March 23, 2017

Mr. Jerald G. Head
Senior Vice President, Regulatory Affairs
GE-Hitachi Nuclear Energy Americas, LLC
P.O. Box 780, M/C A-18
Wilmington, NC 28401-0780

SUBJECT: DRAFT SAFETY EVALUATION FOR AMENDMENT 40 TO GLOBAL NUCLEAR FUEL – AMERICAS TOPICAL REPORT NEDE-24011-P-A-US GENERAL ELECTRIC STANDARD APPLICATION FOR REACTOR FUEL AND THE US SUPPLEMENT (CAC NO. MF4870)

Dear Mr. Head:

By letter dated January 7, 2014 (Agencywide Documents Access and Management System Accession No. ML14007A443), as amended by letter dated February 24, 2015 (ADAMS Accession No. ML15055A408), Global Nuclear Fuel (GNF)–Americas submitted Amendment 40 to NEDE-24011-P-A-19-US General Electric Standard Application for Reactor Fuel (GESTAR II) US Supplement to the U.S. Nuclear Regulatory Commission (NRC) staff for review. Enclosed for GNF review and comment is a copy of the NRC staff's draft safety evaluation (SE) for the licensing topical report.

Ten working days are provided for you to comment on any factual errors or clarity concerns contained in the draft SE. The final SE will be issued after making any necessary changes. The NRC staff's disposition of your comments on the draft SE will be discussed in the final SE.

To facilitate the NRC staff's review of your comments, please provide a marked-up copy of the draft SE showing proposed changes and provide a summary table of the proposed changes.

If you have any questions, please contact Joseph Golla at 301-415-1002.

Sincerely,

/RA/

Kevin Hsueh, Chief
Licensing Processes Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 712

Enclosure:
Draft Safety Evaluation

cc w/o encl: See next page

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DRAFT SAFETY EVALUATION FOR AMENDMENT 40

TO GLOBAL NUCLEAR FUEL – AMERICAS LLC

TOPICAL REPORT NEDE-24011-P-A-US GENERAL ELECTRIC STANDARD APPLICATION

FOR REACTOR FUEL (GESTAR II)

1.0 INTRODUCTION AND BACKGROUND

By letter dated January 7, 2014 (Reference 1), as amended by letter dated February 24, 2015 (Reference 2), Global Nuclear Fuel – Americas, LLC (GNF) submitted Amendment 40 (Agencywide Documents and Access Management System (ADAMS) No. ML14007A441) to Topical Report (TR) NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR) II, U. S. Supplement" to the U. S. Nuclear Regulatory Commission (NRC) staff for review.

GNF requests to add a clarification regarding the description of methods and results for the Refueling Accident for each of the fuel product lines in Section S.2.2.3.5, *Refueling Accident* Analysis, of NEDE-24011-P-A-22-US (Reference 3). This amendment revises this section by separating the method from the results that are product line specific and to be placed in the product line compliance report. Relocating the results to the fuel product line in GESTAR II is expected to remove the confusion of having results in two different locations in the GESTAR document.

2.0 EVALUATION

2.1 Analysis and Results

Section S.2.2.3.5 describes identification of causes, methods, assumptions, and conditions, analysis of results and radiological consequence comparisons for refueling accidents that result in the release of radioactive materials directly to the containment that can occur when the drywell is open. The *Analysis and Results* section calculates a conservative number of failed rods per assembly during the dropped assembly accident. The current analysis included 7x7, 9x9, GE12 (10x10), and GE14 (10x10) fuel rod arrays. GNF is requesting to add GNF2 assemblies with 10x10 fuel rod array to the results and analysis as well as in the radiological consequences comparisons.

According to the accepted GESTAR II analysis the total number of failed fuel rods for a dropped 7x7 fuel rod array bundle is 111. For a 9x9 the same analysis found that the total number of failed fuel rods for a dropped 9x9 fuel rod array bundle is 140. The analysis as shown in Sub-section *Analysis and Results* of S.2.2.3.5, *Refueling Accident Analysis,* of Reference 3 was completed using GE12, GE14, and GNF2 10x10 fuel rod arrays. These numbers for failed fuel rods will be included in the product line GESTAR II compliance report.

