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PROPRIETARY INFORMATION – WITHHOLD UNDER 10 CFR 2.390

RS-22-083
June 17, 2022

10 CFR 50.90

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

LaSalle County Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

Subject: Response to Request for Additional Information Related to the License Amendment Request to Change New Fuel Storage Vault and Spent Fuel Storage Pool Criticality Methodologies, with Proposed Changes to Technical Specifications 4.3.1 and 5.6.5

References:

1. Letter from P.R. Simpson (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Licensing Amendment Request Regarding New Fuel Storage Vault and Spent Fuel Storage Pool Criticality Methodologies, with Proposed Changes to Technical Specifications Sections 4.3.1 and 5.6.5," dated June 30, 2021 (ML21183A169)
2. Letter from D.M. Gullott (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Supplemental Information for License Amendment Request Regarding New Fuel Storage Vault and Spent Fuel Storage Pool Criticality Methodologies, with Proposed Changes to Technical Specifications Sections 4.3.1 and 5.6.5," dated November 4, 2021 (ML21312A457)
3. Email from B. Vaidya (U.S. Nuclear Regulatory Commission) to J. Taken (Constellation Energy Generation, LLC), Subject: LASALLE UNITS 1 AND 2 –REQUEST FOR ADDITIONAL INFORMATION (RAI) RE: License Amendment Request Regarding New Fuel Storage Vault and Spent Fuel Storage Pool Criticality Methodologies, with Changes to TS Sections 4.3.1 and 5.6.5, dated May 18, 2022 (ML22138A411)

In Reference 1, Exelon Generation Company, LLC (EGC) submitted a license amendment request to adopt a new criticality safety analysis (CSA) methodology for LaSalle County Station, Units 1 and 2 (LSCS). On February 1, 2022 (ADAMS Accession No. ML22032A333), EGC was renamed Constellation Energy Generation, LLC (CEG).

Attachment 3 contains Proprietary Information. Withhold from public disclosure under 10 CFR 2.390. When separated from Attachment 3, this document is decontrolled.

LSCS is adopting a new 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). Use of the new SFP CSA methodology requires a change to the LSCS Technical Specifications (TS) 4.3.1, "Criticality." CEG 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 following attachments are included in support of CEG's response to the NRC request for additional information (RAI) in Reference 3:

1. Response to NRC Request for Additional Information (**Non-Proprietary Version**)
2. Global Nuclear Fuels – Americas, LLC 10 CFR 2.390 Affidavit for Withholding
3. Response to NRC Request for Additional Information (**Proprietary Version**)

Attachment 3 contains proprietary information to be withheld from public disclosure in accordance with 10 CFR 2.390, as documented by the signed affidavit in Attachment 2. The affidavit sets forth the basis on which Global Nuclear Fuels' (GNF) information may be withheld from public disclosure by the NRC and addresses with specificity the considerations listed in 10 CFR 2.390(b)(4), "Public inspections, exemptions, requests for withholding." Accordingly, it is respectfully requested that the information, which is proprietary to GNF be withheld from public disclosure. A redacted non-proprietary version of the RAI responses provided in Attachment 3 is provided as Attachment 1.

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 alter the conclusion provided in Reference 1. Additionally, 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 response to Request for Additional Information by transmitting a copy of this letter (without attachments) to the designated State Officials in accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b).

There are no regulatory commitments contained in this letter. Should you have any questions concerning this letter, please contact Mr. Jason C. Taken at (630) 657-3660.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 17th day of June 2022.

Respectfully,

Lueshen, Kevin Digitally signed by Lueshen, Kevin
Date: 2022.06.17 12:43:01 -05'00'

Kevin Lueshen
Sr. Manager Licensing
Constellation Energy Generation, LLC

Attachment 3 contains Proprietary Information. Withhold from public disclosure under 10 CFR 2.390. When separated from Attachment 3, this document is decontrolled.

