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SOUTHERN COMPANY
Energy to Serve Your World℠

December 5, 2002

Docket No.: 50-348

NEL-02-0239

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Joseph M. Farley Nuclear Plant – Unit 1
Licensee Event Report 2002-002-00
Manual Reactor Trip Due to Partially Dropped Control Rod

Ladies and Gentlemen:

Joseph M. Farley Nuclear Plant – Licensee Event Report (LER) No. 2002-002-00 is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A).

There are no NRC commitments in this letter. If you have any questions, please advise.

Respectfully submitted,

J. B. Beasley, Jr.

WAS/sdl: LER2002-002-00.doc

Attachment

IE22

cc: Southern Nuclear Operating Company
Mr. D. E. Grissette, General Manager - Farley

U. S. Nuclear Regulatory Commission, Washington, D. C.
Mr. F. Rinaldi, Licensing Project Manager - Farley

U. S. Nuclear Regulatory Commission, Region II
Mr. L. A. Reyes, Regional Administrator
Mr. T. P. Johnson, Senior Resident Inspector - Farley

NRC FORM 366 (1-2001)

U S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO 3150-0104 EXPIRES 6-30-2001

Estimated burden per response to comply with this mandatory information collection request 50 hours Reported lessons learned are incorporated into the licensing process and fed back to industry Send comments regarding burden estimate to the Records Management Branch (T-6 E6) U S Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503 If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Joseph M. Farley Nuclear Plant - Unit 1	05000 348	1 OF 3

TITLE (4) Manual Reactor Trip Due to Partially Dropped Control Rod

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
October	15	2002	2002	– 002 –	00	12	05	2002		05000
									FACILITY NAME	DOCKET NUMBER

		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check all that apply) (11)			
OPERATING MODE (9)	1	20 2201(b)	20 2203(a)(3)(ii)	50 73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
POWER LEVEL (10)	100	20 2201(d)	20 2203(a)(4)	50 73(a)(2)(iii)	50.73(a)(2)(x)
		20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50 73(a)(2)(iv)(A)	73 71(a)(4)
		20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50 73(a)(2)(v)(A)	73 71(a)(5)
		20 2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
		20 2203(a)(2)(iii)	50 46(a)(3)(ii)	50.73(a)(2)(v)(C)	
		20 2203(a)(2)(iv)	50 73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
		20 2203(a)(2)(v)	50.73(a)(2)(i)(B)	50 73(a)(2)(vii)	
		20 2203(a)(2)(vi)	50 73(a)(2)(i)(C)	50 73(a)(2)(viii)(A)	
		20 2203(a)(3)(i)	50 73(a)(2)(ii)(A)	50 73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
D. E. Grissette, General Manager Nuclear Plant	334-899-5156

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	AA	RECT	W120	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-spaced typewritten lines) (16)

On October 15, 2002 at 2356, with the reactor at 100% power, Unit 1 was manually tripped due to a partially dropped control rod. Rods had been stepped in from 227 to 222 steps over the past three hours for routine xenon oscillation suppression. Upon inserting Bank D rods from 222 to 221 steps, rod F-06 dropped 24 steps to 198. A rod deviation alarm and a single channel high negative neutron flux rate trip alarm annunciated. Operators manually tripped the reactor in accordance with Abnormal Operating Procedures. All safeguards equipment functioned as designed following the trip.

The dropped rod was due to an open failure of the movable gripper coil blocking diode. When the diode failed open and rod motion was attempted, the control rod was in an unlatched condition for up to 300 milliseconds while power was removed from the stationary gripper during the normal rod motion cycle. This resulted in a free fall of rod F-06 until the rod control logic re-energized the stationary gripper.

A design change was implemented to remove the blocking diodes from all stationary and movable gripper coil circuits. Testing was performed to verify that this change had no significant effect on the gripper unlatch times and therefore no effect on rod drop times. Testing verified that the rod control system continued to operate per design. The reactor was returned to critical at 0542 on October 17, 2002. The corresponding design change was implemented on Unit 2.

