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November 3, 2022 10 CFR 50.90

RS-22-117

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Dresden Nuclear Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237, and 50-249

Subject: Response to Request for Additional Information RE: License Amendment Request Regarding New Fuel Storage Vault and Spent Fuel Storage Pool Criticality Methodologies

References:

1. Letter from P.R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "License Amendment Request Regarding New Fuel Storage Vault and Spent Fuel Storage Pool Criticality Methodologies with Proposed Change to Technical Specifications Section 4.3.1," dated June 8, 2022 (ADAMS Accession No. ML22159A310)

2. Email from S. Arora (U.S. NRC) to L. Palutsis (Constellation Energy Generation), " Dresden 2 and 3 –RAI RE: License Amendment Request Regarding New Fuel Storage Vault and Spent Fuel Storage Pool Criticality Methodologies," dated October 12, 2022 (ADAMS Accession No. ML22290A084)

In Reference 1, Constellation Energy Generation, LLC (CEG) requested an amendment to Renewed Facility Operating License Nos. DPR-19 and DPR-25 for Dresden Nuclear Power Station (DNPS), Units 2 and 3, respectively. The proposed changes support the transition from Framatome (formerly AREVA) ATRIUM 10XM fuel to Global Nuclear Fuel – Americas, LLC (GNF-A) GNF3 fuel by allowing a different methodology to be used for the criticality safety evaluation for the spent fuel pool (SFP) and the new fuel vault (NFV).

In Reference 2, the NRC requested additional information that is needed to complete review of the proposed methodology change. The Attachment to this letter provides the additional information requested.

CEG has reviewed the information supporting the finding of no significant hazards consideration, and the environmental consideration that were previously provided to the NRC in Reference 1. The additional information provided in this submittal does not affect the bases for concluding that the proposed license amendments do not involve a significant hazards

consideration. In addition, the information provided in this submittal does not affect the bases for concluding that neither an environmental impact statement nor an environmental assessment needs to be prepared in connection with the proposed amendment.

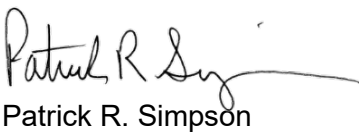
CEG is notifying the State of Illinois of this supplement to a previous application for a change to the operating license by sending a copy of this letter and its attachments to the designated State Official in accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b).

There are no regulatory commitments included in this letter.

Should you have any questions concerning this letter, please contact Mrs. Linda Palutsis at 630-657-2821.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 3rd day of November 2022.

Respectfully,



Patrick R. Simpson
Sr. Manager Licensing
Constellation Energy Generation, LLC

Attachment: Response to Request for Additional Information

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station
Illinois Emergency Management Agency – Department of Nuclear Safety

ATTACHMENT
Response to Request for Additional Information

REQUEST FOR ADDITIONAL INFORMATION
OFFICE OF NUCLEAR REACTOR REGULATION

CONSTELLATION ENERGY GENERATION, LLC

DOCKET NOS. 50-237, AND 50-249
EPID: L-2022-LLA-0085

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated June 8, 2022, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22159A310) Constellation Energy Generation, LLC (CEG, or the licensee) submitted a request for amendments to Renewed Facility Operating License Nos. DPR-19 and DPR-25 for Dresden Nuclear Power Station (DNPS) Units 2 and 3. Specifically, the amendment request is proposing a new criticality safety analysis (CSA) methodology for performing the criticality safety evaluation for legacy fuel types in addition to the GNF3 reload fuel in the spent fuel pool (SFP). The amendment request is also proposing a change to the new fuel vault (NFV) CSA to utilize the GESTAR II methodology for validating the NFV criticality safety for GNF3 fuel in the General Electric (GE) designed NFV racks.

The U.S. Nuclear Regulatory Commission (NRC) staff is currently reviewing your application and has identified areas where additional information is needed to complete its review. The Request for Additional Information (RAI) is provided below.

SFNB RAIs:

Regulatory Requirements:

Title 10 of the Code of Federal Regulations (10 CFR), Part 50, Appendix A, Criterion 5 requires, "Structures, systems, and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown."

10 CFR Part 50, Appendix A, Criterion 62 requires, "Criticality in the fuel storage and handling system shall be prevented by physical systems or processes, preferably by use of geometrically safe configurations."

Paragraph 50.68(a) of 10 CFR requires, "Each holder of a construction permit or operating license for a nuclear power reactor issued under this part or a combined license for a nuclear power reactor issued under Part 52 of this chapter, shall comply with either 10 CFR 70.24 of this chapter or the requirements in paragraph (b) of this section." The licensee has chosen to comply with Paragraph 50.68(b) of 10 CFR.

