



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

Ref: 10 CFR 54

September 11, 2009  
3F0909-02

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

Subject: Crystal River Unit 3 – Response to Request for Additional Information for the Review of the Crystal River Unit 3 Nuclear Generating Plant, License Renewal Application (TAC NO. ME0274)

References: (1) CR-3 to NRC letter, 3F1208-01, dated December 16, 2008, "Crystal River Unit 3 – Application for Renewal of Operating License"

(2) NRC to CR-3 letter dated August 3, 2009, "Request for Additional Information for the Review of the Crystal River Unit 3 Nuclear Generating Plant, License Renewal Application (TAC NO. ME0274)" – Section 4.2

Dear Sir:

On December 16, 2008, Florida Power Corporation (FPC), doing business as Progress Energy Florida, Inc., requested renewal of the operating license for the Crystal River Unit 3 Nuclear Generating Plant (CR-3) to extend the term of its operating license an additional 20 years beyond the current expiration date (Reference 1). The Nuclear Regulatory Commission (NRC), by letter dated August 3, 2009, provided a request for additional information (RAI) concerning the License Renewal Application (Reference 2). The Enclosure to this letter provides the response to the RAI. Attachment 2 to the Enclosure contains proprietary information.

The Enclosure has several attachments. Attachment 1 is an affidavit prepared by AREVA NP, Inc., that justifies withholding the report provided in Attachment 2 from public disclosure as proprietary information in accordance with 10 CFR 2.390(a)(4). Attachments 3 and 4 to the Enclosure provide additional non-proprietary AREVA NP, Inc. documents in support of the RAI response. No new regulatory commitments are contained in this submittal.

If you have any questions regarding this submittal, please contact Mr. Mike Heath, Supervisor, License Renewal, at (910) 457-3487, e-mail at [mike.heath@pgnmail.com](mailto:mike.heath@pgnmail.com).

Sincerely,

Jon A. Franke  
Vice President  
Crystal River Unit 3

JAF/dwh

Enclosure: Response to Request for Additional Information

xc: NRC CR-3 Project Manager  
NRC License Renewal Project Manager  
NRC Regional Administrator, Region II  
Senior Resident Inspector

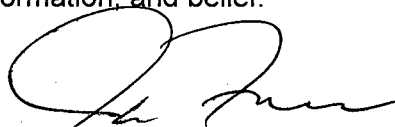
Progress Energy Florida, Inc.  
Crystal River Nuclear Plant  
15760 W. Power Line Street  
Crystal River, FL 34428

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, doing business as Progress Energy Florida, Inc.; 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 11 day of September, 2009, 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

**PROGRESS ENERGY FLORIDA, INC.**

**CRYSTAL RIVER UNIT 3**

**DOCKET NUMBER 50 - 302 / LICENSE NUMBER DPR - 72**

**ENCLOSURE**

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

## **RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

### **Request for Information RAI 4.2.6-1**

#### Background

The CR-3 LRA states that:

The ART at the inside surface of CR-3 Lower Nozzle Belt Forging AZJ 94 is 3.0 °F higher than the ART evaluated for the previously limiting forging [from BAW-2247A, Fracture Mechanics Analysis of Postulated Underclad Cracks in B&W Designed Reactor Vessels for the Period Of Extended Operation].

#### Request

Demonstrate that the reanalysis of the CR-3 Lower Nozzle Belt Forging AXJ 94 [sic - should be AZJ-94] is consistent with the methodology used in BAW-2247A [sic - should be BAW-2274A]. Provide information, including input data, intermediate calculations, etc., as necessary, to support that the analyses performed for CR-3 are consistent with those in BAW-2274A.

#### CR-3 Response

A 1996 fracture mechanics analysis, topical report BAW-2274A, demonstrated that underclad cracking could be accommodated in the beltline, nozzle belt, and closure head regions of B&W-designed reactor vessels at 48 EFPY. Since CR-3 withdrew from Generic License Renewal Project (GLRP) activities just prior to the preparation of BAW-2274A, this topical report was not applicable to CR-3. However, the B&W Owners Group decided to continue using the CR-3 reactor vessel materials in the analysis since one of the CR-3 beltline materials was conservative for the participating GLRP plants. An assessment of the impact of the CR-3 60-year (54 EFPY) projected fluence on the results of the 48 EFPY underclad cracking analysis is provided in Section 2.5 of the AREVA NP non-proprietary document 51-9057252-001, "CR3 Reconciliation of 60-Year Fluence Projections Used in Reactor Vessel Beltline Embrittlement Calculations for License Renewal" (see Attachment 3). That assessment concluded that the only region that requires reanalysis for CR-3 at 54 EFPY is the lower Nozzle Belt Forging. The reanalysis of CR-3 Nozzle Belt Forging AZJ 94 is contained in AREVA NP proprietary document 32-9075768-000, "Evaluation of CR3 Nozzle Belt Forging for Underclad Cracking for License Renewal (Proprietary)" (see Attachment 2). The results demonstrate that a postulated crack in the Nozzle Belt Forging satisfies the IWB-3612 acceptance criteria of the ASME Boiler and Pressure Vessel Code, 2001 Edition through 2003 Addenda, for 60 years (54 EFPY) of operation. Attachment 1 is an affidavit prepared by AREVA NP, Inc., that justifies withholding document 32-9075768-000 from public disclosure in accordance with 10 CFR 2.390(a)(4).

