuit was functional, therefore, the safety significance was low.
- The HPCI pump suction valve, 23MOV-17, was not tested to demonstrate that the valve would open on high drywell pressure or low RPV water level. The significance is minimal because this valve is normally open. Again, this is a design feature and not a design safety requirement. Testing demonstrated that if the valve were closed it would have repositioned, therefore, the safety significance was low.

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- Interlocks between the HPCI test return valve (23MOV-21) to the Condensate Storage Tank and the Torus Suction Valves (23MOV-57 and 58) were not tested; however, 23MOV-21 is verified to automatically shut on a HPCI initiation signal; therefore, testing of the interlock function was and is not necessary.
- Failure to test the manual HPCI steam supply containment isolation logic is not significant from a design or safety basis but is voluntarily reported in order to provide the complete status of incomplete HPCI logic testing.

Corrective Action

1. Temporary procedure changes were made immediately to the applicable surveillance test and testing was satisfactorily performed.
2. The Surveillance Test Program Improvement Plan was incorporated into the FitzPatrick Results Improvement Program.
3. Technical Services has issued TSSO-18 "Surveillance Test (LSFT) Adequacy Review Procedure". This procedure established a multi-discipline team to review the adequacy of plant surveillance tests to meet the intent of Logic System Functional Test (LSFT) requirements. The review will verify LSFT procedures against the plant configuration and recommend procedure and drawing changes, as necessary.

The review of procedures included "red lining" of elementary and logic diagrams against the applicable surveillance test procedure to denote a detailed point to point and contact by contact review. Testing overlap was verified. Plant administrative controls for the Site Surveillance Test Program were upgraded to incorporate lessons learned through the LSFT review process as part of the Surveillance Test Program Improvement Plan.

4. Based upon the results of the HPCI Actuation logic review, a schedule for review of selected systems was implemented. This schedule anticipated completion of the review of the Low Pressure Coolant Injection and containment cooling modes of the Residual Heat Removal System [BO], ATWS Recirculation Pump Trip (RPT), Automatic Depressurization (ADS) [SB] and Primary Containment Isolation System (PCIS) [JM] logic testing by September 30, 1993. This supplement serves to update this report regarding the results of the on-going LSFT review.

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5. LER-93-009 described a corrective action to identify other logic system function test surveillances that used the GE Test switch and to review whether the switch tests all logic circuits in a sample of identified tests. The accelerated review of selected system logic tests identified in corrective action 4 of this LER is a revision to that corrective action. With the exceptions of ATWS recirculation pump trip and the primary containment isolation system testing, the GE Test Switch is utilized to conduct the testing.
6. LER-92-032, Corrective Action #2, describes a schedule of surveillance procedure review that would be complete by December 31, 1993. Due to the significant change in level of detail to be applied to the adequacy review, this review will not be completed until December 31, 1994.
7. The LSFT review process is being continued for the following systems:
 - Core Spray [BM]
 - Control Rod Blocks
 - High Pressure Coolant Injection [BJ] - Independent review as described in LER-93-017
 - Average Power Range Monitor [JD] - Independent review as described in LER-93-017
8. Revised administrative controls for Surveillance Test Procedures require that all new surveillance test procedures and those undergoing a biennial review receive an adequacy review unless justification for deferral is approved by the surveillance program coordinator. This process will continue.

Additional Information

LER-93-009 describes the corrective action initiated which led to this identification of additional incomplete logic testing. LER-92-032 describes FitzPatrick's intention to perform an adequacy review of surveillance procedures.

Failed Components: None

Similar Events: LER-93-009, 92-032, 90-007, 90-015 and 89-008 describe similar cases where surveillance testing was incomplete or missed.