



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

July 31, 2012
3F0712-08

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

Subject: Crystal River Unit 3 – Response to Second Request for Additional Information to Support NRC PRA Licensing Branch (APLA) 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 8, 2012, "Crystal River, Unit 3 EPU LAR – Additional Draft RAI from APLA (PRA Related) (ME6527)"
 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:

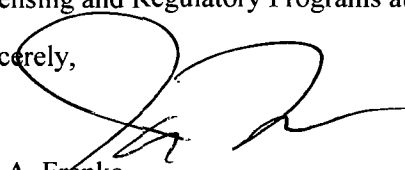
By letter dated June 15, 2011, Florida Power Corporation (FPC) requested a license amendment to increase the rated thermal power level of Crystal River Unit 3 (CR-3) from 2609 megawatts (MWt) to 3014 MWt (Reference 1). On May 8, 2012, via electronic mail, the NRC provided a draft request for additional information (RAI) needed to support the Probabilistic Risk Assessment (PRA) Licensing Branch technical review of the CR-3 Extended Power Uprate (EPU) License Amendment Request (LAR) (Reference 2). By teleconference on May 14, 2012, FPC discussed the draft RAI with the NRC to confirm an understanding of the information being requested. On July 5, 2012, the NRC provided a formal RAI required to complete the evaluation of the CR-3 EPU LAR (Reference 3).

The attachment, "Response to Second Request for Additional Information – Probabilistic Risk Assessment Licensing 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 Second Request for Additional Information – Probabilistic Risk Assessment Licensing 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
HRR

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



(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 SECOND REQUEST FOR ADDITIONAL
INFORMATION – PROBABILISTIC RISK ASSESSMENT
LICENSING BRANCH TECHNICAL REVIEW OF THE CR-3
EPU LAR**

**RESPONSE TO SECOND REQUEST FOR ADDITIONAL
INFORMATION – PROBABILISTIC RISK ASSESSMENT LICENSING
BRANCH TECHNICAL REVIEW OF THE CR-3 EPU LAR**

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 8, 2012, via electronic mail, the NRC provided a draft request for additional information (RAI) needed to support the Probabilistic Risk Assessment (PRA) Licensing (APLA) Branch technical review of the CR-3 Extended Power Uprate (EPU) License Amendment Request (LAR). By teleconference on May 14, 2012, FPC discussed the draft RAI with the NRC to confirm an understanding of the information being requested. On July 5, 2012, the NRC provided a formal RAI required to complete the evaluation of the CR-3 EPU LAR. For tracking purposes, each item related to this RAI is uniquely identified as APLA X-Y, with X indicating the RAI set and Y indicating the sequential item number.

APLA 2-1

Page 2.13-29 of Attachment 5 to the original LAR dated June 15, 2011, describes the review conducted to analyze fire risk for extended power uprate (EPU). This section states that at the time of LAR evaluation, the cable routing and component location had not been finalized, therefore the impact on fire risk could not be quantified. Also the timing analysis for the new operator action to lock out the atmospheric dump valve (ADV) actuation had not been performed therefore, the fire human reliability analysis (HRA) value could not be determined. The Fire PRA was updated based only on HRA timing and did not include fire ignition frequency nor fire loading. The concluding sentence states that since HRA timing change due to EPU are insignificant, it is concluded that there is no significant change in overall fire risk. The NRC staff requests additional information explaining how the Fire PRA was updated for the EPU. Please provide updated results for the Fire PRA if cable routing, component location and HRA timing on ADV actuation are now finalized. In addition, please describe how the results for non multi compartment fire core damage frequency in Table 2.13-2 of Attachment 5 to the original LAR dated June 15, 2011, were obtained.

Response:

To further clarify the FPC response to RAI APLA 1-4 in the FPC to NRC letter dated March 22, 2012 (Reference 2); the CR-3 fire PRA model is being significantly updated to support the implementation of 10 CFR 50.48(c) and National Fire Protection Association (NFPA) Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition," (NFPA 805). The fire PRA is based on the guidance of NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities," September 2005, (Reference 3) and the model was built using the 2009 internal events model. A peer review was performed and the open facts and observation findings potentially impacting EPU were provided in Appendix 3 of the FPC to NRC letter dated August 11, 2011 (Reference 4).

The CR-3 fire PRA model was utilized during the development of the CR-3 EPU LAR to provide available fire risk insights based upon known EPU design information. To fully quantify core damage frequency (CDF) and large early release frequency (LERF) resulting from fire related events, specific design details such as cable type and routing must be known. As such,

the calculated non multi compartment fire CDF shown in Table 2.13-2, "Risk Results Without Risk Reduction Modifications," of the CR-3 EPU Technical Report (TR) (Reference 1, Attachments 5 and 7) only reflects the revised HRA considering the CR-3 EPU.

A complete fire PRA evaluation is comprised of two parts: 1) the effects of a fire within an individual fire compartment (i.e., non multi compartment); and 2) the effects of a fire within a fire compartment and the adjacent compartments (i.e., multi compartment).

The impact of the CR-3 EPU on the non multi compartment analysis fire risk contribution was determined using the following process:

- Operator actions were adjusted with new timing based upon EPU thermal-hydraulic analysis.
- HRA values were adjusted for fire impact using the same HRA methodology as the fire PRA base model; human failure events were evaluated using standard HRA methods as implemented in the Electric Power Research Institute HRA calculator.
- The CDF and LERF were requantified for the fire PRA model using the fire adjusted HRA values. LERF did not change as a result of the fire adjusted HRA values. The revised CDF for the non multi compartment analysis was reported in Table 2.13-2 of the CR-3 EPU TR.

The fire PRA multi compartment analysis requires details of the location of cables, and components relative to doors, dampers, and penetrations. The location of cables and components associated with certain EPU modifications (e.g., the Inadequate Core Cooling Mitigation System) has not been finalized; therefore, a multi compartment analysis has not been performed reflecting the CR-3 EPU. A multi compartment analysis is continuing to be developed in support of the transition of the CR-3 Fire Protection Program (FPP) to NFPA 805 and will consider the CR-3 as-built design at that time, including an analysis of the finalized EPU and other plant modifications.

Deterministic and probabilistic methods have been, and continue to be, utilized in the detailed design of the EPU and other plant modifications to minimize the potential increase in plant fire risk. The EPU modifications, including the ADV related modifications, are not expected to significantly alter the fire risk conclusions provided in Section 2.13, "Risk Evaluation," of the EPU TR and fire induced events are not expected to be dominant risk contributors to the overall plant CDF or LERF during operation at EPU conditions.

A separate LAR regarding the transition of the CR-3 FPP to NFPA 805 will provide updated fire PRA results based on plant conditions at that time and will include the multi compartment analysis results. Therefore, to avoid duplication of NRC reviews, FPC proposes to not address the CR-3 fire PRA further as part of the CR-3 EPU LAR review.

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. FPC to NRC letter dated March 22, 2012, "Crystal River Unit 3 – Response to Request for Additional Information to Support NRC PRA Licensing Branch Technical Review of the

CR-3 Extended Power Uprate LAR (TAC No. ME6527).” (ADAMS Accession No. ML12086A107)

3. NUREG/CR 6850, “EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities,” September 2005.
4. FPC to NRC letter dated August 11, 2011, “Crystal River Unit 3 – Response to Request for Additional Information to Support NRC Probabilistic Risk Assessment Licensing Branch Acceptance Review of the CR-3 Extended Power Uprate LAR (TAC No. ME6527).” (ADAMS Accession No. ML11234A051)