December 27, 2001

Mr. Dale E. Young, Vice President
Crystal River Nuclear Plant (NA1B)
ATTN: Supervisor, Licensing and Regulatory Programs
15760 W. Power Line Street
Crystal River, Florida 34428-6708

SUBJECT: CRYSTAL RIVER UNIT 3 REQUEST FOR ADDITIONAL INFORMATION RE: PROPOSED LICENSE AMENDMENT REQUEST NO. 263, REVISION 0, RELOCATION OF REACTOR COOLANT SYSTEM PARAMETERS TO THE CORE OPERATING LIMITS REPORT AND 20 PERCENT STEAM GENERATOR TUBE PLUGGING (TAC NO. MB2499)

Dear Mr. Young:

By letter dated July 24, 2001 (3F0701-11), you submitted an amendment application to revise the Crystal River Unit 3 (CR-3) Improved Technical Specifications (ITS) Tables 3.3.1-1, 3.4.1, and 5.6.2.18 to relocate the reactor coolant system (RCS) parameters to the Core Operating Limits Report (COLR), and to increase the steam generator tube plugging limit to 20 percent. The staff is currently reviewing your request, and the reviewers have determined that additional information is needed. The questions, listed below, were previously discussed with the staff in a December 18, 2001, telephone call.

1. The license amendment request is to allow plugging of up to an equivalent of 20 percent of all Once-Through Steam Generator (OTSG) tubes. For symmetric plugging, this allows up to 20 percent of the tubes in each OTSG to be plugged. Florida Power Corporation did not specifically state the level of asymmetric tube plugging or the maximum percentage of plugged tubes in any one OTSG that is to be allowed. Although asymmetric tube plugging analyses and results were discussed, it is not clear which analysis determines the limiting acceptable tube plugging asymmetry. Please provide a discussion regarding any restrictions being placed on the maximum number of plugged tubes in any one OTSG and the maximum plugging asymmetry between OTSGs. Provide justification for these restrictions.

2. Three vendor-proprietary OTSG Thermal-Hydraulic performance-related computer codes were referenced and used by the licensee in the 20 percent tube plugging analyses:

FSPLIT
VAGEN
PORTHOS

a. Discuss the interaction of these three codes with the design-basis accident/transient analysis codes.

b. These three codes have not been reviewed and approved for use by the U.S. Nuclear Regulatory Commission. Are these codes appropriately controlled in accordance with Title 10 of the *Code of Federal Regulations*, Appendix B?

c. Confirm that the input data, model, and options selected accurately represent CR-3 plant-specific design features and justify the use of these codes for CR-3. Please note that the use of the PORTHOS code was not discussed in the submittal.

d. Provide a discussion of the key assumptions and methodology used to determine the impact of symmetric and asymmetric OTSG tube plugging on RCS flow and hot-to-cold leg temperature difference (ΔT) for both three and four reactor coolant pump (RCP) operation and confirm that the results are bounding.

e. Provide a discussion regarding the methodology used to calculate, combine, and apply the symmetric and asymmetric core design and Departure from Nucleate Boiling (DNB) flow penalties.

3. Regarding the impact of tube plugging on increased RCS flow resistance, please provide a reference and discuss the method used to quantify that 6.7 sleeves have the same hydraulic resistance as one plug. Include in the discussion any test data and analyses this is based on, the effects of OTSG tube plugging asymmetry on this value, and whether this equivalent bounds all steady-state and transient operating conditions.

4. Regarding the impact of reduced RCS flow rate and potential asymmetry in system flow on fuel component integrity:

a. Clad oxidation has been determined to be the limiting constraint while CR-3 utilizes Zircaloy-4 cladding. Discuss the administrative controls, processes, or procedures in place to ensure the necessary limitations on burnup and peaking for cycle-specific reload designs are such that acceptance criteria for clad oxidation will be maintained.

b. Please discuss the expected increase in clad oxidation levels for the current CR-3 Zircaloy-4 fuel type and demonstrate acceptance criteria are met.

c. Discuss the administrative controls, processes, or procedures in place to ensure the necessary limitations on clad lift-off for cycle-specific reload designs are such that acceptance criteria will be maintained.

d. Discuss the methodology applied for the guide tube boiling analysis to determine that no saturation will occur in the guide tube Assembly Hold-down Springs, Guide Tubes, and Spacer Grids.

5. Regarding the Core Physics impacts:

a. Discuss the rationale for choosing a ±1.1°F inlet temperature asymmetry penalty. Is this meant to be consistent with the requested Technical Specifications (TS) change of 1.2°F?

b. Provide more detail regarding the “conservative equation” to determine an adjusted burnup that was developed for use in core designs.

c. Provide a listing of the approved methods used to evaluate the effects of OTSG tube plugging on each aspect of core physics discussed in the submittal.

d. Provide a quantitative discussion regarding the impact on transient Xenon power distribution.

e. Do the four configurations evaluated for each core physics aspect bound the maximum allowed plugging asymmetry (this ties in with question 1)?

