



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

April 7, 2017

Mr. Adam Hilton  
FMO Facility Manager  
Global Nuclear Fuel-Americas, L.L.C.  
P.O. Box 708, Mail Code J20  
Wilmington, NC 28402

**SUBJECT: GLOBAL NUCLEAR FUEL- AMERICAS,L.L.C – NUCLEAR REGULATORY  
COMMISSION INTEGRATED INSPECTION REPORT 70-1113/2017-002**

Dear Mr. Hilton:

The Nuclear Regulatory Commission (NRC) conducted an announced inspection during the first quarter of calendar year 2017 (January 1 – March 31, 2017), at the Global Nuclear Fuel-Americas, L.L.C facility in Wilmington, NC. The purpose of the inspection was to determine whether activities authorized under the license and the implementation of programs and procedures for Environmental Protection, Radiation Protection and Transportation were conducted safely and in accordance with Nuclear Regulatory Commission (NRC) requirements. The enclosed report presents the results of the inspection. At the conclusion of this inspection, the inspectors discussed the findings with you and members of your staff at an exit meeting held on March 9, 2017.

These inspections examined activities conducted under your license as they relate to public health and safety, and to confirm compliance with the Commission's rules and regulations, and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, interviews with personnel, and facility walk-downs. Throughout the inspection, observations were discussed with your managers and staff.

Based on the results of this inspection, the NRC has determined that no violations of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedures," a copy of this letter, its enclosures, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

If you have any questions, please contact Tom Vukovinsky of my staff at 404-997-4622.

Sincerely,

***/RA/ T. Vukovinsky for***

Eric C. Michel, Chief  
Projects Branch 2  
Division of Fuel Facility Inspection

Docket No. 70-1113  
License No. SNM-1097

Enclosure:  
NRC Inspection Report 70-1113/2017-002  
w/Supplementary Information

cc:  
Scott Murray, Manager  
Facility Licensing  
Global Nuclear Fuels – Americas, L.L.C.  
Electronic Mail Distribution

W. Lee Cox, III, Chief  
North Carolina Department of Health and Human Services  
Division of Health Service Regulation  
Radiation Protection Section  
Electronic Mail Distribution

SUBJECT: GLOBAL NUCLEAR FUEL- AMERICAS,L.L.C – NRC INTEGRATED INSPECTION  
REPORT 70-1113/2017-002

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NAME	T. Vukovinsky	R. Gibson	G. Goff	R. Womack			
DATE	4/7/2017	4/7/2017	4/7/2017	4/7/2017			
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U. S. NUCLEAR REGULATORY COMMISSION  
REGION II

Docket No.: 70-1113

License No.: SNM-1097

Report No.: 70-1113/2017-002

Licensee: Global Nuclear Fuel - Americas, LLC

Location: Wilmington, North Carolina 28402

Dates: January 1, 2017 to March 31, 2017

Inspectors: R. Gibson, Senior Fuel Facility Inspector (Section A.3)  
G. Goff, Fuel Facility Inspector (Section A.1)  
R. Womack, Fuel Facility Inspector in Training (Section A.2)

Approved by: E. Michel, Chief  
Projects Branch 2  
Division of Fuel Facility Inspection

## **EXECUTIVE SUMMARY**

Global Nuclear Fuel - Americas, LLC  
NRC Integrated Inspection Report 70-1113/2017-02  
January 1 – March 31, 2017

NRC regional inspectors conducted inspections during normal shifts in the areas of Environmental Protection, Radiation Protection, and Transportation. During the inspection period, normal production activities were ongoing. These announced, routine inspections consisted of a selective examination of licensee activities accomplished by direct observation of safety-significant activities and equipment, walk-downs of the facility including items relied on for safety (IROFS), interviews and discussions with licensee personnel, and a review of facility records and procedures. There were no safety signification findings identified during this inspection.

