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

April 4, 1996

Docket Nos.: 50-348
50-364

10 CFR 50.54

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

Joseph M. Farley Nuclear Plant
30-Day Response to NRC Bulletin 96-01
Control Rod Insertion Problems

Ladies and Gentlemen:

By letter dated March 8, 1996, the NRC issued Bulletin 96-01, "Control Rod Insertion Problems," requiring actions to be taken by utilities regarding the susceptibility and evaluation of the Rod Control System to the phenomena of control rod failure to completely insert. The Bulletin was issued to accomplish two goals; first, to alert addressees to problems encountered during recent events in which control rods failed to completely insert upon the scram signal, and second, to assess the operability of control rods, particularly in high burnup fuel assemblies. The Bulletin requested licensees provide a 30-day response which assesses the operability of the control rods.

Provided in Attachments 1 and 2 is the Southern Nuclear Operating Company (SNC) 30-day response for the Farley Nuclear Plant (FNP). Southern Nuclear Operating Company considers that the control rods for both units are operable based on a review of plant specific data and current industry data as noted in our enclosed response. Should you have any questions, please advise.

Respectfully submitted,

D Morey

Dave Morey

Sworn to and subscribed before me this 4th *day of* April *1996*

Marcha Gayle Dow
Notary Public

My Commission Expires: November 1, 1997

WAS/clt:bul_9601.doc
Attachments

cc: Mr. S. D. Ebneter, Region II Administrator
Mr. B. L. Siegel, NRR Senior Project Manager
Mr. T. M. Ross, FNP Sr. Resident Inspector

IE57

ATTACHMENT 1

NRC Required Response (1)

Within 30 days of the date of this bulletin, a report certifying that control rods are determined to be operable; actions taken for Requested Actions (1) and (2); and the plans for implementing Requested Action (3) and (4).

SNC Response:

Requested Action (1)

Promptly inform operators of recent events (reactor trips and testing) in which control rods did not fully insert and subsequently provide necessary training, including simulator drills, utilizing the required procedures for responding to an event in which the control rods do not fully insert upon reactor trip (e.g., boration of a pre-specified amount).

SNC Response:

All licensed personnel assigned to on-shift duties have been notified of the recent industry events, the potential impact to FNP should such an event occur there, and the proper compensatory actions to take in the event of such an event. Simulator time is being provided for the operating crews during the requalification cycle now in progress. During this session the crews will observe an event similar to that addressed by the bulletin and training on procedures to be used for addressing the event will be re-emphasized. This training has been incorporated in the 1996 License Requalification Program and will be completed by May 1, 1996, for appropriate individuals.

Requested Action (2)

Promptly determine the continued operability of control rods based on current information. As new information becomes available from plant rod drop tests and trips, licensees should consider this new information together with data already available from Wolf Creek, South Texas, North Anna, and other industry experience, and make a prompt determination of control rod operability.

SNC Response:

The FNP control rods are operable. Proper rod movement has been verified by periodic rod stepping during power operation as required by Technical Specifications. There have been no instances of rods failing to fully insert after a trip for FNP Units 1 or 2. In addition, recorded rod drop times and rod stepping tests show no indications of control rod sticking.

At FNP, a standard 12-foot active fuel length core design is used on both units which consists of LOPAR and/or Vantage 5 fuel. A review of burnup data for FNP rodded assemblies was performed to determine the highest burnup in a rodded assembly during near end of cycle reactor trips since Vantage 5 fuel has been in the core. Burnups in excess of 41,800 MWD/MTU in Vantage 5 fuel and 52,300 MWD/MTU in LOPAR fuel were present during the trips with no instances of a failure of a control rod to insert.

A review of drag testing performed on rodded fuel assemblies since Vantage 5 fuel has been used at FNP indicated no instances of abnormal or excessive drag.

As of February 29, 1996, all fuel assemblies which house control rod assemblies on both FNP units had burnups which were less than 43,000 MWD/MTU. The maximum estimated burnup at EOL of any assembly currently in service which houses a control rod assembly is less than 49,000 MWD/MTU.

Both Farley Unit 1, Cycle 14 and Unit 2, Cycle 11 have shutdown margin in excess of the minimum required by Technical Specification 3.1.1.1 (which accounts for the most reactive control rod stuck fully withdrawn from the core).

Additional industry data has been compiled by the WOG. This information indicates that for data on 24 plants received thus far, 501 rodded assemblies had accumulated burnup greater than 40 MWD/MTU and 106 rodded assemblies had accumulated burnup greater than 45 MWD/MTU (the large numbers of fuel assemblies are based upon receiving data from multiple cycles over up to a five year period). None of these plants reported problems with control rod insertion. FNP will continue to follow this issue with the industry.

