Southern Nuclear Operating Company
Post Office Box 1295
Birmingham, Alabama 35201
Telephone (205) 868-5131

Dave Morey
Vice President
Farley Project

Southern Nuclear Operating Company
the southern electric system

June 27, 1996

Docket Number: 50-348

10 CFR 50.73

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Joseph M. Farley Nuclear Plant - Unit 1
Licensee Event Report Number 96-002-00
Technical Specifications Surveillance Requirements
Not Met And Common-Cause Failure Identified

Ladies and Gentlemen:

Joseph M. Farley Nuclear Plant Licensee Event Report No. 96-002-00 is being submitted in accordance with 10 CFR 50.73(a)(2)(i) and 10 CFR 50.73(a)(2)(vii).

Respectfully submitted,

Dave Morey

EFB/maf CVLER02.DOC

Attachment

cc: Mr. S. D. Ebneter
Mr. B. L. Siegel
Mr. T. M. Ross

IE22
1/1

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), 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)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Joseph M. Farley Nuclear Plant - Unit 1	0 5 0 0 0 3 4 8	1 OF 5

TITLE (4)
Technical Specifications Surveillance Requirements Not Met And Common-Cause Failure Identified

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	
									J. M. Farley - Unit 2	0 5 0 0 0 3 6 4
0 5	2 9	9 6	9 6	– 0 0 2	– 0 0	0 6	2 7	9 6	FACILITY NAME	

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
1		20.2201(b)	20.2203(a)(2)(v)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)
POWER LEVEL (10)		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
1 0 0		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below
		20.2203(a)(2)(iv)	50.36(c)(2)	X 50.73(a)(2)(vii)	or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
R. D. Hill, General Manager - Nuclear Plant	AREA CODE 3 3 4 8 9 9 - 5 1 5 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	
X	I C	I 8 1	G 0 8 0	Y							

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-space typewritten lines) (16)

At 1137 on May 29, 1996 with Units 1 & 2 in Mode 1 operating at 100% power, it was determined that Farley Nuclear Plant (FNP) had been operating in a condition prohibited by Technical Specifications (TS). TS 3.3.1 requires surveillance testing to be performed on the Underfrequency (UF) - Reactor Coolant Pump Reactor Trip System Instrumentation channels [JC]. However, it was determined that adequate testing on the required channels was not being conducted. During subsequent testing to satisfy surveillance requirements, a common-cause failure was identified that resulted in Unit 1 independent UF channels being inoperable in a system designed to shut down the reactor.

The cause of the missed surveillance was cognitive personnel error which resulted in a failure to update surveillance test procedures (STPs) following modifications to the UF reactor trip circuitry during each Unit's recent refueling outage. The cause of the common-cause failure was cognitive personnel error in that post modification testing was inadequate to identify and correct the failure prior to power operation. The Units 1 & 2 UF STPs have been revised to include appropriate testing of the UF circuitry. The Units 1 & 2 UF reactor trip circuits have been modified and subsequently tested satisfactorily. Specifically, diodes have been added to the UF circuitry on both Units to enhance their ability to perform in a DC interruption application. Management expectations regarding the identification and development of post modification testing will be clarified to appropriate personnel. Training will be conducted to ensure that personnel developing and reviewing design modification packages have sufficient knowledge to identify and perform required procedure changes.

Plant and System Identification

Westinghouse -- Pressurized Water Reactor
Energy Industry Identification System codes are identified in the text as [XX].

Description of Event

At 1137 on May 29, 1996 with Units 1 & 2 in Mode 1 operating at 100% power, it was determined that Farley Nuclear Plant (FNP) had been operating in a condition prohibited by Technical Specifications (TS). TS 3.3.1 requires that the Underfrequency - Reactor Coolant Pump (RCP) channels of the Reactor Trip System instrumentation [JC] be calibrated each refueling and functionally tested each quarter. Based on a thorough review of all applicable plant procedures, it was determined that adequate testing of all elements of the Underfrequency (UF) circuitry was not being conducted as required by TS and had not been appropriately tested since design changes were implemented during each Unit's recent refueling outage (Unit 2 Spring '95; Unit 1 Fall '95). In addition, during subsequent testing to satisfy surveillance requirements, a common-cause failure was identified which resulted in Unit 1 independent UF channels being inoperable in a system designed to shut down the reactor.

During a review of the UF circuitry as part of the preparation of FNP's response to Generic Letter 96-01, it was questioned on May 28, 1996 if existing surveillance test procedures adequately verified proper performance of interposing relays which had been added to the UF circuitry during each Unit's recent refueling outage. The interposing relays had been added to make the UF reactor trip circuits "fail-safe" on a loss of DC control power condition. The design changes were performed on Units 1 & 2 by the addition of interposing relays in the UF control circuits.