### **Radiological Controls**

- In the area of Radiation Protection, no violations were identified. (Section A.1)
- In the area of Environmental Protection, no violations were identified. (Section A.2)
- In the area of Transportation, no violations were identified. (Section A.3)

### **Attachment**

Key Points of Contact  
List of Items Opened, Closed, and Discussed  
Inspection Procedures Used  
Documents Reviewed

## REPORT DETAILS

### Summary of Plant Status

Global Nuclear Fuel- Americas (GNF-A), LLC manufactures uranium dioxide (UO<sub>2</sub>) powder, pellets, and light water reactor fuel bundles at its Wilmington, NC facility. The facility converts uranium hexafluoride (UF<sub>6</sub>) to UO<sub>2</sub> using a Dry Conversion Process (DCP) and performs UO<sub>2</sub>, gadolinium pellet and fuel fabrication operations. During the inspection period, normal production activities at the facility were ongoing.

#### A. Radiological Controls

##### 1. Radiation Protection (Inspection Procedures 88030-Appendix B)

###### a. Inspection Scope and Observations

The inspectors reviewed radiation protection (RP) procedures related to airborne contamination, bioassay, ventilation control, and records retention to verify the changes to the procedures complied with Section 4.2, Radiation Safety Procedures and Radiation Work Permits (RWPs), of the license application and to ensure the changes did not decrease the effectiveness of safety.

The inspectors reviewed the Total Effective Dose Equivalent (TEDE) results to verify that the results were less than the regulatory limit specified in 10 Code of Federal Regulation (CFR) 20.1201 of 5 rem/yr and the limit of 4 rem/yr specified in Section 4.9, Action Levels for Radiation Exposures, of the license application. Inspectors noted that the maximum TEDE result for a licensee worker in 2016 was 0.482 rem. The inspectors also reviewed the most recent Lens Dose Equivalent (LDE) and Shallow Dose Equivalent (SDE) results to verify they were less than the 10 CFR 20.1201 LDE limit of 15 rem/yr and SDE limit of 50 rem/yr, as well as the limits in Section 4.9 of the license application.

The inspectors reviewed personnel dosimeter documentation to verify the dosimeter processing was conducted by a National Voluntary Laboratory Accreditation Program (NVLAP) approved vendor per 10 CFR 20.1501(d)(1) and that dosimetry was issued to applicable personnel in accordance with 10 CFR 20.1502(a). The inspectors also reviewed personnel exposure records to verify the records were maintained in accordance with 10 CFR 20.2106, NRC Form 5, and the relevant procedure, WI-27-105-21, Radiation Protection Records, Revision (Rev.) 0, dated July 08, 2013.

The inspectors reviewed the respiratory protection program to verify compliance with 10 CFR 20.1703 and Section 4.10, Respiratory Protection Program, of the license application. Specifically, the inspectors walked down the medical facility to observe respiratory testing equipment and interviewed nurses that test workers for respirator usage. The inspectors also observed a respirator fit test to verify it was conducted in accordance with licensee procedures. The inspectors reviewed recent air sampling records to verify the respiratory protection program adequately identified potential airborne hazards and maintained air sampling records in accordance with 10 CFR 20.2103(b)(3). The inspectors examined a selection of respirators and vendor records to verify the respirators and cartridges were approved by the National Institute for Occupational Safety and Health (NIOSH).

Through a review of training records, the inspectors observed that respirator users were properly trained and qualified via online training for the use of respiratory protection equipment. Inspectors also reviewed annual online refresher training records to determine no workers' qualifications were delinquent. The inspectors noted that if a qualified worker was delinquent in their refresher training, access to contaminated areas was denied via the badge reader system. The training was in accordance with Section 11.4, Training and Qualifications, of the license application.

The inspectors reviewed the procedure for the bioassay program, WI-27-105-17-01, Urinalysis Program for Soluble Uranium, Rev. 1.1, dated August 1, 2016, and toured GNF-A's bioassay processing facility to determine if the licensee was in compliance with Section 4.7, Internal Exposure – Urinalysis Program, of the license application. Inspectors also reviewed bioassay records for internal exposure levels and compliance with 10 CFR 20.2103(b)(3) and Section 4.9 of the license application.

The inspectors toured the Dry Conversion Process area, Dry Scrap Recycle area, and the gadolinium fuel rod area to verify radiological signs and postings accurately reflected radiological conditions within the areas per 10 CFR Part 20.1902. The inspectors observed that the Notice to Employees, NRC Form 3, was posted in a high traffic area in accordance with 10 CFR 19.11.

