Florida Power
A Progress Energy Company

Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72

Ref: 10 CFR 50.90

July 19, 2001
3F0701-02

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Crystal River Unit 3 - Response to NRC Request for Additional Information Re: Proposed License Amendment Request #259, Revision 0, "Control Complex Cooling System" (TAC No. MB1617)

Reference:
1. NRC to FPC letter, 3N0501-08, dated May 24, 2001. "Crystal River Unit 3 – Request for Additional Information Re: Proposed License Amendment Request No. 259, Revision 0, Control Complex Cooling System" (TAC No. MB1617)

2. FPC to NRC letter, 3F0301-01, dated March 28, 2001. "License Amendment Request #259, Revision 0, Control Complex Cooling System"

Dear Sir:

Florida Power Corporation (FPC) hereby submits the response to the NRC request for additional information (RAI) forwarded by Reference 1. In Reference 2, FPC requested a one-time increase in the Completion Time for restoring an inoperable Control Complex Cooling System Train from 7 days to 35 days.

During a July 16, 2001 telephone conversation with the NRC CR-3 Project Manager, the date for this response was mutually agreed as July 19, 2001.

This letter establishes no new regulatory commitments.

If you have any questions regarding this submittal, please contact Mr. Sid Powell, Supervisor, Licensing and Regulatory Programs at (352) 563-4883.

Sincerely,

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James H. Terry
Manager, Engineering

JHT/jal

Attachments: Response to NRC Request for Additional Information

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

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50 - 302 / LICENSE NUMBER DPR - 72

ATTACHMENT

LICENSE AMENDMENT REQUEST #259, REVISION 0
Control Complex Cooling System

Response to NRC Request for Additional Information

Response to NRC Request for Additional Information

1. **NRC Request:**

Describe the analysis performed to obtain the change in core damage frequency presented in the amendment request, and discuss the model of control complex cooling failure probability and the estimated change in value: include initiating events considered, assumptions, how compensatory measures were incorporated into the analysis, and the potential introduction of new common cause failures. The change in core damage frequency and the conditional core damage probability presented on pages A-3 and A-4 are inconsistent and appear to be incorrect. Please clarify.

FPC Response:

The probabilistic safety analysis (PSA) evaluation to support the one-time Completion Time extension from 7 days to 35 days consisted of determining the change in core damage frequency (CDF) and the change in conditional core damage probability (CCDP). Two cases were evaluated.

Case 1

The first case was based on current plant configuration and procedures. For this case, the Appendix R chiller (CHP-2) may be available, but there is limited procedural guidance to assure readiness or timely use if the operating chiller fails. It was also determined that there is no impact to the existing initiating events or common cause analysis due to the chiller refurbishment.

For this case, the change in the CCDP or the incremental CCDP (ICCDP) was determined by subtracting the baseline CDF (3.40E-06/yr) from the conditional CDF with the chiller out of service (1.16E-05/yr), and multiplying by the Completion Time extension being evaluated:

(1.16E-05/yr – 3.40E-06/yr) x (35 –7) days x 1 year/365 days = 6.3E-07 per chiller.

Therefore, the ICCDP for increasing the Completion Time from 7 days to 35 days is 6.3E-07 per chiller without procedural guidance to assure readiness or timely use if the operating chiller fails.

Case 2

The second case was based on applying plant changes, which would implement procedural control for using the CHP-2 as a backup to the operating chiller. It was also determined that there is no impact to the existing initiating events or common cause analysis due to the chiller refurbishment or compensatory measures. In this case, CHP-2 is nearly "risk-equivalent" to the normal chiller for supporting the risk significant components as determined by the PSA (see response to Request 2).

In this case, consideration was given for plant compensatory measures, which will be implemented to provide backup cooling using the installed CHP-2 (see response to Request 3). The compensatory measures were modeled in the PSA by modifying the human error probability (HEP) of implementing CHP-2. For this case, the conditional CDF with a chiller out of service is 3.74E-06/yr. This results in an ICCDP for increasing the Completion Time from 7 days to 35 days of 2.61E-08 per chiller.

Applying this ICCDP to both Control Complex Chillers results in an ICCDP of 5.22E-08.

