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

December 6, 1995
3F1295-11

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Subject: Revised Response to Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment

References: 1. NRC to FPC letter, 3N0789-22, dated July 18, 1989
2. FPC to NRC letter, 3F0894-06, dated August 5, 1994

Dear Sir:

Florida Power Corporation (FPC) is submitting this revised response to Generic Letter 89-13 (Reference 1). This letter supersedes our earlier letter (Reference 2). We have indicated the changed portions with a vertical line in the right margin.

Since the conclusion of FPC's Service Water System Operational Performance Self Assessment in the fall of 1994, additional actions have taken place to maximize the reliability of CR-3's open and closed cycle systems. This letter details activities that FPC performs that address each of the five areas of concern in the generic letter.

Sincerely,

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

PMB/JWT/MWD

Attachment

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

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STATE OF FLORIDA

COUNTY OF CITRUS

P. M. Beard, Jr. states that he is the Senior Vice President, Nuclear Operations for Florida Power Corporation; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.

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

Subscribed and sworn to before me, a Notary Public in and for the State and County above named, this 6th day of December, 1995.

LYNNE S. SMITH

Notary Public (print)

Notary Public (signature)

Notary Public, State of Florida at Large,

My Commission Expires:

Notary Public, State of Florida at Large
My Commission Expires Dec. 18, 1995
Bonded thru Agent's Notary Brokerage

ATTACHMENT

The generic letter classifies service water either as open-cycle or closed-cycle systems. Accordingly, the CR-3 Nuclear Service and Decay Heat Seawater System (RW) is an open-cycle system while the Nuclear Service Closed Cycle Cooling System (SW) and the Decay Heat Closed Cycle Cooling System (DC) are closed-cycle systems. The SW System and the DC System are physically separate and do not share components. All three systems are classified as safety-related. The RW System supplies seawater to the operating heat exchanger(s) in the SW and DC systems for all plant operating modes. FSAR Figures 9-7, 9-8, and 9-10 show the flow diagrams for the RW System, SW System, and DC System respectively.

GENERIC LETTER 89-13 ACTIONS

I. The Nuclear Service and Decay Heat Seawater System (RW) system is operated under a program of surveillance and control techniques which minimize the incidence of heat exchanger blockage. The surveillance program consists of periodic preventative maintenance that inspects and cleans heat exchangers, inspects raw water piping lining, and inspects and cleans the RW intake pits. The intake structure, intake flumes, and RW pits are inspected on a refueling cycle interval. The control technique implemented at CR-3 to minimize macroscopic fouling of the Service Water Heat Exchangers (SWHE) and Decay Heat Closed Cycle Heat Exchangers (DCHE) is frequent regular maintenance (FRM). The SWHEs are opened, inspected, and cleaned at a periodicity that minimizes the fouling of the heat exchanger tubesheets and tubes. The existing program monitors blockage and compares as found data to established criteria for removing macrofouling in additional SWHEs if required. Due to infrequent operation of RW in the DC systems as compared to continuous flow of RW through the SWHEs, the DCHEs are opened, inspected, and cleaned on a less frequent but regular interval. Raw Water pump (RWP) discharge pressure limits have been established to alert operators that excessive macrofouling of the SWHEs is occurring. Similar pressure limits will be established for the DCHEs.

The following paragraph describes FPC's activities to control mollusks. It is not regarded as a commitment by FPC to use biocides for the life of CR-3.

FPC is presently pursuing State and EPA permitting requirements to use a biocide as means to control mollusks. In anticipation of successfully permitting the biocide, several plant modifications have been completed to inject the biocide and detoxification agent into the RW fluid streams. The biocide stops the growth cycle of barnacles, clams, and other mollusks. The interval for biocide injection will be established to limit the size of the mollusks. Limiting the size of the mollusks will allow them to pass through the heat exchangers without blocking the tube sheet. Biocide use will minimize macrofouling growth in the flume and RW pit thus enhancing our frequent regular maintenance practices. FPC will evaluate the effectiveness of biocides for mollusk control to determine if CR-3 will continue the use of such chemicals.

II. FPC has performed initial testing of the SWHEs utilizing the heat transfer coefficient methodology. The minimum (real-time) UAf of the SWHE is determined by calculation utilizing actual inlet and outlet temperatures of both fluid streams and the closed cycle service water flow. The design basis UAf is calculated using current actual conditions and the post accident design basis heat loads. The comparison of these two values in real time shows the margin available in each SWHE to perform its design function. The development of the UAf meter provides a tool for

determining the real time capability of a heat exchanger to remove heat and supplements the frequent regular maintenance program.

Based upon initial testing results of the SWHEs, a frequent regular maintenance program has been established to maintain the heat transfer capability. Each SWHE is periodically opened, inspected, cleaned, and returned to service. Additionally, tubesheet blockage action levels have been established that if exceeded, result in additional heat exchanger cleanings to ensure the heat removal capability of the SWHEs.

