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

April 25, 1995
3F0495-05

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

Subject: Update of SWSOPA Related Actions

References: A. FPC to NRC letter, 3F0195-01, dated January 18, 1995
B. FPC to NRC letter, 3F0295-08, dated February 27, 1995
C. NRC to FPC letter, 3N1294-12, dated December 16, 1994

Dear Sir:

Florida Power Corporation (FPC) is submitting this letter to update the NRC regarding the related actions that FPC has performed since the Service Water System Operational Performance Assessment (SWSOPA) was conducted from October 3, 1994 through November 10, 1994. Since the conclusion of the SWSOPA, FPC has been performing corrective actions associated with the various issues and nonconformances identified during the assessment and, as noted in References A and B, has taken a broader look at the implications of these issues on several aspects of our operations. A manager-level review team (including Operations, Maintenance, Design Engineering, Systems Engineering, and Licensing) was assembled by senior management to provide this overview. The team identified several broad categories of potential improvements. They have also monitored the progress made on resolving each of the individual issues identified during the assessment. The attachment summarizes the major actions taken or planned in these broad categories. Each action item is tracked by FPC's nonconformance trending and tracking system or other means.

In a to-be-scheduled meeting, FPC personnel will meet with NRC personnel in Atlanta to discuss the SWSOPA results. FPC will present additional information including an updated status of the SWSOPA-related nonconformances as well as our planned improvements in monitoring the SW system's operational status. We believe that meeting will provide an excellent opportunity for a constructive dialogue with your staff. Such a dialogue should help both the NRC and FPC plan future actions. In particular, we hope to be able to provide sufficient

9505030480 950425
PDR ADOCK 05000302
Q PDR

A001
1/1

information to potentially allow the follow-up inspection noted at the exit and in Inspection Report 94-26 be scheduled late in the Summer or early in the Fall. FPC's Design and Systems Engineering personnel will be relocating in June 1995. This relocation could impact FPC's support of a SWSOPA follow-up inspection. As such, FPC suggests the follow-up inspection be scheduled late in the summer or early fall of 1995. The availability of Engineering resources, at that time, would permit better support of the inspection.

Sincerely,

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

PMB/MWD/JWT

Attachments

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

ATTACHMENT

GENERAL BACKGROUND

The CR-3 Nuclear Service and Decay Heat Seawater System (RW) is an open-cycle system relying on once-through flow to and from canals linked to the Gulf of Mexico. The Nuclear Service Closed Cycle Cooling System (SW) and the Decay Heat Closed Cycle Cooling System (DC) are the principle safety-related, closed-cycle systems. The SW and the DC systems are physically separate although they share the RW and the secondary cooling source and can both cool certain components. The RW System supplies seawater to the operating heat exchanger(s) in the SW and DC systems for all plant modes. The SW System is in service at all times, but the configuration and heat loads vary substantially. During normal operational modes the SW supplies cooling to the Control Rod Drives, Reactor Coolant Pumps, Make-Up Pumps, and other components. The DC System is used during normal reactor cooldown, for heat removal during plant shutdown, and would be required for emergency cooling during a Loss of Coolant Accident (LOCA). FSAR Figures 9-7, 9-8, and 9-10 show the flow diagrams for the RW System, SW System, and DC System, respectively.

As noted in the cover letter, the FPC management review team is directing corrective actions in four broad areas to resolve concerns identified in the SWSOPA. These are:

I. Technical Documentation of Design Bases Supporting Operability Determinations;

II. Enhanced Awareness of the Impact of Failures on Overall System;

III. Operability and Reportability Determination Process; and

IV. Enhancements to the CR-3 Heat Removal Systems

The following discussions more fully describe the status of our efforts in these areas.

I. TECHNICAL DOCUMENTATION OF DESIGN BASES SUPPORTING OPERABILITY DETERMINATIONS

The review team noted that, even though FPC has a very advanced configuration management system and extensive design basis documentation, some key information was either not available, not utilized fully or was not well-understood. This situation affected operability and reportability determinations as well as prioritization of various work activities. This situation became apparent in the SW area and could exist elsewhere.

A. Heat Exchanger Calculations

Actions Taken or Planned

Perform or update existing thermal-hydraulic calculations documenting the existing SW and DC heat exchanger conditions. Many of these calculations are necessarily idealized. It would be impractical to model partial tube blockage, take into account differing flow conditions in the heat exchangers, etc. The following calculations are to be performed:

a. Provide design basis heat load values for the SW/DC systems.

b. Provide a hydraulic model of the RW systems reflecting plugged tubes and accounting for the effects of various amounts of tube blockage.

c. Provide heat removal capability curves dependent on heat exchanger blockage, ultimate heat sink (UHS) temperature, and various heat transfer coefficients (U). These curves would form the basis for more appropriate operability assessment guidelines.

