



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001**

July 3, 2023

Scott P. Murray, Licensing Manager  
Global Nuclear Fuel-Americas  
3901 Castle Hayne Road  
P.O. Box 780  
Wilmington, NC 28402

**SUBJECT: GLOBAL NUCLEAR FUEL – AMERICAS LLC: REQUEST FOR ADDITIONAL INFORMATION TO SUPPORT REVIEW OF GLOBAL NUCLEAR FUEL – AMERICAS LICENSE AMENDMENT REQUEST FOR 8 WEIGHT PERCENT URANIUM 235 (ENTERPRISE PROJECT IDENTIFICATION NUMBER L-2022-LLA-0065)**

Dear Scott Murray:

By letter dated June 24, 2022 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML22175A070), Global Nuclear Fuel – Americas LLC requested a license amendment to the U.S. Nuclear Regulatory Commission (NRC) materials license SNM-1097 to permit nuclear fuel fabrication at material enrichments up to 8 weight percent uranium-235. The NRC staff accepted the submittal for formal review via letter dated November 2, 2022 (ADAMS Accession No. ML22304A671).

The NRC staff has identified additional information that is needed to proceed with the formal review. The additional information, specified in the enclosure, should be provided within 30 days from the date of this letter. Prior to submitting a response, please consider holding a call with the NRC staff to discuss the new information.

Pending your response, we anticipate completing our review by October 31, 2023. This date could change depending on the findings of our technical review, urgent assignments, or other factors. We will promptly communicate any significant changes to this schedule.

In accordance with Title 10 of the *Code of Federal Regulations*, Section 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's ADAMS. ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html>.

S. Murray

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If you have any questions regarding this communication, please contact Jonathan Rowley at 301-415-4053, or via email at [jonathan.rowley@nrc.gov](mailto:jonathan.rowley@nrc.gov).

Sincerely,



Signed by Lav, Samantha  
on 07/03/23

Samantha Lav, Chief  
Fuel Facility Licensing Branch  
Division of Fuel Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No. 07001113  
License No. SNM-1097

Enclosure:  
Request for Additional Information

cc: [gnfa@listmgr.nrc.gov](mailto:gnfa@listmgr.nrc.gov)

SUBJECT: GLOBAL NUCLEAR FUEL – AMERICAS LLC: REQUEST FOR ADDITIONAL INFORMATION TO SUPPORT REVIEW OF GLOBAL NUCLEAR FUEL – AMERICAS LICENSE AMENDMENT REQUEST FOR 8 WEIGHT PERCENT URANIUM 235 (ENTERPRISE PROJECT IDENTIFICATION NUMBER L-2022-LLA-0065)

DOCUMENT DATE: July 3, 2023

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**ADAMS Accession No: ML23156A183**

**\*via email**

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## REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST FOR 8 WEIGHT PERCENT URANIUM 235

GLOBAL NUCLEAR FUEL – AMERICAS, LLC

DOCKET NO. 70-1113

MATERIALS LICENSE SNM-1097

The following request for additional information is necessary to facilitate the Nuclear Regulatory Commission (NRC) staff's review.

### **NCS-1**

#### **REGULATORY BASIS**

Title 10 of the *Code of Federal Regulations* (10 CFR) 70.61(d) requires, in part, the risk of nuclear criticality accidents be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical, including use of an approved margin of subcriticality for safety.

NUREG-1520 provides guidance for demonstrating compliance with this requirement. Section 5.3.B.2 of NUREG-1520, "Standard Review Plan for Fuel Cycle Facilities License Applications," Revision 2, states that the NRC staff reviews should include any portions of the integrated safety analysis (ISA) summary affected by the requested changes, including process descriptions, new or changed assumptions, controlled parameters, safety limits, controls, or safety margin, as well as new or changed criticality accident sequences and items relied on for safety.

Section 5.3.B.5 of NUREG-1520, "Standard Review Plan for Fuel Cycle Facilities License Applications," Revision 2, states that the NRC staff reviews should include the justification for the requested changes, including revised criticality safety basis documents (process hazards analyses, criticality safety evaluations, calculations, and other supporting technical documents) that are needed to demonstrate adequate protection against the risk of accidental criticality.

