



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

April 23, 2019

EN 53744

Mr. Brad Beard
Plant 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 70-1113/2019-002**

Dear Mr. Beard:

The Nuclear Regulatory Commission (NRC) conducted announced inspections during the first quarter of calendar year 2019 (January 1 – March 31, 2019), at the Global Nuclear Fuel-Americas, L.L.C facility in Wilmington, NC. The purpose of these inspections was to determine whether activities authorized under the license and programs and procedures implemented in the areas of Safety Operations, and Facility Support were conducted safely and in accordance with NRC requirements. Additionally, the inspectors followed-up on the circumstances associated with an unplanned contamination event that was reported to the NRC through Event Notice 53744, "Unplanned Contamination Due to Kiln Seal Leak," on November 19, 2018. The enclosed report presents the results of these inspections. At the conclusion of these inspections, the inspectors discussed the findings with you and members of your staff at an exit meeting held on March 7, 2019.

Based on the results of these inspections, the NRC has determined that no violations of more than minor significance were identified.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter and enclosure 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>.

Should you have any questions concerning the inspections, please contact Tom Grice of my staff at 404-997-4477.

Sincerely,

/RA/

Leonard Pitts, Acting Chief
Projects Branch 1
Division of Fuel Facility Inspection

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

Enclosure:
NRC Inspection Report 70-1113/2019-002
w/Attachment: 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 – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 70-1113/2019-002

DISTRIBUTION:

J. Zimmerman, NMSS
 R. Johnson, NMSS
 M. Baker, NMSS
 T. Naquin, NMSS
 L. Pitts, RII
 T. Grice, RII
 M. Ruffin, RII
 PUBLIC

PUBLICLY AVAILABLE NON-PUBLICLY AVAILABLE SENSITIVE NON-SENSITIVE
 ADAMS: Yes ACCESSION NUMBER:ML19113A102 SUNSI REVIEW COMPLETE FORM 665 ATTACHED

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI
SIGNATURE		Via feeder	Via feeder	Via feeder			
NAME	T. Grice	L. Pitts	N. Peterka	M. Ruffin			
DATE	4/23/2019	4/23/2019	4/23/2019	4/ 22 /2019			
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\DFFI\REPORTS\FINAL REPORTS\GNF-A\2019\GNFA IR 2019-002.DOCX

U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.: 70-1113

License No.: SNM-1097

Report No.: 70-1113/2019-002

Licensee: Global Nuclear Fuel - Americas, LLC

Location: Wilmington, North Carolina 28402

Dates: January 1, 2019 to March 31, 2019

Inspectors: L. Pitts, Senior Fuel Facility Inspector (Section A.1)
N. Peterka, Fuel Facility Inspector (Section A.2)
M. Ruffin, Fuel Facility Inspector (Section B.1, C.1)

Approved by: L. Pitts, Acting Chief
Projects Branch 1
Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Global Nuclear Fuel - Americas, LLC
Nuclear Regulatory Commission Integrated Inspection Report 70-1113/2019-002
January 1 – March 31, 2019

Nuclear Regulatory Commission regional inspectors conducted inspections during normal shifts in the areas of Safety Operations and Facility Support. During the inspections, 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 interviews and discussions with licensee personnel, and a review of facility records and procedures. There were no violations of more than minor significance identified during these inspections.

Safety Operations

- In the area of Operational Safety, no violations of more than minor significance were identified. (Section A.1)
- In the area of Nuclear Criticality Safety, no violations of more than minor significance were identified. (Section A.2)

Facility Support

- In the area of Maintenance and Surveillance, no violations of more than minor significance were identified. (Section B.1)

Special Topics

- The details surrounding Event 53744 “Unplanned Contamination Due to Kiln Seal Leak” were inspected. No violations of more than minor significance were identified. (Section C.1)

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 (UO₂) powder, pellets, and light water reactor fuel bundles at its Wilmington, NC facility. The facility converts uranium hexafluoride (UF₆) to UO₂ using a Dry Conversion Process (DCP) and performs UO₂, gadolinium pellet and fuel fabrication operations. During the inspections, normal production activities at the facility were ongoing.

A. Safety Operations

1. Operational Safety (Inspection Procedure 88020)

a. Inspection Scope

The inspectors evaluated the operational safety of the facility to verify the licensee operates the plant safely and in accordance with Title 10 Code of Federal Regulations (CFR) Part 70, the license, and the license application. The inspectors interviewed the Integrated Safety Analysis (ISA) Manager, Criticality Safety Manager and engineers and reviewed records associated with the UF₆ Cylinder Handling (Node Group 101), Powder Pack/Receipt (Node Group 207), DCP Miscellaneous (Node Group 208), Auxiliary Operations (Node Group 801/802), and Adjacent Fire (Node Group 808).