The inspectors observed the replacement of stationary air sampler filters in contaminated work zones to verify that surveys adequately evaluated the magnitude and extent of airborne radiation levels in accordance with 10 CFR 20.1501 and Section 4.4, Air Sampling Program, of the license application. The inspectors also walked down high efficiency particulate air (HEPA) filter housings and ventilation ductwork to verify compliance with Section 4.3, Ventilation Requirements, of the license application and the relevant procedure, WI-27-105-25, Heating Ventilation and Air Conditioning (HVAC) Surveys to Detect Uranium Accumulation, Rev. 5.0, dated May 19, 2016.

The inspectors determined the licensee maintains exposures As Low As Reasonably Achievable (ALARA) by reviewing the 2016 ALARA report. The licensee maintains exposures ALARA by controlling access to radiological areas, limiting exposure times, procedure usage, process design, and closely monitoring workers' dose as required by 10 CFR 20.1101(b) and Section 4.1, ALARA Policy, of the license application. Through interviews, inspectors verified that notifications and dose reports were provided to workers in accordance with 10 CFR 19.13.

The inspectors reviewed a triennial audit of the RP program, Triennial Independent Radiation Protection Program Audit, dated October 3-7, 2016, as well as several quarterly RP audits of various areas to verify compliance with Section 11.6, Audits and Assessments, of the license application. The inspectors reviewed several condition reports related to the RP audits or events to verify that corrective actions were effective and implemented in accordance with procedures.

b. Conclusion

No violations of NRC requirements were identified.

## 2. Effluent Control and Environmental Protection (Inspection Procedure 88045)

### a. Inspection Scope and Observations

Through discussions with licensee staff, the inspectors determined that changes to the environmental protection program since the last inspection were in accordance with license requirements and that management maintains a commitment to keep exposure ALARA. The inspectors reviewed four quarterly self-assessment audits from 2016, and verified the licensee is identifying and addressing condition reports and that corrective actions were implemented in accordance with license requirements.

The inspectors reviewed four environmental protection procedures updated since the last inspection to verify that changes did not cause a decrease in safety significance or a reduction in the control of effluents. The inspectors conducted a walk down of stack filtration housings and ambient air stations and observed an environmental protection technician implement procedures for sample collection to verify airborne effluent equipment and systems were operable and maintained in accordance with license requirements. The inspectors reviewed the airborne effluent monitoring results of 2016, to verify the values specified in Appendix B of 10 CFR Part 20 were not exceed.

The inspector reviewed both 2016 semi-annual effluent reports and verified that the licensee was in compliance with 10 CFR 70.59. The inspectors reviewed records for soil sample collection results and discussed the results with licensee staff to verify the levels were within regulatory limits. The inspectors verified that gaseous effluent monitors were calibrated and functional checks performed in accordance with 10 CFR 20.1501.

The inspectors reviewed the public dose assessment to verify the average annual effluent concentrations released in 2016, met the standards of 10 CFR 20.1301 and 20.1302 and that records are being maintained in accordance with 10 CFR 20.2107. The inspector reviewed the airborne portion of the public dose assessment to verify that results were in compliance with the ALARA constraint required by 10 CFR 20.1101(d).

The inspectors toured environmental monitoring stations at both well water and process lagoon sampling locations to verify that the sampling points were in compliance with license requirements. The inspectors observed two environmental operations technicians gather liquid effluent samples at the process lagoons and two other technicians gather well water samples to verify that the licensee conducted operations in accordance with approved procedures. The inspectors observed the laboratory analysis of multiple liquid effluent samples and reviewed past results to verify laboratory quality control and that measurements were in compliance with license requirements and 10 CFR 20.2203.

### b. Conclusion

No violations of NRC requirements were identified.



### 3. Transportation (Inspection Procedure 86740)

#### a. Inspection Scope and Observations

The inspectors evaluated whether the licensee had established and maintained an effective management-controlled program to ensure radiological and nuclear safety in the receipt, packaging, delivery to a carrier, and as applicable, to private carriage of licensed radioactive materials. The inspectors also evaluated whether observed transportation activities were in compliance with the applicable regulations of the Nuclear Regulatory Commission (NRC), 10 CFR Parts 20 and 71, and the Department of Transportation (DOT), 49 CFR Parts 171-178. The observed activities included the preparation of packages by the shipping coordinators for the shipment of cylinder heels in 30B cylinders back to the customers. The observed activities also included the receipt and survey of full uranium hexafluoride (UF<sub>6</sub>) cylinders from customers.