Attachments:
1. Response to NRC Request for Additional Information (**Non-Proprietary Version**)
2. Global Nuclear Fuels - Americas, LLC 10 CFR 2.390 Affidavit
3. Response to NRC Request for Additional Information (**Proprietary Version**)

cc:

U.S. NRC Region III, Regional Administrator (without attachments)
U.S. NRC Senior Resident Inspector, LaSalle County Station (without attachments)
Illinois Emergency Management Agency – Division of Nuclear Safety (without attachments)

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ATTACHMENT 1

Response to NRC Request for Additional Information

Non-Proprietary Version

ATTACHMENT 1
Response to NRC Request for Additional Information

INTRODUCTION

By letter dated June 30, 2021, Exelon Generation, licensee at the time, submitted a request to amend the LaSalle County Station, Units 1 and 2, Facility Operating Licenses as necessary to use 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); to change 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; and to change both LSCS Technical Specifications (TS) 4.3.1, "Criticality," and TS 5.6.5, “Core Operating Limits Report (COLR),” to reflect conditions present upon license amendment approval (ML21183A169). This was supplemented by letter dated November 4, 2021 (ML21312A457). On February 1, 2022 (ADAMS Accession No. ML22032A333), Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC.

RAI-STSB-1

In letter dated June 30, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21183A170), as supplemented by letter dated November 4, 2021 (ADAMS Accession No. ML21312A457), the licensee submitted a license amendment request that proposed changes to LaSalle Technical Specification (TS) 5.6.5. The proposal eliminates NRC approved methods associated with Framatome fuel, leaving only an approved GE method in the TS. The LAR did not provide a technical justification for this change.

10 CFR 50.36 requires that the TS be derived from the analyses and evaluations included in the safety analysis report. At LaSalle, TS 5.6.5, Core Operating Limits Report (COLR), requires that core operating limits be established prior to each refueling cycle and specifies the NRC approved topical reports that define the methods that are used for determination of the core operating limits.

Provide a basis for the proposal to delete the Framatome topical reports from TS 5.6.5. Verify that fuel not evaluated by the remaining topical report will not be loaded or reloaded into the core without previous NRC approval and that the methods associated with the topical reports proposed for deletion from TS 5.6.5 are no longer used for establishing COLR criteria.

Constellation Response to RAI-STSB-1

Beginning in 2009, LSCS Unit 2 operated a limited number of ATRIUM 10XM fuel bundles as Lead Use Assemblies (LUAs); the engineering change documentation and associated 50.59 review determined that prior NRC approval was not required prior to operation. In 2012 and 2013, LSCS Units 1 and 2 respectively transitioned from reload batches of AREVA’s (now Framatome) ATRIUM 10 fuel to GNF’s GNF2 fuel. The change from AREVA fuel to GNF fuel was implemented with engineering change documentation, including the required 50.59 reviews. There was no change to TS 5.6.5 during these fuel introductions and vendor transitions, as GESTAR II remained part of the licensing basis. GNF2 fuel was demonstrated to be compliant with GESTAR II via the Amendment 22 process (Reference 8), so it was determined through the 50.59 screening process that a 50.59 evaluation and NRC approval was not required prior to operation of the GNF2 fuel type for either unit.

There were multiple cycles of mixed core operation with AREVA (now Framatome) and GNF fuel for each unit. ATRIUM 10 fuel ceased operation in Unit 1 on February 15, 2016. ATRIUM 10 fuel and the ATRIUM 10XM LUAs ceased operation in Unit 2 on February 6, 2017. All ATRIUM 10 and ATRIUM 10XM fuel bundles were subsequently removed from both cores and currently reside in the LSCS spent fuel pools.

CEG is confident that the reinsertion of a previously irradiated Framatome bundle in a future reload will not be necessary. As such, the Framatome methodologies currently listed in LSCS TS 5.6.5 are no longer utilized. Removal of the Framatome methodologies from the list of methodologies used for establishing COLR criteria is necessary to ensure that prior NRC approval would be obtained if any Framatome fuel, previously irradiated or fresh, is to be operated in either LSCS core.

During the RAI clarification call held May 18, 2022, CEG indicated that a violation was received for transitioning fuel vendors without notifying the NRC of such change. After further research, no violation was issued for transitioning fuel vendors without notifying the NRC of such change.

