Progress Energy

Crystal River Nuclear Plant
Docket No. 50-302
Operating License No. DPR-72

July 31, 2012
3F0712-07

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

Subject: Crystal River Unit 3 – Response to Third Request for Additional Information to Support NRC Health Physics and Human Performance Branch (AHPB) Technical Review of the CR-3 Extended Power Uprate LAR (TAC No. ME6527)

References:
1. CR-3 to NRC letter dated June 15, 2011, "Crystal River Unit 3 – License Amendment Request #309, Revision 0, Extended Power Uprate" (ADAMS Accession No. ML112070659)
2. Email from S. Lingam (NRC) to D. Westcott (CR-3) dated May 14, 2012, "RE: Crystal River EPU LAR (ME6527) - Health Physics Draft RAI"
3. NRC to CR-3 letter dated July 5, 2012, "Crystal River Unit 3 Nuclear Generating Plant – Request For Additional Information For Extended Power Uprate License Amendment Request (TAC No. ME6527)" (ADAMS Accession No. ML12171A347)

Dear Sir:

By letter dated June 15, 2011, Florida Power Corporation (FPC) requested a license amendment to increase the rated thermal power level of Crystal River Unit 3 (CR-3) from 2609 megawatts (MWt) to 3014 MWt (Reference 1). On May 14, 2012, via electronic mail, the NRC provided a draft request for additional information (RAI) related to radiation protection needed to support the AHPB technical review of the CR-3 Extended Power Uprate (EPU) License Amendment Request (LAR) (Reference 2) following a teleconference on May 9, 2012 with FPC to confirm an understanding of the information provided in the CR-3 EPU LAR. On July 5, 2012, the NRC provided a formal RAI required to complete its evaluation of the CR-3 EPU LAR (Reference 3).

The attachment, "Response to Third Request for Additional Information – Health Physics and Human Performance Branch Technical Review of the CR-3 EPU LAR," provides the CR-3 formal response to the RAI.

This correspondence contains no new regulatory commitments.

If you have any questions regarding this submittal, please contact Mr. Dan Westcott, Superintendent, Licensing and Regulatory Programs at (352) 563-4796.

Sincerely,

Jon A. Franke
Vice President
Crystal River Nuclear Plant

JAF/gwe

Attachment: Response to Third Request for Additional Information – Health Physics and Human Performance Branch Technical Review of the CR-3 EPU LAR

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

Crystal River Nuclear Plant
15760 W. Powerline Street
Crystal River, FL 34428

A001
NRR

STATE OF FLORIDA

COUNTY OF CITRUS

Jon A. Franke states that he is the Vice President, Crystal River Nuclear Plant 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.

Jon A. Franke
Vice President
Crystal River Nuclear Plant

The foregoing document was acknowledged before me this 31 day of July, 2012, by Jon A. Franke.

Signature of Notary Public
State of Florida

CAROLYN E. PORTMANN
Commission # DD 937553
Expires March 1, 2014
Bonded Thru Troy Fain Insurance 800-385-7019

(Print, type, or stamp Commissioned Name of Notary Public)

Personally Known ✓ -OR- Produced Identification _____

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302 / LICENSE NUMBER DPR-72

ATTACHMENT

RESPONSE TO THIRD REQUEST FOR ADDITIONAL INFORMATION – HEALTH PHYSICS AND HUMAN PERFORMANCE BRANCH TECHNICAL REVIEW OF THE CR-3 EPU LAR

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AHPB RAI

AHPB 3-1

On page 2.10.1-2 of Attachment 5 to the original LAR dated June 15, 2011, the licensee states that the zone criteria established for the general accessible areas in the containment was ≤ 25 millirem per hour. It acknowledges that during the design of the plant, this was accomplished by designing the shields at an assumed power level of 2544 MWt to ensure dose rates at various locations were less than the specified zone criteria. The licensee evaluates the impact of the EPU by using actual operating data and providing the total person-rem for containment entries at power as well as the maximum dose to any individual working at the plant. While it may be true that the change in dose rates in accessible areas is not expected to increase significantly after the EPU and therefore, cumulative doses can be kept as low as reasonably achievable and individual doses below Title 10 of the *Code of Federal Regulations*, Part 20 occupational dose limits, the dose information does not demonstrate that the original dose rates established in the original shield design will not increase beyond their original design values. Provide justification that demonstrates that the dose rates are not expected to increase beyond the dose rates established under the original shielding design analysis performed at an assumed power level of 2544 MWt.