The inspectors reviewed a number of shipping records involving the shipment and receipt of special nuclear material products in UF<sub>6</sub> cylinders and waste materials for disposal. The licensee ensured that the appropriate documentation accompanied the packages being shipped. The inspectors verified that the licensee recorded the required information on the packaging and shipping orders such as the transportation index, criticality safety index, package activity, labeling, and placards.

The inspectors reviewed training records to verify the licensee administered hazardous materials transportation training to applicable personnel as required by the DOT 49 CFR 172.704 and the current license. The inspectors observed the shipment, receipt, and surveys of type 30B cylinders for processing. The inspectors also observed the packing and surveying of a new powder container (NPC) for shipment to verify the shipment was prepared in accordance with approved procedures. The inspectors reviewed shipping records and surveys from previous fuel assembly, powder, and heeled cylinder shipments to verify that the records were in accordance with approved procedures.

The inspectors verified the licensee met the 10 CFR 71.21 conditions required to use the general license provision for transport of licensed material. The inspectors reviewed audits of the transportation program to verify the licensee was performing periodic audits of the program as required by the license application. The results of the audits were appropriately addressed in the corrective action program.

The inspectors reviewed the licensee's corrective action program (CAP) entries in the area of transportation for the past 24 months to verify that deviations from procedures and unforeseen process changes affecting transportation were documented and investigated promptly. Also, the inspectors evaluated the corrective actions associated with Condition Reports – 24694, 24628, 19472, and 21551 to verify the completed corrective actions were in accordance with the license application.

#### b. Conclusion

No violations of NRC requirements were identified.

**B. Exit Meeting**

The inspection scope and results were presented to members of the licensee's staff at various meetings throughout the inspection period and were summarized on March 9, 2017, with Adam Hilton and staff. No dissenting comments were received from the licensee. Proprietary information was discussed but not included in the report.

## SUPPLEMENTARY INFORMATION

### 1. KEY POINTS OF CONTACT

#### Licensee personnel

<u>Name</u>	<u>Title</u>
E. Anderson	Environmental Health and Safety Projects Manager
J. Anderson	Shipping Coordinator
L. Byrd	Radiation Protection Monitor
R. Cable	Radiation Engineer
M. Connor	Manager, Fabrication
R. Crott	Manager, Environmental Health and Safety Programs
K. Crowe	RN, Care Nurse Manager
A. Daley	Environmental Health and Safety
C. Davis	Warehouse Operator
J. Dillen	Warehouse Operator
D. Eghbali	Environmental Health and Safety Staff
K. Ferdinando	Radiation Protection Monitor
S. Grant	Logistics, GE Hitachi
M. Haney	Radiation Supervisor
M. Harrell	Cylinder Dock Operator
D. Hartsock	Logistics, GE Hitachi
J. Head	General Manager, Regulatory Affairs
A. Heppner	Manager, Logistics GE Hitachi
A. Hilton	Facility Manager
P. Kontz	Radiation Protection Technician
T. Male	Shipping Coordinator
J. Mathews	Logistics, GE Hitachi
T. Mayer	HVAC Engineer – FMO, P. E.
K. McGovan	Training Coordinator
S. Murray	Manager, Licensing
D. Nay	FMO Manufacturing Engineering Manager
S. O’Conner	Environmental Engineer, EHS
P. Ollis	Facility Licensing
T. Priest	Environmental Health and Safety
J. Robinson	Logistics, GE Hitachi
C. Rollins	RN, Assistant Care Nurse Manager
E. Saito	Environmental Health and Safety Manager & Nuclear Safety Manager
M. Strickland	Refurbishing Operator
K. Williams	Environmental Engineer, EHS
G. Warmkessel	Quality, FMO Transportation

### 2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened

None

#### Opened & Closed

None

Closed

None

### 3. INSPECTION PROCEDURES USED

88030	Radiation Protection (Appendix B)
88045	Effluent Control and Environmental Protection
86740	Transportation

### 4. DOCUMENTS REVIEWED

#### Records:

2016 Annual ALARA Review; FMO, WFSC, GLE and SCO; dated February 21, 2017

Calibration record for rotameter SAS #815

Dose Surveys for BSG Line #2, Conversion Lines #1 and #2, and DSR

HVAC Monthly Survey Data Sheets:

