

**Florida
Power**
CORPORATION
Crystal River Unit 3
Docket No. 50-302

March 30, 1992
SF0392-02

Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Eddy Current Testing Supplemental Information

Reference: 1. FPC to NRC - Letter dated January 10, 1991
2. ACRS to Chairman Selin - Letter dated November 15, 1991

Dear Sir:

Florida Power Corporation (FPC) is hereby submitting supplemental information regarding its plans for steam generator eddy current inspections which will be performed in the Refuel 8 (8R) outage scheduled to begin April 30. FPC is providing:

- A background section with a summary of the results of the previous eddy current inspection performed in 1990;
- A description of the outcome of recently completed investigations initiated to gain a better understanding of previous eddy current results;
- A discussion of FPC's perspective of recent industry experience and regulatory interaction relative to eddy current inspection technology and steam generator integrity;
- A description of the revised action plan for 8R based on the evaluation results of that industry experience, and
- A conclusion summarizing FPC's actions to assure the long term integrity of the Crystal River Unit 3 (CR-3) steam generators.

BACKGROUND:

FPC provided supplementary data of the 1990 Refuel 7 (7R) eddy current (EC) inspection of CR-3's Once-Through Steam Generators (OTSGs) in Reference 1. That letter referred to various investigations being performed to improve FPC's understanding of the inspection results. The letter provided plans for future

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activities contemplated by FPC to gather additional data and to assure the long-term integrity of the steam generators.

FPC has become aware of recent industry experiences concerning steam generator (SG) integrity (principally Trojan, North Anna-1, and McGuire-1) as well as Regulatory/Industry communications involving SG tube defect mechanisms. Presentations were made at the 1991 Regulatory Information Conference, recent ACRS meetings (as noted in the referenced letter), and EPRI/ NRC interactions (earlier this month). FPC has modified its previous plans to address both the industry experiences and the evolving understanding of SG tube defect mechanisms.

RESULTS OF RECENT INVESTIGATIONS:

Analysis of the 7R EC data revealed a significant number of indications in the boiling region and in the tube freespans. Historically, corrosion in OTSGs has occurred in the superheat region (principally along the open lane at the 15th Tube Support Plate (TSP) and at the upper tubesheet). A cursory review of recent EC inspection results from other OTSG plants indicated that they were also observing indications in the boiling region and in the tube freespans. Many of these indications were below the threshold of a clear signal (those signals which are difficult to distinguish from background noise). It is therefore important to note that while the location of these indications is somewhat unanticipated, their presence may not be indicative of phenomena that impact steam generator integrity.

Because of the findings in the tube freespans of the boiling region, FPC initiated a redirection of the B&W Owners Group (BWOOG) Steam Generator Committee's effort in OTSG data trending. The effort focused on determining more precisely to what extent the other OTSGs were experiencing boiling region and freespan indications (including those below the threshold of a clear signal). This study indicated that a significant number of the indications in OTSGs were in the boiling region (at the TSP as well as in the freespans). The data suggested that indications might be beginning to occur lower in the bundle for OTSGs than in the past. Based on this information, the BWOOG initiated the "Tube Integrity Project". The project consists of three phases: (I) verification and identification of the full extent of boiling region and freespan indications; (II) identification of the degradation mechanisms responsible for these indications; and (III) development of appropriate corrective action.

Phase I of this project will be started later this year and will consist of reviewing the most recent EC inspection results from all of the OTSGs to determine if the previously identified boiling region and freespan indication trends are indeed an active phenomena. Phase II will include tube pulls from the various plants to identify the corrosion mechanisms responsible for the possible degradation. The results of Phase II will dictate the appropriate scope for Phase III.

FPC PERSPECTIVE OF RECENT INDUSTRY EXPERIENCE:

FPC has evaluated the recent industry experiences and discussed these experiences with others in the industry. Based on these evaluations and discussions, some aspects of the recent industry events may be relevant to OTSGs. In particular indications below the threshold of a clear signal must be dealt with aggressively. Efforts to permit better flaw characterization of these types of indications need to be expedited. However, it is important to note, as the ACRS did in Reference 2, that is inappropriate to plug tubes based solely on a through-wall criteria applicable to a very different crack morphology than is generally being experienced.

REVISED STEAM GENERATOR INSPECTION PLANS:

Based on these considerations, FPC has enhanced its steam generator inspection plans for 8R as follows:

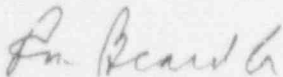
- A) Inspect all tubes in the "A" SG which have not been previously inspected (43%) and approximately half of the tubes in the "B" SG (31%) which have not been inspected. The remaining 31% of the tubes in the "B" SG will be inspected no later than 9R (1994).
- B) All tubes containing 1% - 39% wall loss; tubes three rows on either side of the untubed lane; tubes adjacent to plugged, but non-stabilized tubes; and tubes containing indications below the threshold of a clear signal will be re-inspected.
- C) Tubes with indications below the threshold of a clear signal will be re-inspected, to the extent possible, by a motorized rotating pancake coil (MRPC) probe, as has been the practice for the past two EC inspections.
- D) Additionally, FPC will pull 1-6 tube samples. Chemical and metallurgic analyses and burst tests will be performed on these tubes in an effort to gather data that will assist in better characterizing freespan indications that are below the threshold of a clear signal. The intent of pulling tubes is to determine what corrosion, if any, is occurring in the freespans and to assist in sizing indications below the threshold for a clear signal. This effort will be conducted in conjunction with EPRI. Ultimately, such information may be used to establish the basis for an appropriate alternate plugging criteria for certain limited situations as has been pursued by other licensees and granted by the NRC.

Contingency plans are being formulated to perform EC testing and pull more tubes in the 1993 Mid-Cycle outage if the results of this year's tube pulls so dictate. Due to budgetary considerations, sleeving will not be performed in 8R as was originally planned. Current plans are, however, to install some sleeves in 9R (1994).

CONCLUSION:

FPC's commitment to maintaining the long term integrity of the CR-3 steam generators is reflected in the inspection plan that will be implemented this year and in its active involvement in the B&W Owners group and EPRI projects. FPC concurs with the positions expressed in the referenced ACRS letter and considers the enhanced EC inspection plan to be consistent with it. FPC will provide updates on this issue as the circumstances warrant.

Sincerely,



P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB/LVC

xc: Regional Administrator, Region II
NRR Project Manager
Senior Resident Inspector