Instead, a violation (unrelated to this application) for non-compliance with TS 5.6.5 was issued during a 2015 inspection for using an analytical method that was not previously reviewed and approved by the NRC. Specifically in 2013, the licensee used TRACG04P code to determine the Oscillation Power Range Monitor setpoints prior to NRC approval. The TRACG04P code was subsequently reviewed and approved on April 24, 2015. TS Section 5.6.5.b stated, in part that the analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the TS. The licensee entered this finding into their Corrective Action Program (CAP) as IR 02528609 and IR 02528612 to correct the issue.

LSCS maintains the GESTAR II methodology in TS 5.6.5 because it is the primary licensing basis document utilized by Global Nuclear Fuels (GNF). As stated in the latest revision of GESTAR II Section 1.1, “Fuel design compliance with the fuel licensing acceptance criteria constitutes USNRC acceptance and approval of the fuel design without specific USNRC review.” Additionally, “if a new fuel design does not meet one of the criteria in Subsection 1.1, it…means the design has gone beyond the generic approval and must be reviewed” (Reference 9). To this end, LaSalle is allowed to continue to use GESTAR II, as amended, as part of the licensing basis via 50.59 evaluation and do not require prior NRC approval because the NRC has previously approved the GESTAR II amendments.

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)(1) of 10 CFR requires, “Plant procedures shall prohibit the handling and I will keep these as they are specific to SFP storage at any one time of more fuel assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water.”

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.”

Paragraph 50.68(b)(4) of 10 CFR requires, in part, “If no credit for soluble boron is taken, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95-percent probability, 95-percent confidence level, if flooded with unborated water.”

The LSCS SFP Criticality Safety Analysis (NCA) does not take credit for soluble boron, so the 50.68(b)(4) requirements regarding soluble boron do not apply.

In addition, paragraph 50.36(c)(4) of 10 CFR requires, “Design features. Design features to be included are those features of the facility such as materials of construction and geometric arrangements, which, if altered or modified, would have a significant effect on safety and are not covered in categories described in paragraphs (c) (1), (2), and (3) of this section.”

RAI-SFNB-1:

In Section 2.2 New Fuel Vault Criticality Safety Analysis of Attachment 1 to the licensee’s June 30, 2021, letter it states, “The LSCS NFV racks are General Electric (GE) designed low density racks with an interrack spacing of 12.25 inches (see section 9.1.1.2 of LSCS UFSAR). The NFV rack CSA coverage for the new GNF3 fuel will be the GESTAR II (Reference 6.4) analysis for

GE designed low density NFV racks upon approval of this proposed license amendment. The applicability of GESTAR II to the GNF3 fuel type is documented in the GNF3 GESTAR II validation report (Reference 6.6). The LSCS NFV interrack pitch is ≥ 10.5 inches (the criteria listed in GESTAR II) and thus the racks may be utilized to store new GNF fuel with in-rack SCCG k_{inf} ≤ 1.31 (Reference 6.4)."

However, neither Reference 6.4 "GE Licensing Topical Report NEDE-24011-P-A, "GESTAR II" - Implementing Improved GE Steady-State Methods, Revision 31 (TAC No. MA6481) (ML20330A197)" (contained in ADAMS Package Accession No. ML20330A195) nor Reference 6.6 "NEDC-33879P, Revision 4, "GNF3 Generic Compliance with NEDE-24011-P-A (GESTAR II), August 2020 ML20244A105)" contained in (ADAMS Package Accession No. ML20244A104) contain a nuclear criticality safety methodology or nuclear criticality safety analysis. Please provide the following:

- NFV criticality safety analysis methodology used in the analysis.
- Criticality safety analysis that sets the limits for the LSCS NFV.
- Criticality safety analysis that demonstrates GNF3 fuel meets the limits for the LSCS NFV.