ENCLOSURE

2.2 Radiological Consequences Comparisons

The relative activity for a 9x9 rod will be 49 rods/74 rods or 0.66 times the activity in a 7x7 rod. Based on the assumption that 140 9x9 rods fail compared to 111 for 7x7 core, the relative amount of activity released for the 9x9fuel is (140/111)* (0.66) = 0.83 times the activity released for a 7x7 core. Therefore the activity released to the environment from 9x9 fuel designs will be 83 percent of those values presented in the Final Safety Analysis Report (FSAR) for 7x7 cores. These radiological exposures for the 7x7 as well as 9x9 fuel will both be less than the consequences for the accident well below the 10 CFR Part 100 guidelines.

The activity released to the environment and the radiological exposures for GE 10x10 fuel designs expressed as a fraction of the values presented in the FSARs for a 7x7 core are listed as below:

- GE14: (151/111)(49/87.333) = 0.76 times the activity released for a 7x7 core. (Reference 5)
- GNF2: (172/111)(49/85.6) = 0.89 times the activity released for a 7x7 core. (Reference 4)

Where:

172 is the number of failed rods for 10x10 fuel designs, 111 is the number of failed rods for the 7x7 fuel designs, 49 is the number of full-length rods in the 7x7 fuel design, 87.333, and 85.6 are equivalent full-length rods for GE14 and GNF2 fuel designs, respectively.

The activity released to the environment and the radiological consequences for GE and GNF fuel designs will be included in the product line GESTAR II compliance reports for the respective fuel designs. The NRC staff has reviewed the referenced documents and determined that the request for GESTAR II Amendment 40 is acceptable for implementation.

3.0 LIMITATIONS, CONDITIONS, AND CONCLUSION

3.1 Limitations and Conditions

1. For future fuel product lines, GNF shall include the results of the number of rods failed in the fuel product line GESTAR II compliance report.
2. The activity released to the environment and the radiological consequences for the HNF's fuel product lines expressed as fraction of the values in the FSAR for 7x7 core shall be included in the GNF fuel product line GESTAR II compliance reports.
3. The evaluation of the relative radiological consequences should be adjusted by the ratio of the product line specific radial peaking factor to the radial peaking factor used in the plant FSAR design basis accident radiological consequence analysis.

3.2 Conclusion

Based on the review and evaluation of GNF request for Amendment 40 to GESTAR II, the NRC staff finds that the proposed Amendment 40 to NEDE-24011-A is acceptable.

4.0 REFERENCES

1. Letter, MFN 14-001, "Amendment 40 to GESTAR II to Clarify Statements Regarding Different 10x10 Fuel Bundle Designs in the GESTAR II US Supplement," Global Nuclear Fuel, January 7, 2014.
2. MFN 14-001 Revision 1, "Re-Submittal of Amendment 40 to GESTAR II Regarding the Refueling Accident in the GESTAR II US Supplement," Global Nuclear Fuel, February 24, 2015 (ADAMS Accession No. ML15055A408).
3. NEDE-24011-P-A-22-US, General Electric Standard Application for Reactor Fuel (GESTAR II, Supplement for United States), Global Nuclear Fuel, November 2015 (Reference 3).
4. MFN-13-029, "GNF2 Advantage Generic Compliance with NEDE-24011-P-A (GESTAR II) NEDC-33270P, Revision 5, Global Nuclear Fuel, May 24, 2013.
5. MFN 09-235 GE 14 Compliance with Amendment 22 of NEDE-24011-P-A (GESTAR II), NEDC-32868P, Revision 3, Global Nuclear Fuels, April 2009.

Principal Contributor: Mathew Panicker, NRR/DSS

Date: March 23, 2017