Response:

The intent of the statement related to the zone criteria established for the general accessible areas in the containment on page 2.10.1-2 of the CR-3 EPU Technical Report (TR) (Reference 1, Attachments 5 and 7) was to acknowledge the historic basis for the plant shielding design as described in Section 11.3, "Radiation Shielding," of the CR-3 Final Safety Analysis Report (FSAR). FSAR Section 11.3 provides a list of radiation occupancy zones; Zones 0 to IV. As indicated in FSAR Section 11.3, the zones not designed as restricted access (i.e., ≥ 100 mrem/hr) were originally intended to be ≤ 25 mrem/hr. However, there are limited access areas within the reactor building (RB) (i.e., containment), outside the secondary shield, where radiation levels currently exceed the historical FSAR Section 11.3 value of 25 mrem/hr excluding consideration of the impact associated with operation at EPU conditions.

The current areas in Zone III that exceed 25 mrem/hr include: the area near a portion of the letdown line that bypasses the RB secondary shield; and the RB sump area. At existing full power conditions, the radiation levels in these areas at 30 cm may exceed 100 mrem/hr, but are less than 1000 mrem/hr. Therefore, access at power is restricted by maintaining the RB locked except during periods when RB access is required. Access to both of these areas are controlled by the CR-3 Radiological Protection Program (RPP) in accordance with 10 CFR 20.1601(a) or CR-3 Improved Technical Specifications 5.8.1, "High Radiation Area." FPC has initiated an FSAR Change Request to revise the zone figures in Section 11.3 to identify these areas as restricted access areas (i.e., Zone IV).

The original CR-3 plant shielding design is considered conservative based upon a fission product source term assumption of 1% failed fuel at full power operation conditions. This is considered conservative for the following reasons:

- 1% failed fuel is equivalent to a Dose Equivalent Iodine-131 (I-131) activity of approximately 4.5 μCi/gm, which is 4.5 times the original operating Dose Equivalent I-131 activity limit of 1.0 μCi/gm; and

- 1% failed fuel is 4 times greater than the fission product source criterion of 0.25% failed fuel for plant shielding design provided in Regulatory Position 2.C of Regulatory Guide 8.8, "Information Relevant To Ensuring That Occupational Radiation Exposures At Nuclear Power Stations Will Be As Low As Is Reasonably Achievable," (Reference 2) .

The Dose Equivalent I-131 limit is being further reduced for EPU operation from 1.0 μCi/gm to 0.25 μCi/gm resulting in limiting fission product sources to approximately 5.5% of that assumed for the original plant shielding design.

Thus, it is reasonable to conclude that, at EPU conditions, the existing plant shielding design can continue to limit radiation dose rates from fission product sources to within the rates established under the original shielding design analysis. It is also reasonable to conclude, based on the conservative CR-3 plant shielding design and the Dose Equivalent I-131 operational limit reduction from 1.0 μCi/gm to 0.25 μCi/gm, that operation at EPU conditions will not result in any accessible RB area radiation level exceeding 1000 mrem/hr; and therefore, will not result in any current accessible area in the CR-3 containment being restricted as a locked high radiation area.

Also, current radiation occupancy and routine personnel access is controlled by the CR-3 RPP and based on plant radiation surveys, which ensures compliance with 10 CFR 20 individual dose requirements and maintains cumulative dose as low as reasonably achievable irrespective of the radiation zones identified in FSAR Chapter 11.

Finally, as indicated in Table 2.12.1-3, "Comparison of Proposed EPU Tests to FSAR Chapter 13 Initial Startup Testing," of the CR-3 EPU TR, a biological shield survey will be conducted during power ascension testing at various power levels, up to 100% of the EPU power level, to confirm the adequacy of the plant radiation shielding.

References

1. FPC to NRC letter dated June 15, 2011, "Crystal River Unit 3 – License Amendment Request #309, Revision 0, Extended Power Uprate." (ADAMS Accession No. ML112070659)

2. NRC Regulatory Guide 8.8, "Information Relevant To Ensuring That Occupational Radiation Exposures At Nuclear Power Stations Will Be As Low As Is Reasonably Achievable," Revision 3, July 1978. (ADAMS Accession No. ML003739549)