6. Please provide the following information for the four RCP and one RCP Coastdown, Locked Rotor, Startup Event, Loss of All AC Power/Station Blackout, Anticipated Transient Without Scram, Large and Small Break Loss-of-Coolant Accidents and Main Steam Line Break events, which were either re-analyzed or re-evaluated for OTSG tube plugging:

a. Initial conditions and justification including instrument uncertainty discussions.

b. Sequence of events.

c. Trip setpoints including instrument uncertainty discussions.

d. Safety system actuation setpoints including instrument uncertainty discussions.

e. Single failure criterion.

f. Codes/methodologies used for analyses, approval reference for these codes, and confirmation that all restrictions and limitations included in the approvals of the codes/methodologies were met.

g. Results and plots of Acceptance Criteria parameters.

8. The Loss of Main Feedwater and Feedwater Line Break events described in the Final Safety Analysis Report (FSAR) include an assumption of 20 percent OTSG tube plugging. Did the analysis assume both symmetric and asymmetric tube plugging, and are all acceptance criteria for these transients met for these conditions?

9. Regarding the Small Break Loss-of-Coolant Accident (LOCA) analyses:

a. The small break LOCA analysis described in the FSAR already includes an assumption of 20 percent OTSG tube plugging. Did the analysis assume both symmetric and asymmetric tube plugging, and are all Acceptance Criteria met for these conditions?

b. The small break LOCA analyses were performed with a maximum of 75 percent of the tubes in the “wetted” region of each OTSG plugged. The licensee suggests that a limit must be established for how many tubes in the “wetted” region can be plugged. Please define the OTSG “wetted” region with respect to identification of tubes within this region and provide information regarding the processes/procedures in place to ensure this limit will not be exceeded.

10. The discussion on the Main Steam Line Break (MSLB) analysis states that “The MSLB design base analyses will remain bounding for the Babcock and Wilcox plants with extended tube plugging as long as the error adjusted OTSG level remains below 95 percent on the operate range, and the plant is not being normally operated with the OTSG aspirator port flooded.”

a. This statement appears to be from a generic B&W study; please provide a reference and a discussion regarding the applicability to CR-3.

b. Discuss the controls in place at Crystal River Unit 3 to ensure that the MSLB design base analyses remain bounding due to compliance with these constraints.

11. Regarding the impact of 20 percent OTSG tube plugging on DNB Safety Limits (Figure 6 of the submittal):

a. Please discuss the method of analysis and computer codes used to evaluate the impact of 20 percent OTSG tube plugging on the Statistical Core Design (SCD) Safety Limits.

b. Does the "Existing Limits" curve in Figure 6 account for 20 percent OTSG tube plugging?

c. Has CR-3 fully converted to SCD methods such that all transients have been analyzed using SCD? If not, provide justification that the "Existing Limits" curve is bounding.

12. Regarding the impact of 20 percent OTSG tube plugging on the Reactor Protection System setpoints:

a. For the High Flux Trip, the MSLB is the most limiting event with respect to overcooling. The submittal states that, "A conservatively low setpoint is modeled such that the MSLB is not limiting for this setpoint." Is this a typographical error, or shouldn't this read as, "A conservatively high setpoint..."? The FSAR MSLB assumes the High Flux Trip is 112 percent; the TS value is 104.9 percent.

b. Please discuss the methodology used and the results of the calculations performed to justify that the current Variable Low Pressure Trip setpoint remains conservative with up to 20 percent OTSG tube plugging.

13. As a result of higher levels of OTSG tube plugging, RCS pressure will increase slightly, and the licensee has requested a TS change to increase the minimum RCS pressure to 2064 psig. There is no discussion in the submittal related to how this value is calculated; therefore, please provide the basis for this value.

14. The licensee has requested that the following parameters be relocated from the TS to the COLR:

RCS DNB Pressure Limit
RCS DNB Temperature Limit
RCS DNB Flow Rate Limits
RCS Variable Low Pressure Setpoint Equation

a. The proposed change for the RCS pressure limit is not consistent with the temperature and flow changes. The temperature and flow changes maintain absolute limits in the TS and add the cycle-specific limits to the COLR. Why is a limit not being maintained in the TS for RCS pressure also?

b. Parameters in the COLR are to be calculated using previously approved NRC methods. Please provide a listing of these methods for the parameters being relocated to the COLR. Current CR-3 TS reference only Topical Report BAW-10179-A. Does this reference cover all methodology for the parameters being relocated to the COLR? Is there an approved topical report that discusses the parameters that can be relocated to an expanded COLR?

c. In relocating the RCS DNB pressure limits to the COLR, the TS limit for three RCP operation is being eliminated. Provide justification for this deletion.

d. Regarding the reason for relocating these parameters to the COLR, the licensee states that this change "will allow the flexibility to utilize the available margins to increase cycle operating margins without the requirement of cycle-specific license amendments." Are the margins that are referred to only those resulting from 20 percent OTSG tube plugging assumptions?

e. Should the RCS Variable Low Pressure function now be listed in the proposed revision to ITS 5.6.2.18a, which lists the parameters documented in the COLR?