Requested Action (3)

Measure and evaluate at each outage of sufficient duration during calendar year 1996 (end of cycle, maintenance, etc.), the control rod drop times and rod recoil data for all control rods. If appropriate plant conditions exist where the vessel head is removed, measure and evaluate drag forces for all rodded fuel assemblies.

a. Rods failing to meet the rod drop time in the technical specifications shall be deemed inoperable.

b. Rods failing to bottom or exhibiting high drag forces shall require prompt corrective action in accordance with Appendix B to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50).

SNC Response:

For FNP Units 1 and 2, the following actions will be performed:

- If a planned or unplanned shutdown of sufficient length occurs in 1996, the unit will be tripped prior to completely driving the rods in. Rod insertion will be observed and hot rod drop time testing with rod recoil measurement will be performed for the first shutdown on a unit only, unless timely complete rod insertion does not occur.
- If the unit trips in 1996, timely rod insertion will be confirmed. If timely rod insertion is not observed, hot rod drop testing with rod recoil measurement will be performed.
- For the Unit 2, Fall 1996 Refueling Outage:
  * The unit will be ramped down and tripped prior to completely driving the rods in. Rod insertion will be observed.
  * Hot rod drop time testing with rod recoil measurement will be performed prior to cooling down.
  * Control rod drag testing will be performed in either the reactor vessel prior to core offload or in the spent fuel pool after offload.
  * Rod drop time testing with rod recoil measurement will be performed when coming out of the outage.
  * No further testing is planned to be performed on the unit after the scheduled outage due to low burnup.

Requested Action (4)

For each reactor trip during calendar year 1996, verify that all control rods have promptly fully inserted (bottomed) and obtain other available information to assess the operability and any performance trend of the rods. In the event that all rods do not fully insert promptly, conduct tests to measure and evaluate rod drop times and rod recoil.

SNC Response:

If either unit trips in 1996, timely rod insertion will be confirmed. If timely rod insertion is not observed, hot rod drop time testing with rod recoil measurement will be performed.

NRC Required Response (2)

Within 30 days of the date of this bulletin, a core map of rodded fuel assemblies indicating fuel type (materials, grids, spacers, guide tube inner diameter) and current and projected end of cycle burnup of each rodded assembly for the current cycle; when available, provide the same information for the next cycle.

SNC Response:

The requested information is provided for the current fuel cycles in Attachment 2. The information in Attachment 2 is organized as follows for each unit: a core map indicating for each rodded location the control rod bank identification, the assembly identification number, the burnup as of February 29, 1996, and the projected end of cycle burnup. In addition, a table of the physical assembly characteristics of the regions of fuel which contain control rods.

The requested information for the next cycle for each unit is not currently available, as those designs are not finalized and are still subject to change. The requested information will be provided for the next cycle on each unit within 30 days following the initial criticality of that cycle.

NRC Required Response (3)

Within 30 days after completing Requested Action (3) for each outage, a report that summarizes the data and that documents the results obtained; this is also applicable to Requested Action (4) when any abnormal rod behavior is observed.

SNC Response:

To be submitted when required by the above evaluations performed in 1996.

ATTACHMENT 2

PHYSICAL CHARACTERISTICS OF RODDED ASSEMBLIES

PLANT FARLEY UNIT 1 CYCLE 14

	REGION 2E	REGION 2F
Assembly Type	Vantage-5*	Vantage-5*
Clad Material	Zirc-4	Zirc-4
Grid Material		
Mid-span grids	Zirc-4	Zirc-4
Bottom/Top grid	Inconel-718	Inconel-718
Guide Tube Material	Zirc-4	Zirc-4
Guide Tube O.D. (inches)		
Above dashpot	0.4740	0.4740
At dashpot	0.4300	0.4300
Guide Tube I.D. (inches)		
Above dashpot	0.4420	0.4420
At dashpot	0.3970	0.3970

*17x17 assemblies with optimized fuel rod O.D. of 0.360 in. and with intermediate flow mixing (IFM) grids

