



July 30, 2015

L-2015-206  
10 CFR 50.90

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

RE: St. Lucie Unit 2  
Docket No. 50-389  
RAI Response to SNPB-RAI-1 for the Technical Specification LAR and Exemption Request Regarding the Transitioning to AREVA Fuel

Reference:

1. FPL letter L-2014-366 dated December 30, 2014, "Application for Technical Specification Change and Exemption Request Regarding the Transitioning to AREVA Fuel," Accession No. ML15002A091
2. FPL letter L-2015-091 dated March 23, 2015, "Supplemental Information for Technical Specification Change and Exemption Request Regarding the Transitioning to AREVA Fuel," Accession No. ML15084A011
3. NRC letter dated May 12, 2015, "St. Lucie Plant, Unit No. 2 - Request for Additional Information Regarding License Amendment Request and Exemption Request Regarding the Transitioning to AREVA Fuel (TAC NOS. MF5494 AND MF5495)," Accession No. ML15127A405
4. FPL Letter L-2015-166 dated June 2, 2015, "RAI Reply for Application for Technical Specification Change and Exemption Request Regarding the Transitioning to AREVA Fuel," Accession No. ML15161A316
5. FPL Letter L-2015-177 dated June 18, 2015, "Resubmittal of the AREVA Small Break LOCA Summary Report Within the Application for Technical Specification Change and Exemption Request Regarding the Transitioning to AREVA Fuel," Accession No. ML15181A290
6. NRC Letter dated June 24, 2015, "St. Lucie Plant, Unit 2 – Request for Additional Information Regarding License Amendment Request and Exemption Request Regarding the Transitioning to AREVA Fuel (TAC Nos. MF5494 and MF5495)," Accession No. ML15166A368

Pursuant to 10 CFR 50.90, Florida Power & Light Company (FPL) submitted via Reference 1 and supplemented via Reference 2 a license amendment to the Technical Specifications (TS) for St. Lucie Unit 2 to allow the use of AREVA fuel. Reference 4 provided the response to the NRC request for additional information (RAI) of Reference 3. Reference 5 modified the proprietary markings contained in the SBLOCA summary report.

The NRC transmitted an additional RAI in Reference 6, and this letter provides the response to the RAI in Attachment 1 to this letter. Attachment 2 provides the affidavit for withholding the supporting proprietary AREVA licensing report from the public, Attachment 3 provides the proprietary AREVA licensing report, and Attachment 4 provides the non-proprietary version of the AREVA licensing report.

A 001  
NRC

If you should have any questions, please contact Mr. Ken Frehafer at (772) 467-7748.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 30, 2015.

Sincerely,

A handwritten signature in black ink that reads "Christopher R. Costanzo". The signature is written in a cursive, flowing style.

Christopher R. Costanzo  
Site Vice President  
St. Lucie Plant

CRC/KWF

Attachments

1. RAI Response
  2. AREVA affidavit for withholding proprietary information from the public
  3. AREVA proprietary report ANP-3428P, Revision 0, St. Lucie Unit 2 Fuel Transition: Response to SNPB-RAI-1
  4. AREVA non-proprietary report ANP-3428NP, Revision 0, St. Lucie Unit 2 Fuel Transition: Response to SNPB-RAI-1
- cc: USNRC Regional Administrator, Region II  
USNRC Senior Resident Inspector, St. Lucie Nuclear Plant  
Ms. Cindy Becker, Florida Department of Health

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION  
REGARDING PROPOSED LICENSE AMENDMENT REQUEST AND EXEMPTION REQUEST  
TO ALLOW THE TRANSITION TO AREVA FUEL  
FLORIDA POWER & LIGHT COMPANY  
ST. LUCIE PLANT, UNIT NO. 2  
DOCKET NO. 50-389  
(TAC NOS. MF5494 AND MF5495)

By letter dated December 30, 2014, as supplemented by letter dated March 23, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML15002A091 and ML15084A011, respectively), Florida Power & Light Company (FPL) submitted a license amendment request to the U.S. Nuclear Regulatory Commission (NRC) for St. Lucie Plant, Unit No. 2 (SL-2). The proposed amendment would revise the TSs to allow the use of AREVA fuel at SL-2. Additionally, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.12, FPL requests an exemption from the provisions of 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems [ECCSs] for light-water nuclear power reactors," and Appendix K to 10 CFR Part 50, "ECCS Evaluation Models," to allow the use of M5 fuel rod cladding in future core reload applications for SL-2.