Constellation Response to RAI-SFNB-1

The New Fuel Vault (NFV) criticality safety analysis methodology has been approved previously as part of GESTAR II. Revision 31 to NEDE-24011P - GESTAR II is the latest version of GESTAR II. GNF3 and the NFV methodology was previously reviewed by the NRC as part of Amendment 37 to GESTAR II and was incorporated first in GESTAR II in Revision 24. Amendment 37 RAI-3 (Reference 2), which is included in the US Supplement to GESTAR II (Reference 3), Page US.B-181, posed a clarification question regarding the details for the k_{inf} calculations for the lattices supporting the NFV analysis for the current GNF products. The RAI-3 response given by GEH/GNF provided details on the methodology and cited other NRC approved reports that utilized the same methodology. This methodology is the peak, cold in-core lattice infinite multiplication factor (k_{inf}) criterion for demonstrating compliance to the 10 CFR 50.68 fuel storage criticality criterion that has been used for all GE supplied fuel storage racks and is currently used for re-rack designs at a number of plants. The methodology relies upon a well-characterized linear relationship between in-core k_{inf} and in-rack k_{eff}, which is evaluated for each rack. A conservative lattice with a peak, cold in-core k_{inf} value at or above the intended storage limit is used in the criticality analyses. A criticality analysis is performed for each new GNF fuel product line per GESTAR II Section 1.1.3.G, which confirms that the k_{inf} limits described in GESTAR II Section 3.5 would result in a k_{max} value compliant with 10 CFR 50.68. The NRC staff reviewed the fresh and irradiated fuel storage criteria proposed and the methodology used in the calculations in Amendment 37 to GESTAR II and issued a Safety Evaluation (SE) that determined that the criteria and methodology are acceptable (Reference 4).

GNF performed a criticality safety analysis for GNF3 fuel using bounding new fuel storage rack parameters in support of their GNF3 GESTAR II validation report. The NFV criticality analysis modeled the actual rectangular dimensions and tolerances of both options to determine the restrictions outlined in GESTAR II. The two models used in the criticality safety analysis for the GNF3 NFV have rectangular dimensions of [[
]]. The limiting model bounds the storage geometry of the NFV racks at Lasalle. The analysis performed is generic to all new fuel vault (NFV) racks manufactured by GE, and the

NFV racks at Lasalle were manufactured by GE. The criticality analysis performed by GNF for GNF3 fuel stored in a NFV is based on the geometry of the NFV racks, specifically the interrack pitch is required to be ≥ 10.5 inches. This set the restrictions outlined in GESTAR II, specifically that with an interrack pitch of ≥ 10.5 inches, the NFV racks may be utilized to store new GNF fuel with an in-core SCCG k_{inf} ≤ 1.31 (Note: the application and thus, RAI-SFNB-1 incorrectly stated **in-rack** SCCG). Therefore, the Lasalle NFV racks may be utilized to store new GNF3 fuel with in-core SCCG k_{inf} ≤ 1.31.

RAI-SFNB-2:

LSCS UFSAR section 9.1.1.2 indicates the NFV racks have a nominal center to center pitch that is considerably less than 10.5 inches. Explain and clarify this apparent discrepancy.

Constellation Response to RAI-SFNB-2

The LSCS UFSAR Section 9.1.1.2 indicates that, *"Each new fuel storage rack holds up to 10 channeled or unchanneled assemblies in a row spaced nominally 7 inches apart center to center. All racks are designed such that they can be arranged in rows on a nominal 12.25-in center-to-center spacing."* This statement in the UFSAR means that in a row the bundles are placed 7 inches apart (center-to-center), and from one row to the next the bundles are placed 12.25 inches apart (center-to-center). The geometry of the new fuel vault racks has been confirmed to be 7 inches along a row and 12.25 inches from row to row, and this nominal spacing has not been changed since construction of the new fuel vault racks. As stated in the response to RAI-SFNB-3, the mechanical and structural design of the NFV racks ensures that the spacing between bundles in the NFV racks is maintained at all times (7 inches x 12.25 inches), even during the worst-case seismic event.