#### **DESCRIPTION OF ISSUE**

In its request dated June 24, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22175A069), Global Nuclear Fuel – Americas LLC (GNF-A) stated that its criticality safety function evaluated the proposed amendment and concluded that the request to increase enrichments up to 8.0 weight percent uranium-235 (U-235) will result in modifications to select nuclear criticality safety controls as documented in supporting Criticality Safety Analyses (CSAs).

#### **INFORMATION NEEDED**

To facilitate the staff's review of the requested amendment, provide the following criticality safety basis documents:

- CSA 206.00.100 for the Dry Conversion Process (DCP) Blend, Pre-Compact, and Granulate Process;
- CSA 407.00.100 for Rod Processing;

Enclosure

- CSA 801.00.100 for General Can Storage; and
- CSA 702H.00.100 for the 8.0 weight percent Liquid Radioactive Waste System

## **NCS-2**

### **REGULATORY BASIS**

The regulation in 10 CFR 70.61(d) requires, in part, the risk of nuclear criticality accidents be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical, including use of an approved margin of subcriticality for safety.

NUREG-1520 provides guidance for demonstrating compliance with this requirement. Section 5.3.B.2 of NUREG-1520, "Standard Review Plan for Fuel Cycle Facilities License Applications," Revision 2, states that the NRC staff reviews should include any portions of the ISA summary affected by the requested changes, including process descriptions, new or changed assumptions, controlled parameters, safety limits, controls, or safety margin, as well as new or changed criticality accident sequences and items relied on for safety.

Section 5.3.B.5 of NUREG-1520, "Standard Review Plan for Fuel Cycle Facilities License Applications," Revision 2, states that the NRC staff reviews should include the justification for the requested changes, including revised criticality safety basis documents (process hazards analyses, criticality safety evaluations, calculations, and other supporting technical documents) that are needed to demonstrate adequate protection against the risk of accidental criticality.

### **DESCRIPTION OF ISSUE**

It is the staff's understanding based that GNF-A does not intend to take credit for neutron absorbers added to in-process fuel, such as gadolinia, for enrichments greater than 5.0 weight percent U-235. However, Section 5.4.4.5 of the SNM-1097 license application states that credit may be taken for neutron absorbers added to in-process fuel, and no changes have been made to the SNM-1097 license application that would limit this practice to enrichments of 5.0 weight U-235 or less. Furthermore, in its request dated June 24, 2022 (ADAMS Accession No. ML22175A069), GNF-A stated that GNF-A does not have plans for segmentation of the fuel fabrication facility based on enrichment and that the entire fuel fabrication facility will be approved and controlled to safely process material enrichments up to 8.0 weight percent U-235.

### **INFORMATION NEEDED**

State whether GNF-A intends to take credit for neutron absorbers added to in-process fuel for enrichments greater than 5.0 weight percent U-235. If GNF-A no longer intends to take credit for neutron absorbers added to in-process fuel, provide changes to the SNM-1097 license application.

## **NCS-3**

### **REGULATORY BASIS**

The regulation in 10 CFR 70.24 requires, in part, each licensee authorized to possess special nuclear material in a quantity exceeding 700 grams of contained U-235, 520 grams of U-233, 450 grams of plutonium, 1,500 grams of contained U-235 if no uranium enriched to more than 4 percent by weight of U-235 is present, 450 grams of any combination thereof, or one-half such quantities if massive moderators or reflectors made of graphite, heavy water or beryllium may be present, maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system meeting the requirements of either paragraph (a)(1) or

(a)(2), as appropriate, and using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs.

NUREG-1520 provides guidance for demonstrating compliance with this requirement. Section 5.3.B.3 of NUREG-1520, "Standard Review Plan for Fuel Cycle Facilities License Applications," Revision 2, states that the NRC staff reviews should include any portions of the license application and ISA Summary pertaining to the licensee's criticality accident alarm system and emergency response measures affected by the change, and that staff reviews should verify that the applicant still complies with the requirements of 10 CFR 70.24, "Criticality accident requirements."