By letter dated April 8, 2015 (ADAMS Accession No. ML15090A240), FPL was informed that the NRC staff finds the application of XN-NF-78-44 (NP) (A), "A Generic Analysis of the Control Rod Ejection Transient for Pressurized Water Reactors [PWRs]" (ADAMS Accession No. ML15049A093), October 1982, Exxon Nuclear Company, Inc. (ENC) to AREVA (Combustion Engineering) CE16x16 fuel, to be an expansion of the applicability of this Topical Report. The letter also stated that the staff would follow this acceptance with a request for additional information (RAI) that asks the licensee to confirm the acceptability of the application of XN-NF-78-44 (NP)(A) to AREVA CE16x16 fuel by performing additional calculations using alternative methods.

Accordingly, the U.S. Nuclear Regulatory Commission staff has reviewed the information submitted by the licensee and, based upon this review, determined that the following additional information is required to complete the evaluation.

**SNPB-RAI-1**

**Background**

Section 4.25 of ANP-3347P, Revision 0, "St. Lucie, Unit 2 Fuel Transition Chapter 15 Non-LOCA [Loss of Coolant Accident] Summary Report," provides a description regarding "Spectrum of Control Element Assembly [CEA] Ejection Accidents (UFSAR [Updated Final Safety Analysis Report] 15.4.8)." The non-proprietary version of this document is publicly available under ADAMS Accession No. ML15002A092.

The CEA ejection accident is analyzed using the methodology described in Topical Report XN-NF-78-44 (NP)(A) for total deposited enthalpy in the fuel. Topical Report XN-NF-78-44 (NP)(A) indicates that "the ejected rod analysis presented here will be applicable to all future ENC reloads for PWR type reactors. However, as indicated in the acceptance letter of April 8, 2015, to the licensee, the application of the above methodology to AREVA's CE 16x16 fuel is considered an expansion of the applicability of this topical report.

The Phenomenon Identification and Ranking Table in Section 3 of NUREG/CR-6742, "Phenomenon Identification and Ranking Tables (PIRT) for Rod Ejection Accidents in Pressurized Water Reactors Containing High Burnup Fuel," identifies certain fuel physical, mechanical, and thermal properties of the fuel design under high burnup conditions during the PWR Rod Ejection Accident. These parameters are fuel thermal conductivity, gap conductance, clad conductivity (including oxide layer), transient cladding-to-coolant heat transfer coefficient, heat capacities of fuel and cladding, and other applicable parameters. It is not evident from your submittal on the control rod ejection analysis whether or not a more recent fuel performance code is used to compute the fuel and clad properties.

Upon review of the control rod ejection accident analysis submitted by the licensee in ANP-3347P, Section 4.25, the staff has determined that the margin to the centerline temperature for 20 percent and 65 percent rated thermal power has been substantially reduced for beginning of cycle (BOC).

#### RAI

Based on the above, perform a plant-specific analysis of control rod ejection accident for St. Lucie, Unit 2 using an alternate methodology as was proposed to the staff during the pre-submittal meeting on November 3, 2014. By performing the alternate analysis using the combination of latest fuel performance methodology and the proposed supplement to the ARCADIA reactor analysis system methodology, provide additional information that is necessary for determining the acceptability of the applicability of XN-NF-78-44(NP)(A) to AREVA CE 16x16 fuel design.

#### **SNPB-RAI-1 Response**

The response to the SNPB-RAI-1 (Reference 1), provided in the attached document ANP-3428P, is prepared based on the discussions between Florida Power and Light Company (FPL), AREVA and the NRC Staff during the meeting on June 11, 2015, and includes the following:

1. A comparison of the XN-NF-78-44(NP)(A) methodology rod ejection results with the results of the current fuel vendor methodology, for St. Lucie Unit 2 (16x16) fuel, using conditions consistent with the current St. Lucie Unit 2 Extended Power Uprate (EPU) analysis described in the Updated Final Safety Analysis Report (UFSAR).
2. A summary of the quantitative benchmark results of the XN-NF-78-44(NP)(A) methodology (Reference 2) for enthalpy deposition, applied to the St. Lucie Unit 2 16x16 fuel, as compared to the recent AREVA analysis results for other fuel types, previously provided in ANP-3396P (Reference 3).