From GESTAR II Section 3.5, the 10 CFR 50.68 criteria will be satisfied for new fuel stored in low-density new fuel vault storage racks if the cold uncontrolled in-core k_{inf} for a lattice calculated in the normal reactor core configuration meets the following condition for General Electric designed fuel storage racks: k_{inf} ≤ 1.31 for low-density new fuel vault storage racks with an interrack spacing ≥ 10.50 inches.

The interrack spacing referred to in GESTAR II is the spacing between rows. For LaSalle, this spacing is 12.25 inches, which is greater than 10.50 inches required by GESTAR II. The two models used in the criticality safety analysis for the GNF3 NFV have rectangular dimensions of [[ ]]. The NFV criticality analysis modeled the actual rectangular dimensions and tolerances of both options to determine the restrictions outlined in GESTAR II. These models bound the geometry of the Lasalle NFV racks and are therefore covered under GESTAR II. Therefore, GNF3 fuel with a k_{inf} ≤ 1.31 can be stored in the Lasalle NFV racks and meet the 10 CFR 50.68 criteria.

RAI-SFNB-3:

The LSCS NFV center to center pitch is critical to maintaining the geometric spacing of fuel assemblies to ensure CFR50.68(b)(2) is met. Describe the controls LSCS has in place to ensure the LSCS NFV center to center spacing is maintained?

Constellation Response to RAI-SFNB-3

The mechanical and structural design of the NFV racks ensures that the spacing between bundles in the NFV racks is maintained at all times, even during the worst-case seismic event. Therefore, the spacing in the NFV racks is ensured to be greater than that required in the GESTAR II criticality safety analysis for new GNF3 fuel stored in a NFV.

From LSCS UFSAR Section 9.1.1.3, *"The new fuel storage racks are designed to meet Seismic Category I requirements. Stresses in a fully loaded rack do not exceed stresses specified by the ASTM standards for aluminum alloys when subjected to the seismic loads."* Also from LSCS UFSAR Section 9.1.1.3, *"The new fuel racks are designed to be restrained by holddown bolts to assure that rack spacing does not vary during an SSE."*

In addition, the design of the NFV racks prevents bundles from being inserted into locations in the NFV racks that would reduce spacing outside the bounds analyzed in the GESTAR II criticality safety analysis for new GNF3 fuel stored in a NFV.

From LSCS UFSAR Section 9.1.1.2, *"The design of the racks prevents accidental insertion of the fuel assembly in a position not intended for the fuel. This is achieved by abutting the side flanges on adjacently installed racks. In this way, the only spaces in the assembly are those into which it is intended to insert fuel."*

RAI-SFNB-4:

In Section 4.1 Applicable Regulatory Requirements/Criteria of Attachment 1 to the licensee's June 30, 2021, letter states, in part "The regulation also states that for the optimum moderation case the k_{eff} must not exceed 0.98 at a 95 percent probability, 95 percent confidence level. The optimum moderation case is not applicable to LaSalle's NFV as it is a moderation controlled area (see Section 9.1.1.3 of the LSCS UFSAR)." In Section 9.1.1.3 of the LSCS UFSAR states, "The new fuel storage vault will be covered during periods when construction or maintenance activities are underway on the refueling floor." However, 10 CFR 50.68(b)(3) requires optimum moderation be prevented to forgo complying with the k-effective portion of the paragraph. It is unclear how covering the NFV for part of the time is sufficient to preclude an optimum moderation condition all of the time. Explain how an optimum moderation condition is precluded at all times.

Constellation Response to RAI-SFNB-4

Section 9.1.1.3 of the LSCS UFSAR states, *"The new fuel storage vault will be covered during periods when construction or maintenance activities are underway on the refueling floor."* This statement in the UFSAR is not intended to be encompassing of measures in preventing the optimum moderation condition. It is meant to be a supplemental good practice to ensure the new fuel storage vault is covered during construction or maintenance activities on the refuel floor. Additionally, this is not the only time the new fuel vault is covered; the new fuel vault is generally covered.

The optimum moderation condition is precluded at all times at LSCS because administrative controls as generally defined in SIL 152 have been incorporated for the area. See response to RAI-SFNB-5 for additional details on how LSCS complies with SIL 152.