For the staff to complete its review schedule, your response is appreciated by 90 days from your receipt of this letter. This date was mutually agreed on in a telephone conversation with CR-3 personnel on December 18, 2001. If circumstances result in the need to revise the target date, please call me at the earliest opportunity at 301-415-1437.

Sincerely,

/RA/

John M. Goshen, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-302

cc: See next page

a. The proposed change for the RCS pressure limit is not consistent with the temperature and flow changes. The temperature and flow changes maintain absolute limits in the TS and add the cycle-specific limits to the COLR. Why is a limit not being maintained in the TS for RCS pressure also?

b. Parameters in the COLR are to be calculated using previously approved NRC methods. Please provide a listing of these methods for the parameters being relocated to the COLR. Current CR-3 TS reference only Topical Report BAW-10179-A. Does this reference cover all methodology for the parameters being relocated to the COLR? Is there an approved topical report that discusses the parameters that can be relocated to an expanded COLR?

c. In relocating the RCS DNB pressure limits to the COLR, the TS limit for three RCP operation is being eliminated. Provide justification for this deletion.

d. Regarding the reason for relocating these parameters to the COLR, the licensee states that this change "will allow the flexibility to utilize the available margins to increase cycle operating margins without the requirement of cycle-specific license amendments." Are the margins that are referred to only those resulting from 20 percent OTSG tube plugging assumptions?

e. Should the RCS Variable Low Pressure function now be listed in the proposed revision to ITS 5.6.2.18a, which lists the parameters documented in the COLR?

For the staff to complete its review schedule, your response is appreciated by 90 days from your receipt of this letter. This date was mutually agreed on in a telephone conversation with CR-3 personnel on December 18, 2001. If circumstances result in the need to revise the target date, please call me at the earliest opportunity at 301-415-1437.

Sincerely,

/RA/

John M. Goshen, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-302

cc: See next page

DISTRIBUTION:
PUBLIC
PDII-2 Reading
RidsNrrDlpmLpdii2 (RCorreia)
RidsNrrPmJGoshen
RidsAcrsAcnwMailCenter
MKowal (e-mail)
RidsNrrDlpmLpdii (HBerkow)
RidsRgn2MailCenter (LWert)
BClayton (Hardcopy)
RidsOgcRp

DOCUMENT NAME: C:\Program Files\Adobe\Acrobat 4.0\PDF Output\mb2499rai.wpd
ADAMS ACCESSION NO. ML013610251

OFFICE	PDII-2/PM	PDII-2/LA	PDII-2/SC
NAME	JGoshen	EDunnington for BClayton	RCorreia
DATE	12/21/01	12/21/01	12/21/01

OFFICIAL RECORD COPY

cc:

Mr. R. Alexander Glenn
Associate General Counsel (MAC-BT15A)
Florida Power Corporation
P.O. Box 14042
St. Petersburg, Florida 33733-4042

Mr. Daniel L. Roderick
Plant General Manager
Crystal River Nuclear Plant (NA2C)
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Mr. Michael A. Schoppman
Framatome ANP
1911 North Ft. Myer Drive, Suite 705
Rosslyn, Virginia 22209

Mr. William A. Passetti, Chief
Department of Health
Bureau of Radiation Control
2020 Capital Circle, SE, Bin #C21
Tallahassee, Florida 32399-1741

Attorney General
Department of Legal Affairs
The Capitol
Tallahassee, Florida 32304

Mr. Joe Myers, Director
Division of Emergency Preparedness
Department of Community Affairs
2740 Centerview Drive
Tallahassee, Florida 32399-2100

Chairman
Board of County Commissioners
Citrus County
110 North Apopka Avenue
Inverness, Florida 34450-4245

Ms. Sherry L. Bernhoft
Manager Regulatory Affairs
Crystal River Nuclear Plant (NA2H)
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Senior Resident Inspector
Crystal River Unit 3
U.S. Nuclear Regulatory Commission
6745 N. Tallahassee Road
Crystal River, Florida 34428

Mr. Richard L. Warden
Manager Nuclear Assessment
Crystal River Nuclear Plant (NA2C)
15760 W. Power Line Street
Crystal River, Florida 34428-6708