Additionally, the response provided in ANP-3428(P) also includes a discussion of how the physical, mechanical and thermal properties of the fuel design under high burnup conditions are addressed in the Rod Ejection analyses performed with the EMF-2310(P)(A) NRC approved methodology (Reference 4). EMF-2310(P)(A) methodology is used for the rod ejection DNB and fuel centerline temperature analysis. The discussion provided in the attached ANP-3428(P) document also addresses the conservatism in the fuel centerline temperature generated with the EMF-2310(P)(A) methodology, which resulted in low margin to the fuel centerline melt limit.

The generic issues, independent of the application to 16x16 fuel, related to the conservatism of the enthalpy deposition calculation performed with the 1D rod ejection methodology [XN-NF-78-44(NP)(A)], and the comparison with the 3D methodologies, as necessary, will be discussed with the NRC Staff and addressed separate from this RAI, as discussed in the June 11, 2015 meeting (Reference 5).

#### References:

1. NRC Letter dated June 24, 2015, "St. Lucie Plant, Unit 2 – Request for Additional Information Regarding License Amendment Request and Exemption Request Regarding the Transitioning to AREVA Fuel (TAC Nos. MF5494 and MF5495). (ADAMS Accession No. ML15166A368)
2. XN-NF-78-44(NP)(A), "A Generic Analysis of the Control Rod Ejection Transient for Pressurized Water Reactors," Exxon Nuclear Company, September 1983.
3. L-2015-091, Letter from C. Costanzo (FPL) to USNRC Document Control Desk, "St. Lucie Unit 2 Docket No. 50-389 – Supplemental Information for Technical Specification Change and Exemption Request Regarding the Transitioning to AREVA Fuel," March 23, 2015. (ADAMS Accession No. ML15084A011)
4. EMF-2310(P)(A), Revision 1, "SRP Chapter 15 Non-LOCA Methodology for Pressurizer Water Reactors," Framatome ANP, Inc., May 2004.
5. NRC Letter dated July 13, 2015, "Summary of June 11, 2015, Closed Meeting With Florida Power and Light Company and AREVA Regarding Request for Additional Information for the License Amendment and Exemption Requests Regarding the Transitioning to AREVA Fuel (TAC Nos. MF5494 and MF5495). (ADAMS Accession No. ML15188A340)

A F F I D A V I T

COMMONWEALTH OF VIRGINIA    )  
  ) ss.  
CITY OF LYNCHBURG            )

1.       My name is Nathan E. Hottle. I am Manager, Product Licensing, for AREVA Inc. (AREVA) and as such I am authorized to execute this Affidavit.

2.       I am familiar with the criteria applied by AREVA to determine whether certain AREVA information is proprietary. I am familiar with the policies established by AREVA to ensure the proper application of these criteria.

3.       I am familiar with the AREVA information contained in the following document: "St. Lucie Unit 2 Fuel Transition: Response to SNPB-RAI-1," referred to herein as "Document." Information contained in this Document has been classified by AREVA as proprietary in accordance with the policies established by AREVA Inc. 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 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 to determine whether information should be classified as proprietary:

- (a) The information reveals details of AREVA'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.
- (d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for AREVA in product optimization or marketability.
- (e) The information is vital to a competitive advantage held by AREVA, would be helpful to competitors to AREVA, and would likely cause substantial harm to the competitive position of AREVA.

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

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

8. AREVA 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.

Nathan E. Hoth

SUBSCRIBED before me this 20<sup>th</sup>  
day of July, 2015.

Sherry L. McFaden

Sherry L. McFaden  
NOTARY PUBLIC, COMMONWEALTH OF VIRGINIA  
MY COMMISSION EXPIRES: 10/31/18  
Reg. # 7079129