RAI-SFNB-5:

The measures LSCS has to ensure NFV optimum moderation condition is precluded at all times are essential to forgoing the NFV optimum moderation k-effective analysis otherwise stipulated in CFR50.68(b)(3). Describe the controls LSCS has in place to ensure those measures are not compromised?

Constellation Response to RAI-SFNB-5

Section 9.1.1.3 of the LSCS UFSAR states, *"In addition, controls have been implemented to further reduce the probability of a criticality occurrence, i.e., the storage array will be in a moderation controlled area. A moderation control area limits the amount of hydrogenous material in the area. Administrative controls as generally defined in SIL 152 (Reference 10 [of LSCS UFSAR Section 9.1]) have been incorporated for the area."*

To preclude the existence of the optimum moderation condition in the new fuel vault, LSCS uses the following administrative and procedural controls:

- The new fuel vault is located in a moderation controlled area that limits the amount of hydrogenous material in the area.
- The Refueling Floor does not have fog-type firefighting nozzles.
- Only manual firefighting equipment is utilized on the Refueling Floor and adequate floor drainage is provided.
- When activities that increase the probability of a fire (i.e., welding, grinding, etc.) are being performed within 25 feet of the vault and the vault contains new fuel, the vault plugs are installed.
- NO more than one fuel bundle shall be suspended above the fuel storage array at any time, at a height NO greater than 24 inches to limit penetration displacement if the bundle were to be dropped.
- A fuel array of up to three fuel bundles outside of a normal storage area or normal shipping container should be maintained with an edge-to-edge spacing of 12 inches or more from all other fuel.
- A fuel array of four or more fuel bundles outside of the normal fuel storage areas or normal shipping containers is prohibited.
- Fuel handling in the fuel storage area should be limited to one fuel assembly or the weight equivalent per crane. An exception to this requirement is a properly designed fuel shipping container or an overload test weight. The shipping container or overload test weight should at no time be suspended above the fuel storage array.
- The new fuel vault should always be kept dry.
- Fuel movement in the new vault must not be permitted if an abnormal condition of vault flooding occurs.
- Fuel should NOT be placed in aisles or moved through aisles adjacent to and at the same level of the storage racks.

- No more than two fuel bundles should be allowed in or around a fuel prep machine at any time. This fuel should be separated from the main body of stored fuel by at least 12 inches.

As to how these measures that preclude the NFV optimum moderation condition are not compromised – these administrative controls are generally implemented via fire protection plans or procedural requirements. This is summarized as follows:

- Hydrogenous material is limited on the refuel floor at all times.
- The Fire Protection Report at Lasalle dictates the fire plan for the refueling floor and which fire fighting equipment is to be used and not used at Lasalle.
- The fuel handling guidance described above is specified in Lasalle Fuel Handling procedures.

LSCS utilizes these standard industry practices to comply with GE SIL 152 to preclude the optimum moderation condition. These practices have been found acceptable to forgo specifically analyzing the optimum moderation condition stipulated in 10 CFR50.68 (b)(3).

RAI-SFNB-6:

The description of the analysis in NEDC-33931P Revision 1 (Attachment 2 to the licensee's November 4, 2021, letter) Section 5.5.2 Normal Bias Cases provides a brief description of the analysis performed to evaluate the 'No Boral/Inserts on the rack periphery' issue. The analysis considers perturbed scenarios referenced to a non-perturbed scenario. NEDC-33931P Revision 1 Section 5.5.3 Abnormal/Accident Bias Cases provides a brief description of the analysis performed to evaluate the 'Abnormal positioning of fuel assembly outside the fuel storage rack.' This analysis also considers perturbed scenarios referenced to a non-perturbed scenario. The descriptions provided indicates the non-perturbed scenario values in both the 'No Boral/Inserts on the rack periphery' and the 'Abnormal positioning of fuel assembly outside the fuel storage rack' evaluations should be identical. However comparison of the information listed in Tables 13/14 to Tables 15/16 indicate they are not identical. Explain the differences between the non-perturbed scenario values in these tables.