The inspectors evaluated selected items relied on for safety (IROFS) to verify that they were present and capable of performing their intended safety functions. As part of this evaluation, the inspectors reviewed the quantitative risk assessments for Auxiliary Operations (QRA-801/802), DCP Miscellaneous (QRA-208), and Adjacent Fire (QRA-808). Additionally, the inspectors verified the physical presence of active engineered safety controls, evaluated the safety controls to determine their capability and operability, and verified that potential accident scenarios were covered.

The inspectors evaluated the licensee's administrative controls to verify that they were implemented and adequately communicated to licensee personnel tasked with implementing those controls. The inspectors reviewed the Powder Pack Area operating procedures (OP-1339.01.000 – 1339.02.300) and the Powder Receipt Area operating procedures (OP-2200.00.000 – 2200.00.300) to verify that required actions for the associated IROFS, as identified in the ISA Summary, had been correctly transcribed into written operating procedures. The inspectors evaluated these procedures' with respect to operating limits and operator responses for upset conditions to verify that limits needed to assure safety were adequately described in the procedures.

The inspectors interviewed operators and technicians in the field to verify that operators and technicians were adequately implementing the required safety controls. Through interviews and document reviews, the inspectors verified the licensee conducted periodic surveillance as required by the ISA Summary for the selected safety controls.

The inspectors reviewed the licensee's corrective action program (CAP) entries for the past six months to verify that deviations from procedures and unforeseen process changes affecting nuclear criticality, chemical, radiological, or fire safety were documented and investigated promptly.

b. Conclusion

No violations of more than minor significance were identified.

1. Nuclear Criticality Safety (Inspection Procedure 88015)

a. Inspection Scope

The inspectors reviewed the selected Criticality Safety Analysis (CSA) and associated assumptions and calculations to verify consistency with the commitments in the license application, including the consideration of the Double Contingency Principle, assurance of subcriticality under normal and credible abnormal conditions with the use of subcritical margin, technical practices and methodologies, and treatment of nuclear criticality safety (NCS) parameters. The inspectors reviewed the selected CSAs to determine whether the approved CSAs were available, were of sufficient detail and clarity to permit independent review, and whether calculations were performed within the validated area of applicability and consistent with the validation report. The CSAs were selected based on factors including risk-significance, if they were new or revised, the use of unusual control methods, and operating history. The CSAs reviewed included UF₆ Cylinder Handling, DCP Miscellaneous Areas, and the Scrap Pack Facility. The inspectors also reviewed supporting criticality calculations and computer models to verify all normal and credible abnormal conditions were subcritical with an approved margin of subcriticality.

For the CSAs listed above, the inspectors reviewed the licensee's generation of accident sequences to verify whether the CSAs systematically identified normal and credible abnormal conditions for the analysis of process upsets in accordance with the commitments and methodologies in the license application. This effort included the review of accident sequences that the licensee determined to be not credible in order to determine whether the bases for incredibility were consistent with the commitments, definitions, and methodologies in the license application and were documented in sufficient detail to permit an independent assessment of credibility.

The inspectors performed walk-downs of the DCP Miscellaneous areas, UF₆ Cylinder Storage, and the Scrap Pack Facility to determine whether existing plant configuration and operations were covered by, and consistent with, the process description and safety basis description in the CSAs. The inspectors reviewed process and system descriptions to verify engineered controls established in the CSAs were included. The inspectors reviewed operating procedures and postings to verify selected administrative controls established in the CSAs were included. The inspectors interviewed operators and engineers to verify administrative actions established in the CSAs were understood and implemented properly in the field.

The inspectors reviewed records from NCS engineer walkthrough assessments to determine whether NCS staff routinely inspected fissile material operations to ascertain that criticality requirements were being satisfied.

The inspectors reviewed the selected CSAs listed above to verify they were performed in accordance with NCS program procedures and received appropriate independent review and approval.

The inspectors reviewed recently revised NCS program procedures to verify the changes were consistent with the requirements contained in Section 5 of the license application.

The inspectors reviewed selected NCS-related CAP entries to verify anomalous conditions were identified and entered into the CAP, proposed corrective actions were sufficiently broad, actions were prioritized on a schedule commensurate with their significance, and whether they were completed as scheduled and addressed the problem identified. The following entries were reviewed: 29872, 29880, and 30232.

b. Conclusion

No violations of more-than-minor significance were identified.