The DCHEs have not been tested by the heat transfer coefficient methodology. The DC system functions to remove core heat during accident scenarios and when the plant is shutdown during normal conditions. During normal plant operation the DC System is not operating, therefore, no heat load is available to perform a heat exchanger capability test. During shutdown operation, the small temperature difference across the DCHE makes testing impractical.

The DCHEs are cleaned on a periodic basis which is based upon historical data (frequent regular maintenance).

The performance of other safety-related heat exchangers in the closed cycle systems at CR-3 does not indicate the need for testing. CR-3 continues to maintain a proactive chemical treatment of the closed cycle systems. This chemical treatment has taken place since initial plant startup. For example, visual examination, via video, has shown the various heat exchangers served by the SW system to be free of corrosion and fouling. This condition has been substantiated by physical examination of pulled tubes.

III. FPC periodically inspects the RW system intake area, flumes, and intake pits for accumulations of biofouling agents and silt as an established preventative maintenance program,. For the last year, the B RW pit has been inspected and cleaned every 6 months. The B RW pit is normally in service providing cooling during routine plant operation. The A RW pit was inspected twice during the last year. The A RW pit is infrequently operated as compared to the B train, therefore the collection of debris is substantially less resulting in no need to clean out what minimal debris was present. The frequency of future pit cleanings will be based upon operational experience.

CR-3 also has an ongoing program for RW piping liner inspection. Readily accessible RW spoolpieces are periodically inspected when the SWHEs and DCHEs are opened for maintenance. Spoolpieces identified with liner delamination in progress are periodically ultrasonically tested to verify minimum wall thickness until it is repaired. Other RW piping is periodically inspected utilizing cameras mounted on robotic mechanisms that crawl through pipes.

IV. FPC has performed a design confirmation of the RW, SW, and DC Systems. The design confirmation program required an increase in the technical specification UHS temperature limit to 95°F. This technical specification change request was reviewed by the NRC and the NRC issued Technical Specification Amendment No. 109, dated February 14, 1989. In addition to this confirmation program, the following activities which were planned before the generic letter was issued are used by FPC to meet the intent of the requested action.

a. Single Failure Proof Design

To support the development of an Equipment Qualification Master List (EQML), FPC developed Shutdown Logic Diagrams (SLD's) and Safety Function Diagrams (SFD's). The SLD's depict all the systems required to mitigate the design basis accidents described in Chapter 14 of the CR-3 FSAR. The SFD's depict all components of a system required to achieve a particular safety function. In addition to supporting the EQML, the SFD's were used to confirm that the SW, RW, and DC systems will perform their safety function with a single active failure.

b. As-Built Configuration

The previous and ongoing efforts of several FPC nuclear departments including Systems Engineering, Quality Programs, and Configuration Management continue to demonstrate that the as-built system configuration is in accordance with the appropriate licensing basis documentation.

FPC uses the System Engineer approach to designate the person accountable for maintaining an awareness of system performance. The System Engineer periodically walks the systems down, reviews plant performance data to observe trends in system performance, and observes the maintenance and repair of system components, particularly during system outages.

While the generic letter did not require the reconstitution of the design basis of the service water systems, the existing Design Basis Documents were replaced with Enhanced Design Basis Documents (EDBD) for each system. This program involved the assembly and review of original design basis calculations, reverification of assumptions in the original analyses, and concluded with a comprehensive system walkdown.

V. Maintenance practices, operating and emergency procedures, and training at CR-3 involves a comprehensive set of management directives, plant operating quality assurance manual procedures, and training department procedures. Revisions to these documents can also occur whenever updated information is obtained from various sources. For example, review of

technical information is controlled by Administrative Procedure AI-404A, "Review of Technical Information" and AI-404B, "Review of Industry Operating Experience." These procedures cover correspondence from sources external to FPC. Included in these sources are technical information from Babcock and Wilcox (B&W), new vendor manuals, vendor manual revisions, B&W Transient Assessment Program (TAP) Reports, INPO Significant Operating Experience Reports (SOER), INPO Significant Events Reports (SER), INPO Significant Event Notices (SEN), NRC Notices, and selected EPRI reports. This process has been established to ensure that lessons learned can be factored into plant maintenance, operations, training, and engineering activities.

FPC confirms personnel use the directives, procedures, and training lesson plans to manage the CR-3 service water systems. Evaluations by FPC's Quality Department and other outside groups, such as INPO, support our confirmation. Corrective actions are identified and properly dispositioned. If the periodic surveillance programs or periodic testing indicates that modifications to the systems are necessary or that procedures should be revised, FPC will follow its established programs to ensure that its systems remain in compliance with regulations.