Constellation Response to RAI-SFNB-6

The 'No Boral/Inserts on the rack periphery' and 'Abnormal positioning of fuel assembly outside the fuel storage rack' cases are not intended to be identical. Therefore, the results in Tables 13/14 and Tables 15/16 should not be identical, as is the case in NEDC-33931P. In the rack periphery study detailed in NEDC-33931P, Revision 1, Section 5.5.2, the non-perturbed case [[

]]. In the study examining the abnormal positioning of fuel outside of the storage rack in NEDC-33931P, Revision 1, Section 5.5.3, the non-perturbed case [[

]]

RAI-SFNB-7:

In Section 1.0 INTRODUCTION of NEDC-33931P Revision 1 (Attachment 1 to the licensee's November 4, 2021, letter) it states, "A maximum Standard Cold Core Geometry (SCCG), uncontrolled peak in-core k_∞ of 1.275 as defined by the lattice physics code TGBLA06 (Reference 1) is set as the limit for this analysis." However, NEDC-33931P Revision 1 Reference 1 does not have a clear nexus to how TGBLA06 calculates a SCCG. Additionally, NEDC-33931P Revision 1 Reference 1 is dated November 10, 1999, which predates GNF3 fuel by at least a decade. Provide the methodology or appropriate reference for how TGBLA06 calculates SCCG and the analysis or appropriate reference for how TGBLA06 is an appropriate code for modeling GNF3.

Constellation Response to RAI-SFNB-7

TGBLA06 is a lattice physics code that calculates exposure dependent pin-by-pin isotopic specifications for the use in developing the design basis lattice used in the spent fuel pool criticality safety analysis, but also has many other applications across GEH/GNF. NEDC-33931P, Revision 1, Reference 1 documents the NRC's earlier acceptance of TGBLA06 and its methodology (Reference 10). More recently, during Amendment 49 to NEDE-24011P - GESTAR II (Reference 5), Supplement 5P-A, Revision 1, "Applicability of GE Methods to Expanded Operating Domains – Supplement for GNF3 Fuel" was included to discuss in detail the applicability of GEH/GNF methods, such as TGBLA06, to the GNF3 product line. The NRC performed a Final Safety Evaluation for this supplement (Reference 6) and amendment (Reference 7) and accepted the supplement's technical conclusions and inclusion into GESTAR II.

References

1) LaSalle Units 1 and 2 – Updated Final Safety Analysis Report (UFSAR), Revision 25, dated April 2022
2) "GESTAR II Amendment 37," dated March 2017 (ADAMS Accession Number ML17066A346 (proprietary version))
3) GE Licensing Topical Report, NEDE-24011-P-A-31-US, "US Supplement to General Electric Standard Application for Reactor Fuel (GESTAR II)," dated November 2020 (ADAMS Accession Number ML20330A195 (proprietary version) and ML20330A196 (non-proprietary version))
4) Letter, K. Hsueh (NRC) to J. Head (GNF-A), "Final Safety Evaluation for Amendment 37 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. MF0743)," dated March 13, 2017 (ADAMS Accession Number ML17066A291 and ML17069A311)
5) Letter, B. Moore (GNF-A) to U.S. Nuclear Regulatory Commission, "Administrative Amendment 49 to NEDE-24011-P-A-27, General Electric Standard Application for Reactor Fuel (GESTAR II)," dated October 1, 2018 (ADAMS Accession Number ML18274A195)