PHYSICAL CHARACTERISTICS OF RODDED ASSEMBLIES

PLANT FARLEY UNIT 2 CYCLE 11

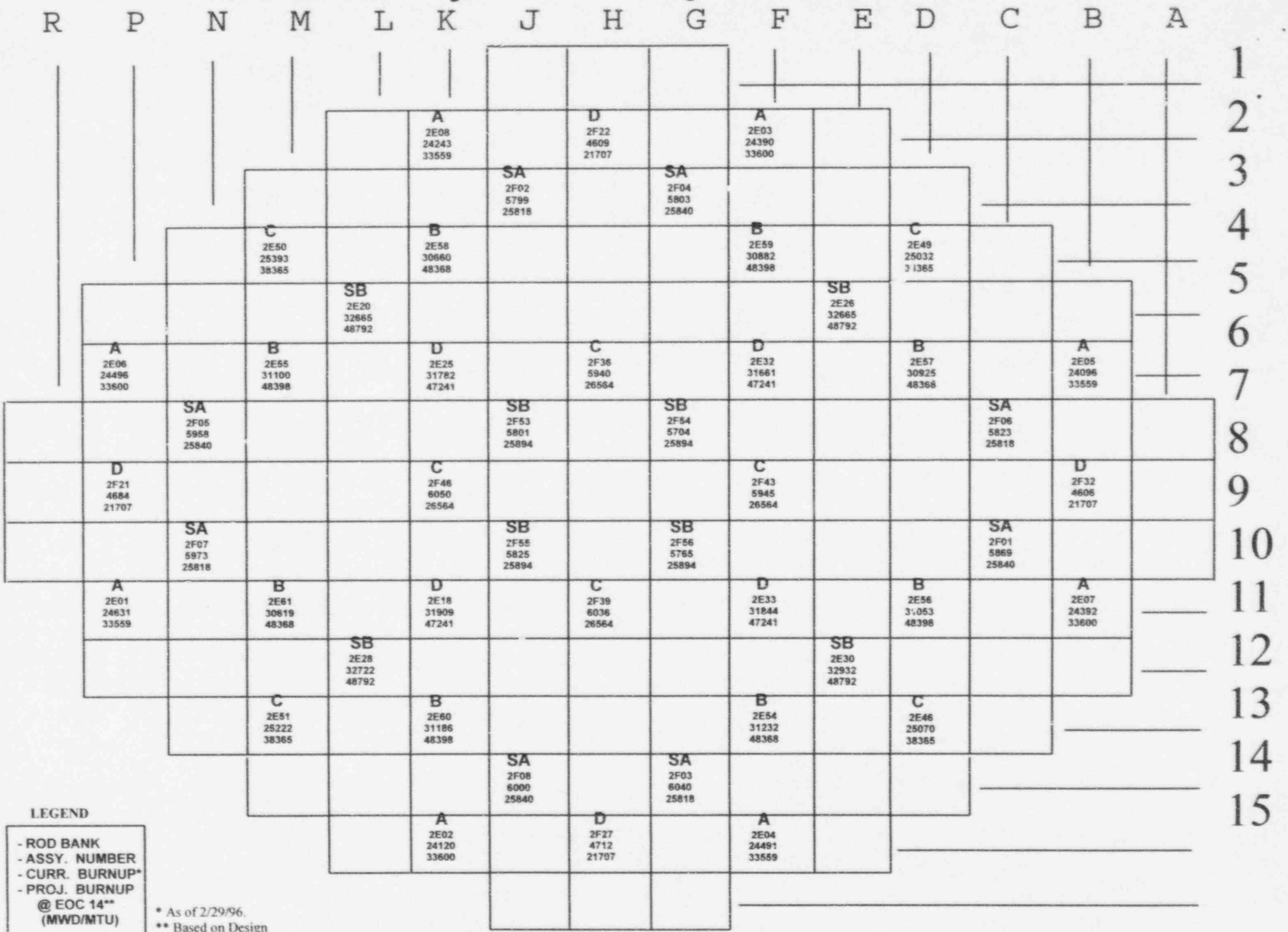
	REGION W	REGION 2M	REGION 2N
Assembly Type	LOPAR[1]	Vantage-5[2]	Vantage-5[2]
Clad Material	Zirc-4	Zirc-4	Zirc-4[3]
Grid Material			
Mid-span grids	Inconel-718	Zirc-4	Zirc-4
Bottom/Top grid	Inconel-718	Inconel-718	Inconel-718
Guide Tube Material	Zirc-4	Zirc-4	Zirc-4
Guide Tube O.D. (inches)			
Above dashpot	0.4820	0.4740	0.4740
At dashpot	0.4300	0.4300	0.4300
Guide Tube I.D. (inches)			
Above dashpot	0.4500	0.4420	0.4420
At dashpot	0.3970	0.3970	0.3970

(1) 17x17 assemblies with standard fuel rod O.D. of 0.374 in. without intermediate flow mixing (IFM) grids.

(2) 17x17 assemblies with optimized fuel rod O.D. of 0.360 in. and with intermediate flow mixing (IFM) grids.

(3) Two assemblies (2N41 and 2N52) each contain 12 ZIRLO™ clad fuel rods for demonstration.

Farley Unit 1 Cycle 14



LEGEND

- ROD BANK
- ASSY. NUMBER
- CURR. BURNUP*
- PROJ. BURNUP @ EOC 14** (MWD/MTU)

* As of 2/29/96.

** Based on Design

Farley Unit 2 Cycle 11