#### DESCRIPTION OF ISSUE

The current SNM-1097 grants an exemption from the requirements of 10 CFR 70.24 in areas where the licensee has demonstrated that a criticality accident is not credible and there is not more than 1) a safe batch of finished reactor fuel rods, or 2) the quantity of uranium authorized for delivery to a carrier when fully packaged for transport according to a valid the NRC authorization for such packages without limit on the number of packages, provided storage locations preclude mechanical damage and flooding. However, the basis for granting this exemption relied on the assumption that special nuclear material would be limited to an enrichment of 5.0 weight percent U-235.

#### INFORMATION NEEDED

State which areas of the facility GNF-A intends to be exempt from the requirements of 10 CFR 70.24. For each such area, provide information that demonstrates that the current exemption from the requirements of 10 CFR 70.24 remains valid for enrichments up to 8.0 weight percent U-235. Alternatively, submit a request for exemption from the requirements of 10 CFR 70.24 for each such area and provide a justification that demonstrates that criticality is not credible for enrichments up to 8.0 weight percent U-235.

#### **Environmental RAIs**

#### REGULATORY BASIS

The regulation in 10 CFR 51.60, "Environmental report – materials licenses," and the guidance in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs," outline the information that should be provided by the licensee for the NRC staff to assess the environmental impacts of the proposed action and prepare an Environmental Assessment (EA).

#### DESCRIPTION OF ISSUE

The licensee should provide publicly available information in order for the NRC staff to complete its environmental review of the proposed license amendment request (LAR). The proposed increased enrichment may require some necessary changes for safe handling of material. For each of the items mentioned in the "Information Needed" section below, provide the requested details so that the NRC can evaluate the impacts of the requested action.

#### INFORMATION NEEDED

#### **Enviro-1**

Please explain what changes would occur due to use of uranium enriched to 8.0 weight percent U-235 at the GNF-A fuel fabrication facility.

- a. Would the same type and size 30-B cylinder be used with the higher enrichment, or a different model cylinder be used?
- b. Would the process for receipt, handling and temporary storage change due to increased enrichment? If no changes are necessary, please state this.
- c. Would the cylinder pad storage change to accommodate the increased enrichment. If no changes are necessary, please state this.
- d. Would the number of enriched uranium shipments change, increase, or decrease? If so, by how many and what would be the annual total? If no changes are expected in the shipping amount, please state this and indicate how many shipments are expected in a given year.

### **Enviro-2**

Discuss the reduction in dosimetry at the fence line since physically relocating the 30B cylinder storage pad. In your October 2022 response to the NRC's Request for Supplemental Information (RSI), you indicated that the dose at the fence line was 22 mRem in 2021 and that the storage pad was moved away from the fence line as a result of the potential elevated dose.

- a. Explain the process followed to relocate the cylinders,
- b. Describe where the storage pad is currently located and,
- c. Discuss the current dose at the fence.

### **Enviro-3**

In your October 2022 response to the NRC's RSI, in reference to the public and occupational dose, you indicated that the 2007 environmental report and the 2009 EA remain valid or bounding. You further state that "Over the past Decade there have been additional reductions in many of these results." Please describe the reductions and what produced the reductions in dose.

### **MCA-1**

#### **REGULATORY BASIS**

In accordance with 10 CFR 70.22(b), an application must contain a full description of the program for control and accounting of special nuclear material that will be in the applicant's possession under license to show how compliance with the requirements of 10 CFR 74.31, 74.33, 74.41, or 74.51, as applicable, will be accomplished.

#### **DESCRIPTION OF ISSUE**

In the submittal letter under "Material Control and Accounting," the licensee states that "the Material Control and Accountability (MC&A) function has evaluated the proposed amendment and commits that changes to the policies, procedures, and controls to support the proposed amendment will be implemented consistent with the existing MC&A program." However, the submittal provides no information regarding the specific impacts to the MC&A program or what changes to the program or fundamental nuclear material control plan (FNMCP) are anticipated. Although 10 CFR 70.32(c) allows, without prior NRC approval, for changes that would not decrease the effectiveness of the MC&A program, the NRC must make a determination that the MC&A controls related to the proposed license amendment are adequate in accordance with 10 CFR 70.23(a)(6).

INFORMATION NEEDED

Please provide information on the impacts to the MC&A controls applicable to the proposed amendment, anticipated changes to the MC&A program or FNMCP associated with the proposed amendment, and justification for any determination made in accordance with 10 CFR 70.32(c).