6) Letter, D. Morey (NRC) to M. Catts (GNF-A), "Final Safety Evaluation for NEDC-33173P Supplement 5 – Applicability of GE Methods to Expanded Operating Domains – Supplement for GNF3 Fuel (EPID: L-2017-TOP-0033)," dated March 21, 2019 (ML19064A229 (proprietary version) and ML19074A054 (non-proprietary version))
7) Letter, D. Morey (NRC) to M. Catts (GNF-A), "Final Safety Evaluation for Proposed "Administrative Amendment 49 to NEDE-24011-P-A-27, 'General Electric Standard Application for Reactor Fuel (GESTAR II)'" (EPID L-2018-TOP-0039)," dated September 25, 2019 (ADAMS Accession Number ML19267A051)
8) Letter FLN-2007-011, A. Lingenfelter (GNF-A) to U.S. Nuclear Regulatory Commission, "GNF2 Advantage Generic Compliance with NEDE-24011-P-A (GESTAR II), NEDC-33270P, March 2007, and GEXL17 Correlation for GNF2 Fuel, NEDE-33292P, March 2007," dated March 14, 2007 (ADAMS Accession Number ML070780333 (proprietary version) and ML070780335/ML070780337 (non-proprietary version))
9) 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))
10) Letter MFN-035-99, S. Richards (NRC) to G. Watford (GE), "Amendment 26 to GE Licensing Topical Report NEDE-24011-P-A, "GESTAR II" - Implementing Improved GE Steady State Methods (TAC No. MA6481)," dated November 10, 1999 (ADAMS Accession Number ML993230184)

ATTACHMENT 2

Global Nuclear Fuels - Americas, LLC 10 CFR 2.390 Affidavit for Withholding

Global Nuclear Fuel – Americas, LLC

AFFIDAVIT

I, Kent Halac, state as follows:

(1) I am the Senior Engineer, Global Nuclear Fuel – Americas, LLC ("GNF-A"), and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the letter from K. Lueshen (Constellation Energy Generation, LLC) to the Nuclear Regulatory Commission, RS-22-083, "Response to Request for Additional Information Related to the License Amendment Request to Change New Fuel Storage Vault and Spent Fuel Storage Pool Criticality Methodologies, with Proposed Changes to Technical Specifications 4.3.1 and 5.6.5," dated June 2022. GNF-A proprietary information in RS-22-083 is identified by a dotted underline inside double square brackets. [[This sentence is an example {3}]]. GNF-A proprietary information in figures and large objects is identified by double square brackets before and after the object. In each case, the superscript notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GNF-A relies upon the exemption from disclosure set forth in the *Freedom of Information Act* ("FOIA"), 5 U.S.C. §552(b)(4), and the *Trade Secrets Act*, 18 U.S.C. §1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for trade secrets (Exemption 4). The material for which exemption from disclosure is here sought also qualifies under the narrower definition of trade secret, within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975 F.2d 871 (D.C. Cir. 1992), and Public Citizen Health Research Group v. FDA, 704 F.2d 1280 (D.C. Cir. 1983).

(4) The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a and (4)b. Some examples of categories of information that fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GNF-A's competitors without a license from GNF-A constitutes a competitive economic advantage over other companies;

b. Information that, if used by a competitor, would reduce its expenditure of resources or improve its competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information that reveals aspects of past, present, or future GNF-A customer-funded development plans and programs, resulting in potential products to GNF-A;

d. Information that discloses trade secret or potentially patentable subject matter for which it may be desirable to obtain patent protection.

(5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GNF-A and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GNF-A, not been disclosed publicly, and not been made available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions for proprietary or confidentiality agreements or both that provide for maintaining the information in confidence. The initial designation of this information as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in the following paragraphs (6) and (7).

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, who is the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or who is the person most likely to be subject to the terms under which it was licensed to GNF-A.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist, or other equivalent authority for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GNF-A are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary and/or confidentiality agreements.

(8) The information identified in paragraph (2) is classified as proprietary because it contains the detailed GNF-A methodology for fuel analyses for the GNF-A Boiling Water Reactor (BWR). These methods, techniques, and data along with their application to the design, modification, and analyses associated with the fuel analyses were achieved at a significant cost to GNF-A.

The development of the evaluation processes along with the interpretation and application of the analytical results is derived from the extensive experience databases that constitute a major GNF-A asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GNF-A's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GNF-A's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and

analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GNF-A. The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial. GNF-A's competitive advantage will be lost if its competitors are able to use the results of the GNF-A experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GNF-A would be lost if the information were disclosed to the public. Making such information available to competitors without there having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall and deprive GNF-A of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

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

Executed on this 16th day of June 2022.

Kent Halac
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