Results/Status

All calculations noted are complete for the SW heat exchangers. The DC calculations are currently scheduled to be completed by May 31, 1995.

B. We are surveying the affected departments to identify similar calculational efforts that may need to be accomplished. The initial survey did not identify many specific needs. We are evaluating other means to gain greater assurance that such needs are identified and met.

C. The 1995 continuing engineering training will include an extensive session on our Enhanced Design Basis Documents (EDBDs), as well as Probabilistic Safety Assessment (PSA), including the use of the "Risk Monitor," and operability assessments to significantly improve our use of design basis information.

I. ENHANCED AWARENESS OF THE IMPACT OF FAILURES ON THE OVERALL SYSTEM

The impact of the failure of RWV-36 and subsequent dialogue internally and with the NRC team identified a need to better understand the impact of individual components on overall system performance.

A. FPC has a fairly wide variety of tools available to assess the impact of component failures on system performance. Standard system descriptions and lesson plans included in both operator and engineering training provide thorough treatment of most operating modes and many failure modes. The EDBDs frequently include single-failure or failure modes and effects types of analysis in the text. The PSA fault trees and the safety function diagrams used to re-validate the EQ Master List also are

excellent tools in understanding component/system relationships. Specific training on the PSA and EDBD will be included in the 1995 engineering training as noted earlier. Other staff will also have the opportunity to receive training on the EDBDs this year.

B. Implement the Risk Monitor

Actions Taken or Planned

As part of FPC's efforts to support on-line maintenance risk-assessment and in preparation for implementation of the Maintenance Rule, FPC has been developing a "Risk Monitor." We have evaluated the best method of providing the capability for real-time analysis of the risk associated with changes in the operating status of equipment/components. This would certainly include the CR-3 cooling water (RW, SW, DC) systems.

Results/Status

FPC is now making available, on standard personal computer work stations connected to appropriate local area networks, a tool which links the PSA models with the Equipment Clearance Order (ECO) system. The CR-3 Risk Monitor will become a valuable aid for Operations, Planning, Scheduling, Maintenance, System Engineering, and Licensing personnel to determine the safety impact of existing or potential equipment unavailabilities and any proposed actions affecting equipment availability. The output of the tool is both an assessment of Technical Specification compliance as well as the relative risk of existing conditions or potential changes to those conditions. The tool is now available on a number of work stations and will be more fully integrated into our work control, nonconformance and other processes as its use matures.

III. OPERABILITY AND REPORTABILITY DETERMINATION PROCESS

The review team agrees with both the assessment team and the NRC team that many past situations warranted operability assessments that either were never done, not done to appropriate standards or were not documented well.

A. Failure to Perform Operability Assessments

Actions Taken or Planned

The review team concluded that there was a lack of consistency in the performance of operability assessments. One apparent cause was that inappropriate individuals were required to make decisions regarding whether or not operability (or reportability) assessments were needed. CP-111, "Initiation and Processing of Precursor Cards and Problem Reports," was revised to require the Nuclear Shift Manager (NSM) and the Nuclear Shift Supervisor on Duty (NSSOD) to review all Problem Reports (PRs) and to explicitly note their assessment of operability on the PRs as

well as in various logs. A department-wide directive, NOD-14, "Evaluating Operability and Determination of Safety Function" is based on the guidance attached to Generic Letter 91-18, and our own experiences. All events which affect the functionality of plant equipment or which appear to be reportable are to be brought to the NSM's attention immediately. The NSM, in turn, will discuss it with the NSSOD and others as appropriate. If warranted, a PR will be generated. If the event does not appear to warrant a PR, then a precursor card is generated. All of these are reviewed by the Nuclear Shift Manager and at a daily meeting the next working day. This meeting generally includes representatives from Operations, Maintenance, Chemistry/Radiation Protection, Scheduling, Design Engineering, Systems Engineering, and Licensing. Precursor cards which warrant an operability assessment are escalated to a PR at that meeting. We believe this to be an effective back-up to the expected process.

Results/Status

CP-111 was revised on January 31, 1995 to include the requirement that the NSM review the PR information with the NSSOD to identify any operability, technical specification application, or operational issues.

IV. ENHANCEMENTS TO THE CR-3 HEAT REMOVAL SYSTEMS

The most important actions that FPC is taking are associated with actually improving the reliability of the heat exchangers through proactive measures, frequent regular maintenance and enhanced monitoring. While it may have not been apparent in the assessments and our various communications since, the service water systems have received a high priority. Previously, our efforts focussed on basic system functionality assured through replacement of degraded piping segments, enhancements to various protective coatings and other efforts. This does not fully mitigate the short-comings in our program implementation but it is important to note that the service water systems have received considerable priority by all of Nuclear Operations.