B. Facility Support

1. Maintenance and Surveillance (Inspection Procedure 88025)

a. Inspection Scope

The inspectors reviewed the maintenance and surveillance program at GNF-A to verify compliance with the license, license application chapter 11.3, "Maintenance," and program procedures. The inspectors reviewed documents, conducted interviews, and performed walk-downs to verify the maintenance program ensured IROFS and other safety controls remained available and reliable to perform their intended safety function when needed. Specifically, the inspectors interviewed senior managers, supervisors, maintenance planners, engineers, and other maintenance personnel to evaluate maintenance and surveillance program activities and adherence to procedures.

The inspectors witnessed the maintenance supervisor discuss the planned actions for the day and the ongoing major maintenance projects to verify provisions were in place to ensure pre-job planning and preparation of maintenance work orders (WOs) were conducted in accordance with licensee procedures and requirements. The inspectors reviewed completed maintenance and surveillance WOs, surveillances, calibrations, and post maintenance test records (see attached list) to verify they were accurate, contained the proper level of detail, and to determine whether the operability of IROFS and other safety controls was being challenged and verified in accordance with maintenance procedures. The inspectors also reviewed work packages to determine whether they were reviewed in accordance with maintenance procedures prior to returning equipment to service.

The inspectors walked down Line 1 of the DCP to observe ongoing distributed control system maintenance and to observe the method in which the kiln surveillance was conducted. The inspectors reviewed past surveillances of the kiln and WOs generated for maintenance activities conducted on the kiln to verify the work was properly authorized and activities were conducted in accordance with procedures.

The inspectors interviewed maintenance and engineering managers regarding the training and qualification program for maintenance personnel performing work on safety related equipment, including IROFS. The inspectors reviewed the training and qualification records of select maintenance personnel to verify the individuals were qualified to perform their assigned maintenance activities in accordance with approved training procedures CP-20-107, "GNF-A Manufacturing Training and Qualification Program," and WI-20-107, "ISA Training."

The inspectors reviewed the licensee's CAP to verify performance issues relating to the maintenance and surveillance of IROFS and safety controls were identified and entered into the CAP and to evaluate the adequacy of corrective actions taken.

b. Conclusion

No violations of more than minor significance were identified.

C. Special Topics

1. Event Follow-up (Inspection Procedure 88075)

a. (Closed) Licensee Event Report (LER) EN 53744 Global Nuclear Fuel Americas – Unplanned Contamination Due to Kiln Seal Leak

On November 19, 2018, GNF-A submitted a 24-hour report to the NRC for Event Number 53744, "Unplanned Contamination Due to Kiln Seal Leak," in accordance with 10 CFR Part 70.50 (b)(1), due to an unplanned contamination event that required access to the contaminated area, by workers or the public, to be restricted for more than 24 hours. Specifically, at approximately 1445 on November 17, 2018, a leak was discovered on the Fuel Manufacturing Operation (FMO) Dry Conversion Line 1 kiln seal, causing an alarm on the Hydrogen Fluoride (HF) room detection system. The potential cause of the leak was failure of the seal on the kiln due to routine usage and the length of time the seal had been in usage.

The inspectors initially reviewed the ISA and determined the failure of the reactor-kiln equipment barrier occurred within its assumed frequency. All the other IROFS in the loss of containment accident sequence were available and operated as expected, and therefore the performance requirements of 10 CFR 70.61 were maintained.

The inspectors reviewed the Temporary Operating Procedure (TOP) 27069 and Radiation Work Permit (RWP) 5862 to verify adequate safety precautions were taken during the cleanout operations and radiological hazards were controlled by a job-specific RWP. The inspectors also interviewed licensee managers and discussed the circumstances of the unplanned contamination event. The inspectors performed a visual inspection of the Line 1 kiln and reviewed the condition report to determine whether the corrective actions were adequate. The licensee replaced the packing in the seal box and no leaks were detected when the cold traps were vaporized. The process was shut down for system upgrades at the time of this inspection.

All follow up actions and inspections associated with EN 53744 are complete and this item is considered closed.

D. Exit Meeting

The inspections scopes and results were presented to members of the licensee's staff at various meetings throughout the inspections and were summarized on March 7, 2019, with Jonathan Rohner 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>
K. Campbell	Manager, Powder Production & SS
T. Croom	Maintenance Coordinator, HVAC
J. Degoyler	FMO Integrated Safety
D. Eghbali	Senior Criticality Safety Engineer
A. Gay	FMO Maintenance Team Lead
R. Haney	Radiation Protection Supervisor
K. McGowan	FMO Training Specialist
S. Murray	Manager, Facility Licensing
D. Nay	Manager, FMO Manufacturing Engineering
P. Ollis	Facility Licensing
L. Paulson	Program Manager Criticality Safety
J. Rohner	Manager, EH&S
E. Saito	Manager, Radiation Protection Program
F. Szakasits	Maintenance Coordinator, CI&S
D. Thompson	Manager, Maintenance