LICENSEE EVENT REPORT (LER)

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

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

Description of Event

Unit 1 reactor was operating at 100% power on October 15, 2002. A xenon oscillation, characteristic of core behavior beyond 5000 MWD/MTU, was occurring at the time of the event. Control measures were being implemented as specified in Unit Operating Procedures. Reactor control rods [AA] had been stepped in from 227 to 222 steps over the previous three hours for routine xenon oscillation suppression. At 2353 on October 15, 2002, when the operator inserted Bank D rods from 222 to 221 steps, rod F-06 dropped 24 steps to 198. A rod deviation alarm and a single channel high negative neutron flux rate trip alarm annunciated. Reactor power decreased about 0.5 %. The remainder of rods in Bank D indicated 221 steps as expected. The operator informed the Shift Supervisor of conditions. The Shift Supervisor directed a manual reactor trip at 2356 in accordance with procedure FNP-1-AOP-19.0, Malfunction of Rod Control System. This procedure requires a reactor trip when any rod has fallen greater than 12 steps from its demanded position.

Troubleshooting revealed an open blocking diode in the movable gripper coil circuit. The diode is a standard Motorola type 1N1206AR. Moveable gripper, stationary gripper and lift coil fuses were continuity checked satisfactorily. Continuity and insulation resistance (megger) checks for the cables and coils associated with the F-06 control rod drive mechanism were performed satisfactorily. This testing was conducted from the cabinet to the coils and included containment penetrations. Physical inspection and cabinet temperature measurements did not identify any overheat conditions or other causes for the failure of the diode. Review of industry experience did not identify aging as an issue.

Industry experience indicates that the diodes are not required, and that they represent a single failure vulnerability. Therefore, a design change was implemented to remove and jumper out the blocking diodes in the movable and stationary gripper coils for all control rods. Testing was performed to verify that this change had no significant effect on the gripper unlatch times and therefore no effect on rod drop times. Coil current profile measurements with diodes in place, and profile measurements with diodes removed, showed no significant differences. This measurement provided assurance that the rod control system would continue to operate per design.

The reactor was returned to critical at 0542 on October 17, 2002.

Cause of Event

The dropped rod was due to an open failure of the movable gripper coil blocking diode. When the diode failed open and rod motion was attempted, the control rod was in an unlatched condition for up to 300 milliseconds while power was removed from the stationary gripper during the normal rod motion cycle. This resulted in a free fall of rod F-06 until the rod control logic re-energized the stationary gripper.

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

Possible causes for the diode failure included electrical problems in the affected circuit and excessive temperature. Investigations and physical inspection revealed no problems. Industry operating experience did not identify aging as an issue. Available vendor information indicated that failures of these diodes have resulted in "isolated cases" of dropped rods. Therefore, the diode failure is considered a random failure.

Safety Assessment

All safety systems functioned as designed following the reactor trip.

This event does not represent a Safety System Functional Failure.

Corrective Action

Industry experience indicates that the diodes are not required, and that they represent a single failure vulnerability. Therefore, a design change was implemented to remove and jumper out the blocking diodes in the movable and stationary gripper coils for all control rods. Testing was performed to verify that this change had no significant effect on rod drop times or control rod drive system operation.

The corresponding design change was implemented on Unit 2.

Additional Information

A Four Hour/Eight Hour non emergency report was made on this event at 0045 on October 16, 2002 per 10CFR50.72b(2)(iv)(B) and b(3)(iv)(A).

In order to ensure single failure modes in the rod control circuitry are evaluated, a review of available literature with respect to single point failure vulnerability and other failure modes of the rod control system will be conducted and changes made as appropriate.

The following LERs have been submitted in the past 2 years on reactor trips:

2002-001-00 Unit 1Reactor Trip Due to Inadvertent Electrical Contact During Recorder Maintenance

2001-002-00 Unit 2 Reactor Trip Due to Turbine Trip from Turbine Latch Mechanism Problem

2001-001-00 Unit 2 Reactor Trip Due to Main Generator Neutral Connecting Bolt Failure

2000-004-00 Unit 2 Reactor Trip due to Degraded Main Feed Regulating Valve Transient Response