A. Minimize Heat Exchanger Blockage/Fouling

1. Actions Taken or Planned

Actions need to be enhanced that will minimize the collection of shells, barnacles and other debris in the RW intake pits. The collection of debris in the intake pits is a result of water inflow and the sloughing of shell from the flume. The "B" RW pit has a continuous inflow of seawater; thus, the greatest amount of pit debris accumulation, as it supplies cooling water to normal operating loads. The "A" RW pit is operated infrequently (generally for surveillance testing only.) FPC has scheduled the inspection and cleaning of the "B" RW pit at six month intervals following Refuel 9 (Spring 1994).

Results/Status

The "B" RW pit was inspected and cleaned in December 1994. The "A" RW pit was inspected in January 1995. The "A" pit was not cleaned as there was minimal debris in the pit. The "B" RW pit will be inspected and cleaned during the "B" train ECCS outages scheduled for June 1995 and November 1995. The "A" RW pit will be inspected during the "A" train ECCS outage currently scheduled for July 1995.

2. Actions Taken or Planned

The maintenance activities to minimize SW heat exchanger blockage need to have a clearer technical basis. One of the four SW heat exchangers (SWHE) is removed from service each week for inspection and cleaning. All debris is removed and is "shot and cleaned (with brushes)." The SWHE removed from service is replaced by the stand-by SWHE which has been maintained in a demineralized water lay-up condition since it was cleaned the previous week. The SWHE tubesheet blockage is trended to monitor the adequacy of cleaning frequency.

Results/Status

Tracking and trending of the "A" SWHE tubesheet blockage determined that this heat exchanger was becoming significantly more blocked during the established four week periodicity. The cleaning frequency was increased for the "A" SWHE to pick and clean the tubesheet two weeks after the normal shoot and clean frequency. Blockage for all four SWHEs continues to be trended weekly.

3. Actions Taken or Planned

Take actions to minimize the potential for shell and other debris to block the heat exchanger tubesheets. Several alternatives were evaluated that could minimize growth of marine organisms that lead to debris on the intake flumes or heat exchanger tubesheets. FPC is pursuing the use of ClamTrol to inhibit the growth of organisms in the intake flumes and RW pits. ClamTrol is a biocide that is injected into the seawater stream at regular intervals to prevent the organisms from growing to a size that causes blockage.

Results/Status

FPC has submitted requests to the State of Florida and the Environmental Protection Agency to revise the appropriate approval(s). Resolution of several issues is in progress. We have also completed the conceptual design for the chemical injection and detoxification systems and have acquired some of the necessary equipment.

Nevertheless, the anomalous results need to be resolved. An outage is required to complete an effective flow balance and one is scheduled to be performed during Refuel 10 in the Spring of 1996. The procedure is scheduled to be revised by December 31, 1995 to include more specific flow related acceptance criteria. The results of this flow balance will also be used to benchmark related hydraulic calculations (referenced in item a.4.c).

B. Heat Exchanger Monitoring Program

Actions Taken or Planned

FPC is giving very high priority to developing an effective program to monitor operational readiness of the SW and DC heat exchangers. FPC has evaluated several methods to monitor heat transfer capability testing and trending. FPC is pursuing the use of heat exchanger differential temperatures and flow to monitor heat transfer capability. FPC may also propose a change to our Improved Technical Specifications to allow the assessment of operability on a system basis.

Results/Status

FPC, like many in the nuclear industry, believes that it is difficult to correlate day-to-day heat exchanger performance to expected accident response. However, there must be confidence in the performance of CR-3's heat exchangers. Therefore, FPC has temporarily instrumented a SWHE with high accuracy temperature detectors. High accuracy allows a lower error in the measurements which is important to improve the quality of the data. We have also installed a flow measuring device (Panametrics flow meter) to determine SW flow. The data is being trended, analyzed, and evaluated. FPC's ultimate goal is to utilize this data to determine how well the heat exchanger is performing and take corrective action when warranted. The difficulty comes in extrapolating normal conditions to those likely to be present during an accident with due consideration to instrument and other uncertainties. Performance to date has been encouraging.

FPC will determine a schedule for any proposed ITS changes after the technical issues are more fully resolved.

C. Service Water System Flow Balance

Actions Taken or Planned

Our review of a previous SW system flow balance determined that several inconsistencies existed from a SW flow perspective. This test had two purposes: (1) verify that KW loading of the emergency pump motors are within acceptable values for EGDG-1A, and (2) verify that adequate cooling water from the SW and DC systems is available to designated safety related components during emergency operation. The acceptance criteria was satisfied during the last performance during the June 1992 outage. FPC realized during the SWSOPA that the flow balancing aspects of the test may have been inadequate.

Results/Status

An operability assessment was done during the SWSOPA. It concluded that the system would be capable of performing its safety functions.