The revised CDF, including the Completion Time extension for both chillers, is 3.45E-06/yr. This is an increase of 5E-08/yr from the baseline CDF. This is based on the CDF including an extra 28 days of unavailability for each train of normal chilled water and having compensatory controls for using CHP-2 as a backup.

Although this submittal is only for a one-time extension in Completion Time, the ICCDP of 5.22E-08 is less than 5.0E-07, which is presented in Regulatory Guide (RG) 1.177 as the risk threshold for assessing permanent changes to Technical Specifications. Also, the change in CDF of 5E-08/yr is less than 1.0E-07/yr, which is presented in RG 1.174 as the risk threshold for assessing plant changes.

2. **NRC Request:**

Describe the most significantly affected event sequences impacted by the degradation in control complex cooling during chiller refurbishment (i.e., the primary contributors to the estimated change in core damage frequency).

FPC Response:

The only significant impact to core damage from the chillers is providing heating, ventilation and air conditioning (HVAC) support to the Emergency Feedwater (EFW) control cabinets. Loss of cooling to the cabinets can cause the EFW control valves to inadvertently close. If the operating Control Complex Chiller fails, the operators can use the Appendix R chiller for this function. Although use of this chiller is a fairly simple action, it is not a normal action for non-fire scenarios. If all EFW is lost, it is still possible to cool the core using the non-safety related, diesel-backed Auxiliary Feedwater Pump (FWP-7).

3. **NRC Request:**

Describe the actions to be taken by operators if the operating train of the control complex cooling system should fail during chiller refurbishment. State how compensatory measures will be implemented, the replacement capacity of these measures (i.e., the percent of required heat removal they represent), and the action times involved in their implementation.

FPC Response:

In the event that the operating Control Complex Chiller fails during refurbishment of the redundant Chiller, alternate cooling to the Control Complex will be established through two compensatory measures:

A. startup of a pre-staged portable 15-ton HVAC unit; and

B. alignment of the Appendix R chilled water system to supply cooling to the vital equipment areas in the Control Complex.

A. The guidance for aligning temporary cooling to the Control Complex is provided in Section 4.1 of Maintenance Procedure MP-193, "Temporary Cooling to the Control Complex." As discussed in Reference 2, a 15-ton portable HVAC unit will be pre-staged on the 145-foot elevation of the Turbine Building, outside of the Control Room, prior to the start of Control Complex Chiller refurbishment activities. Initiation of cooling to the Control Room using the portable unit requires routing expandable ductwork (from the unit into the Control Complex through the vestibule and Control Complex Habitability Envelope (CCHE) doors on the 145-foot elevation) and starting the unit. The time to complete these actions is less than one hour.

B. The guidance for aligning Appendix R chilled water to supply dedicated loads in the Control Complex is provided in Section 4.3 of Operating Procedure OP-409, "Plant Ventilation System." Required actions of this procedure section include:

i. securing the Appendix R Chiller and isolating Appendix R chilled water to the Turbine Building Switchgear cooling units

ii. isolating normal duty chilled water to the Emergency Feedwater Initiation and Control (EFIC) Room cooling units

iii. aligning Appendix R chilled water to the individual cooling units in the EFIC, Battery Charger, Inverter, Remote Shutdown, and 4160V and 480V Switchgear Rooms

iv. restarting the Appendix R chiller, and

v. starting the individual cooling unit fans.

The time to complete the above actions is less than one hour.

Should these alternate heat removal methods be required, the Control Complex will be adequately cooled as follows:

A. CR-3 has previous experience maintaining cooling to the Control Room with the portable 15-ton HVAC unit; and

B. The emergency heat loads to be supplied by the Appendix R chiller represent 90% of the Appendix R chiller capacity.

Thus, the Control Complex will be adequately cooled should the operating Control Complex Chiller fail during refurbishment of the redundant Chiller.

4. NRC Request:

State whether preventive maintenance will be done on the control complex cooling system prior to taking the first train out of service.

FPC Response:

Preventive maintenance on the control complex chillers is performed quarterly in accordance with Preventive Maintenance Procedure PM-136, "Control Complex Chillers CHHE-1A and CHHE-1B." No additional preventive maintenance on the chillers is planned.