### **Request for Information RAI 4.2.2-1**

#### Background

Section 4.2.2, Upper Shelf Energy Analysis, states that, "the methodology used to evaluate CR-3 beltline welds at 60 years is consistent with the equivalent margins analysis (EMA) methods reported in BAW-2192PA, "Low Upper-Shelf Toughness Fracture Mechanics Analysis of Reactor

Vessels of B&W Owners Reactor Vessel Working Group for Level A & B Service Loads;" BAW-2178PA, "Low Upper-Shelf Toughness Fracture Mechanics Analysis of Reactor Vessels of B&W Owners Reactor Vessel Working Group for Level C & D Service Loads;" and BAW-2275A, "Low Upper-Shelf Toughness Fracture Mechanics Analysis of B&W Designed Reactor Vessels for 48 EFPY."

Topical Report BAW-2275A addresses the issue of low upper-shelf toughness for Linde 80 welds in Babcock and Wilcox (B&W) reactor pressure vessels (RPVs), for an extended license period of 48 effective full-power years (EFPY). The BAW-2275A evaluation involved 5 plants of the 16 plants covered by BAW-2178PA and BAW-2192PA. CR-3 did not participate in the evaluation contained in BAW-2275A. The staff's safety evaluation of BAW-2275A concluded that the Linde 80 welds have margins equivalent to those of Appendix G of Section XI of the ASME Code for the 5 RPVs analyzed in the report.

#### Request

- a. Provide a technical basis for the application of BAW-2275A to: (1) include CR-3 vessel materials, which were not included in the BAW-2275A analysis, and (2) an extended license period of 54 EFPY, as opposed to the 48 EFPY of the BAW-2275A topical report.
- b. Upper-shelf energy analyses contained Topical Reports BAW-2178PA and BAW-2192PA for CR-3 are bounded by 32 EFPY fluence predictions for the CR-3 beltline welds. The CR-3 fluence values for the extended license period of 54 EFPY exceed these fluence values. Therefore, provide a technical basis for the application of BAW-2178PA and BAW-2192PA using the CR-3 54 EFPY fluence values.

#### CR-3 Response

AREVA NP, Inc., Topical Report ANP-10308, "Low Upper-Shelf Toughness Fracture Mechanics Analysis of the Crystal River Unit 3 Reactor Vessel for 54 EFPY," was prepared to demonstrate that the welds of the CR-3 reactor vessel satisfy the acceptance criteria of Appendix K of Section XI of the ASME Code and, therefore, provide margins of safety equivalent to those of Appendix G of Section XI. Attachment 4 is a copy of AREVA NP, Inc., report ANP-10308.

The equivalent margins analysis has shown that the CR-3 reactor vessel welds at 54 EFPY are bounded by the limiting weld at Three Mile Island Unit 1 at 48 EFPY. It can therefore be concluded that the CR-3 reactor vessel welds have adequate upper-shelf toughness and satisfy the requirement of Appendix G to 10 CFR 50 at 54 EFPY.

**ENCLOSURE**

**ATTACHMENT 1**

**AFFIDAVIT**

**APPLICATION FOR WITHHOLDING PROPRIETARY  
INFORMATION FROM PUBLIC DISCLOSURE**

AFFIDAVIT

COMMONWEALTH OF VIRGINIA )  
 ) ss.  
CITY OF LYNCHBURG )

1. My name is Gayle F. Elliott. I am Manager, Product Licensing, for AREVA NP Inc. (AREVA NP) and as such I am authorized to execute this Affidavit.
2. I am familiar with the criteria applied by AREVA NP to determine whether certain AREVA NP information is proprietary. I am familiar with the policies established by AREVA NP to ensure the proper application of these criteria.
3. I am familiar with the AREVA NP information contained in Calculation Summary Sheet 32-9075768-000 entitled "Evaluation of CR3 Nozzle Belt Forging for Underclad Cracking for License Renewal," dated June 2008, and referred to herein as "Document." Information contained in this Document has been classified by AREVA NP as proprietary in accordance with the policies established by AREVA NP for the control and protection of proprietary and confidential information.
4. This Document contains information of a proprietary and confidential nature and is of the type customarily held in confidence by AREVA NP and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in this Document as proprietary and confidential.
5. This Document has been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in this Document be withheld from public disclosure. The request for withholding of proprietary information is made in accordance with 10 CFR 2.390. The information for which withholding from disclosure is

requested qualifies under 10 CFR 2.390(a)(4) "Trade secrets and commercial or financial information."

6. The following criteria are customarily applied by AREVA NP to determine whether information should be classified as proprietary:

- (a) The information reveals details of AREVA NP's research and development plans and programs or their results.
- (b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.
- (c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for AREVA NP.
- (d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for AREVA NP in product optimization or marketability.
- (e) The information is vital to a competitive advantage held by AREVA NP, would be helpful to competitors to AREVA NP, and would likely cause substantial harm to the competitive position of AREVA NP.

The information in the Document is considered proprietary for the reasons set forth in paragraphs 6(b) and 6(c) above.

7. In accordance with AREVA NP's policies governing the protection and control of information, proprietary information contained in this Document have been made available, on a limited basis, to others outside AREVA NP only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. AREVA NP policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.



9. The foregoing statements are true and correct to the best of my knowledge,  
information, and belief.

A handwritten signature in black ink, appearing to be 'S. L. McFaden', written over a horizontal line.

SUBSCRIBED before me this 19<sup>th</sup>  
day of August, 2009.

A handwritten signature in black ink, appearing to be 'Sherry L. McFaden', written over a horizontal line.

Sherry L. McFaden  
NOTARY PUBLIC, COMMONWEALTH OF VIRGINIA  
MY COMMISSION EXPIRES: 10/31/10  
Reg. # 7079129