In response to this question, on May 28, 1996, UF relay surveillance testing was commenced concurrent with a review of plant procedures to determine if appropriate surveillance testing had been accomplished by procedures other than the specified Maintenance procedures since these did not include testing of the interposing relays. Each channel of the UF protection circuitry is comprised of two UF sensing relays (two per Reactor Coolant Pump Bus). All 6 Unit 2 UF relays were tested satisfactorily without a failure. When tested, both of the Unit 1 Bus 1A UF relays failed

to operate at the 57 Hertz setpoint and provide a proper input to the Solid State Protection System (SSPS). The Unit 1 Bus 1A relays were replaced and tested satisfactorily. Testing then demonstrated that both of the Unit 1 Bus 1C UF relays met the acceptance criteria. Subsequently, with both the 1A and 1C Bus UF relays tested satisfactorily and operable, it was concluded (based on the concurrent procedure review) at 1137 on May 29, 1996, that no procedural coverage existed for testing the interposing relays and adequate surveillance testing was not being performed to verify compliance with the requirements of TS. The Unit 1 Bus 1B UF relays were tested and failed to operate as designed. These relay circuits were modified and tested satisfactorily. Subsequently, the remaining Unit 1 & Unit 2 RCP UF reactor trip circuits were modified and retested satisfactorily. During the above described UF relay surveillance testing, the appropriate TS actions were met.

Cause of Event

The cause of the missed surveillance was due to cognitive personnel error which resulted in a failure to update surveillance test procedures following modifications to the UF reactor trip circuitry. The Unit 2 procedure was not changed following modifications in the Spring of 1995 due to an individual inappropriately concluding that procedures had been changed when they had not been changed. This error was an isolated occurrence and, through normal attrition, this individual is no longer employed at FNP. The Unit 1 procedure was not changed following modifications in the Fall of 1995 due to an individual (different than the individual who performed the Unit 2 review) failing to recognize the need for including interposing relay testing in the surveillance test procedure. This error has been attributed to an insufficient knowledge of surveillance testing requirements. This individual reviewed the Unit 2 procedure, which had not been appropriately updated, and this review incorrectly supported the decision that no procedure change was required.

The above mentioned relay testing identified multiple failures of the "telephone relays" integral to the underfrequency sensing relays (GE Static Frequency Relay models 12SFF16 and 12SFF21). The specific cause of the common-cause failure mechanism has not been identified and investigation is continuing. Following the 1995 design changes, post modification testing was limited in that only the "fail safe" performance of the UF circuits was verified. More comprehensive testing should have identified the common-cause condition and allowed for investigation and repair prior to power operation. The inadequate level of testing has been attributed to an unclear understanding of management expectations in defining the scope of post modification testing. As such, the cause of power operation with an undetected common-cause failure was cognitive personnel error in the development of post modification testing procedures.

Safety Assessment

In accordance with FSAR Chapter 15, the primary protective function for a complete loss of RCS flow event is the RCS low flow reactor trip which prevents the design DNBR limits from being exceeded. The reactor trips from the Reactor Coolant Pump Bus Undervoltage and Underfrequency and RCP Breaker Position all provide anticipatory backups to the low flow trip signal. In addition, the plant's emergency response procedures require plant operators to perform a manual reactor trip when required by plant conditions if an automatic trip does not occur.

The overpower delta temperature, overtemperature delta temperature, and high pressurizer pressure reactor trips also act as diverse backup trips for the complete loss of RCS flow event.

Since all Unit 2 UF relays passed initial testing, it is concluded that these relays would have performed properly if necessary. The failures of two out of three Underfrequency channels on Unit 1, and subsequent improper response to actual plant conditions, would have been mitigated by proper operation of the primary reactor trip, RCS low flow, as well as the diverse trips discussed above.

The health and safety of the public were not affected.

Based on the above, no safety concerns exist.

Corrective Action

The Unit 1 and 2 surveillance test procedures used to verify proper performance of the Underfrequency circuitry have been revised to include testing of appropriate components.

Subsequently, all UF reactor trip circuits were modified and tested satisfactorily.

Diodes have been added to the UF circuitry on both Units to enhance their ability to perform in a DC interruption application.

Management expectations regarding the identification and development of post modification testing will be clarified to appropriate personnel.

Training will be conducted to ensure that personnel developing and reviewing design modification packages have sufficient knowledge to identify and perform required procedure changes.

A root cause analysis and broadness review is in progress.

Additional Information

The following LER was submitted due to inadequate procedural guidance which resulted in missed TS surveillance:

LER 90-002-00 (Shared) - Surveillance Not Performed Due to Inadequate Procedural Guidance.