Paragraph 50.68(b)(2) of 10 CFR requires, "The estimated ratio of neutron production to neutron absorption and leakage (k-effective) of the fresh fuel in the fresh fuel storage racks shall be calculated assuming the racks are loaded with fuel of the maximum fuel assembly reactivity and flooded with unborated water and must not exceed 0.95, at a 95 percent probability, 95

percent confidence level. This evaluation need not be performed if administrative controls and/or design features prevent such flooding or if fresh fuel storage racks are not used." Paragraph 50.68(b)(3) of 10 CFR requires, "If optimum moderation of fresh fuel in the fresh fuel storage racks occurs when the racks are assumed to be loaded with fuel of the maximum fuel assembly reactivity and filled with low-density hydrogenous fluid, the k-effective corresponding to this optimum moderation must not exceed 0.98, at a 95 percent probability, 95 percent confidence level. This evaluation need not be performed if administrative controls and/or design features prevent such moderation or if fresh fuel storage racks are not used."

RAI-SFNB-1:

In Section 2.2 New Fuel Vault Criticality Safety Analysis of Attachment 1 to the June 8, 2022 letter, it states, "The DNPS NFV racks are GE designed low density racks with a center-to-center spacing within a given row of 6.625 inches and an interrack spacing of 11.06 inches. The NFV rack CSA coverage for the new GNF3 fuel will be the GESTAR II (Reference 6.2) analysis for GE designed low density NFV racks, upon approval of this proposed license amendment. The previous NFV CSA will no longer be applicable to DNPS upon implementation of this license amendment because the only fuel to be delivered to the site for core reloads will be GNF3."

However, Reference 6.2, GE Licensing Topical Report NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II, Main)," Revision 31, dated November 2020 (ADAMS Accession Number ML20330A197/ML20330A198 (proprietary version) and ML20330A199 (non-proprietary version)) does not contain a nuclear criticality safety methodology or nuclear criticality safety analysis. To expedite its review of the licensee's amendment request regarding storage of fuel assemblies in its NFV and SFP, the NRC conducted an audit of the documentation supporting the amendment request. During the audit, it was discovered that there is no generic NFV criticality safety analysis methodology. Instead, there is a fuel design specific NFV criticality safety analysis. In order to set the fuel design specific NFV criticality safety analysis as the Analysis of Record for the licensee, the fuel design specific NFV criticality safety analysis needs to be on the docket. Therefore, the NRC staff requests the licensee submit the fuel design specific NFV criticality safety analysis so that the NRC staff can determine whether this analysis demonstrates compliance with the regulatory requirements identified above.

Request

The NRC staff requests the licensee submit the fuel design specific NFV criticality safety analysis so that the NRC staff can determine whether this analysis demonstrates compliance with the regulatory requirements identified above.

CEG Response

The fuel design specific new fuel vault (NFV) criticality safety analysis for GNF3 fuel was provided in GEH Report 003N7421-NP/003N7421-P, Attachments 2 (non-proprietary version) and 4 (proprietary version), (Reference). The fuel-type-specific analysis is applicable for GNF3 fuel stored in GE-designed NFV racks with cell pitches equal to or greater than those shown in

Table 1-1, "New Fuel Vault Rack Dimensions" of the referenced reports. The installed Dresden Nuclear Power Station (DNPS) NFV racks are bounded by Concept 2 dimensions provided in the referenced table. The analysis demonstrates that storage of GNF3 fuel, with maximum cold, uncontrolled in-core eigenvalue (kinf) of 1.31, in the DNPS NFV racks results in a storage rack maximum k-effective within a 95/95 confidence interval (kmax(95/95)) of less than 0.90 for dry normal storage conditions, and less than 0.95 for credible abnormal operation with tolerances and uncertainties considered.

REFERENCE:

GEH Report 003N7421-NP/003N7421-P, Revision 1, "Generic Criticality Safety Analysis of GE New Fuel Storage Racks for GNF3 Fuel," dated September 2022 (ADAMS Accession Nos. ML22278A149 (non-proprietary version) ML22278A150 (proprietary version))

RAI-SFNB-2:

The NFV has a standard cold core geometry (SCCG) limit of less than or equal to 1.31 k-effective (k_{eff}) and the proposed Technical Specification (TS) 4.3.1.1.c SFP SCCG limit is less than or equal to 1.33 k_{eff}. This indicates that fuel assemblies that are acceptable for storage in the SFP cannot be stored in the NFV. Describe how the fuel assemblies at DNPS are controlled in order to ensure that fuel assemblies with a SCCG of between 1.31 and 1.33 k_{eff} are not inadvertently loaded in the NFV.

Request

Describe how the fuel assemblies at DNPS are controlled in order to ensure that fuel assemblies with a SCCG of between 1.31 and 1.33 k_{eff} are not inadvertently loaded in the NFV.

CEG Response

CEG fuel design procedures and processes ensure the SCCG limit of 1.31 for the NFV is independently reviewed along with the SCCG limit of 1.33 for the SFP for all GNF3 fuel assemblies for DNPS. GNF3 fuel assemblies at DNPS will generally be designed with a SCCG of less than or equal to 1.31. This will ensure that all GNF3 fuel assemblies are acceptable for storage in both the DNPS NFV and SFPs.

Should additional margin in the core design be required resulting in a SCCG value greater than 1.31, CEG procedures require documenting in the Corrective Action Program (CAP) and appropriate actions to be put in place to prevent the fuel assemblies from being stored in the NFV.