Primary HVAC Systems & Components for: DSR Areas (January 25, 2017, February 3, 2017), GAD Ceramics (January 25, 2017, February 3, 2017), UO<sub>2</sub> Ceramics (December 18, 2016, January 25, 2017, February 3, 2017)

Secondary HVAC Systems & Components for DSR (January 25, 2017)

Internal and external dose records for many individuals and several specific areas

NSE quarterly audits (2016 - 2017)

Triennial Independent Radiation Protection Program Audit, October 3-7, 2016

1Q16 Environmental Protection Program Findings & Observations

2Q16 Environmental Protection Program Findings & Observations

3Q16 Environmental Protection Program Findings & Observations

4Q16 Environmental Protection Program Findings & Observations

17-009 GNF-A Semi-Annual Effluent Monitoring Report July – December 2016

2016 GNF Wilmington Radiological Notebook

NRC License SNM-1097 Triennial Independent Audit-2016, Environmental Protection Findings & Observations

Report on Compliance with The Clean Air Act Limits for Radionuclide Emissions, dated January 16, 2017

WO-375420, Semi Annual Calibration: Verification of Stack Rotometer BLND564X, dated October 25, 2016

#### Procedures:

E-02, Respiratory Protection, Rev. 7, dated June 4, 2015

OP 1040.12, UO<sub>2</sub> Pellet Grinder, Rev. 42, dated July 6, 2016

WI-27-105-07, Airborne Radioactivity Measurement and Control, Rev. 0, dated July 22, 2015

WI-27-105-16, Respiratory Protection Program, Rev. 1.0, dated November 25, 2014

WI-27-105-17-01, Urinalysis Program for Soluble Uranium, Rev. 1.1, dated August 1, 2016

WI-27-105-21, Radiation Protection Records, Rev. 0, dated July 8, 2013

WI-27-105-25, HVAC Surveys to Detect Uranium Accumulation, Rev. 5.0, dated May 19, 2016

EPI-O-6.0, Stack Sampling Program, Rev. 72, dated December 7, 2016  
 EPI-O-7.0, Soil, Ditch, Vegetation, and State Split Sampling Programs, Rev. 42, dated August 12, 2016  
 EPI-O-8.0, Sample Collection from Site Wells at the GE/GNF-A Wilmington Site, Rev. 56, dated November 4, 2016  
 EPI-O-9.0, Environmental Ambient Air Sampling Stations, Rev. 37, dated July 15, 2016  
 WI-18-104-01, Internal Environmental Protection Audits, Rev. 0, dated May 29, 2013  
 OP 2000.04.201, Shipping and Traffic – Shipping Operations, Rev. 0  
 OP 2000.10. Shipment of UF6 Materials and Containers  
 TOP 236311, GNF/WEC 495 Powder Sampling, Bottle Cleaning and Repacking, Rev. 0  
 OP 1339.01.202, NPC Powder Pack – Normal Operations, Rev. 1  
 OP 1339.01.203, NPC Powder Pack – Clean out  
 OP 1080.70.101, UF6 Cylinder Dock – MC&A, Rev. 2  
 OP 1080.70.300, UF6 Cylinder Dock – Process Information, Rev. 1  
 OP 2000.02, RA/RAJ-II Outer Container Refurbishing, Rev. 28  
 OP 2000.03, RA Inner Container Refurbishing, Rev. 21

Condition Reports Written as a Result of the Inspection:

25076, Stationary Air Sampling Rotameter Calibration, dated March 8, 2017

Condition Reports Reviewed:

CR 18645  
 CR 18908  
 CR 19472  
 CR 19605  
 CR 21551  
 CR 21618  
 CR 21722  
 CR 21734  
 CR 21753  
 CR 21773  
 CR 22095  
 CR 23254  
 CR 24564  
 CR 24628  
 CR 24694  
 CR 24734  
 CR 24936

Other Documents:

Appendix C – OSHA Respirator Medical Evaluation Questionnaire, Rev.1 (no date)  
 Appendix E – Respirator Medical Determination, Rev. 1 (no date)  
 NIOSH Certificates for Full and Half Face Respirators and Cartridges  
 Organizational chart for radiation protection