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

70-1113/2018-003-00 LER Unplanned Contamination Due to Kiln Seal Leak

3. INSPECTION PROCEDURES USED

88015	Nuclear Criticality Safety
88020	Operational Safety
88025	Maintenance and Surveillance of Safety Controls
88075	Event Follow-up

4. DOCUMENTS REVIEWED

Records:

2018 Nuclear Criticality Safety Audit – DCP Homogenizers, BPG, Tumblers, Additive and Sample Rooms, dated December 13, 2018
30B UF6 Cylinder Storage/Shipment Criticality Safety Analysis, Revision (Rev.) 03
CSA No. 1080.70, Receipt and Handling of UF6 Cylinders, Rev. 06
CSA-208.00.100, DCP MRA Facility and Powder Containers, Rev. 01
CSA-705.00.100, Scrap Pack Facility, Rev. 0
CSA-806.02.100, TPC Fuel Rods Storage, Rev. 01

QRA-208, Dry Conversion Process: Miscellaneous, Rev. 8, dated October 31, 2018
 QRA-801/802, Auxiliary Operations, Rev. 13, dated February 14, 2019
 QRA-808, Adjacent Fire, Rev. 5, dated July 12, 2016
 WO 873914
 WO 876185
 WO 795549
 WO 795550
 WO 876176
 WO 876174
 WO 795515
 WO 795514
 WO 845586

Procedures:

CP-24-100, Wilmington Maintenance Administration, Rev. 3.0, dated October 24, 2018
 CP-20-107, GNF-A Manufacturing Training and Qualification Program, Rev 7.0,
 dated March 26, 2018
 CP-12-102, Calibration Program for Instrumentation and Controls, Rev 2.1,
 dated November 18, 2016
 CP-06-216, Functional Test Instructions, Rev 1.1, dated February 9, 2018
 OP 202.00.209, DCP Conversion- Basic Operator Maintenance, Rev 3
 OP 1080.70.201, UF6 Cylinder Dock – Normal Operations, Rev. 06
 OP 1339.01.000, New Powder Container (NPC) Powder Pack, Table of Contents, Rev. 0,
 dated November 4, 2015
 OP 1339.01.100, NPC Powder Pack, General Information, Rev.1, dated October 1, 2018
 OP 1339.01.101, NPC Powder Pack, Material Control and Accountability, Rev. 0,
 dated November 4, 2015
 OP 1339.01.201, NPC Powder Pack, Startup, Rev. 0, dated November 4, 2015
 OP 1339.01.202, NPC Powder Pack, Normal Operations, Rev. 4, dated March 1, 2018
 OP 1339.01.203, NPC Powder Pack, Cleanout, Rev. 0, dated November 4, 2015
 OP 1339.01.204, NPC Powder Pack, Abnormal & Emergency Operations, Rev. 1,
 dated June 20, 2018
 OP 1339.01.205, NPC Powder Pack, Basic Operator Maintenance, Rev. 0, dated
 November 4, 2015
 OP 1339.01.300, NPC Powder Pack, Process Information, Rev. 1, dated
 December 18, 2018
 OP 1339.02.000, TNF-X1 Powder Pack, Table of Contents, Rev. 0, dated
 November 1, 2018
 OP 1339.02.100, TNF-X1 Powder Pack, General Information, Rev. 0, dated
 November 1, 2018
 OP 1339.02.101, TNF-X1 Powder Pack, MC&A, Rev. 0, dated November 1, 2018
 OP 1339.02.201, TNF-X1 Powder Pack, Startup, Rev. 0, dated November 1, 2018
 OP 1339.02.202, TNF-X1 Powder Pack, Normal Operations, Rev. 0, dated
 November 1, 2018
 OP 1339.02.203, TNF-X1 Powder Pack, Cleanout, Rev. 0, dated November 1, 2018
 OP 1339.02.204, TNF-X1 Powder Pack, Abnormal & Emergency Operations, Rev. 0,
 dated November 1, 2018
 OP 1339.02.300, TNF-X1 Powder Pack, Process Information, Rev. 0, dated
 November 1, 2018
 OP 2100.00.100, Scrap Pack – General Information, Rev. 01
 OP 2100.00.204, Scrap Pack – NPC Operations, Rev. 02

OP 2200.00.000, Powder Receipt Facility, Table of Contents, Rev. 0, dated October 10, 2016
 OP 2200.00.100, Powder Receipt Facility, General Information, Rev. 3, dated October 1, 2018
 OP 2200.00.101, Powder Receipt Facility, MC&A, Rev. 0, dated October 10, 2016
 OP 2200.00.201, Powder Receipt Facility, Startup (Outer Area), Rev. 1, dated March 15, 2017
 OP 2200.00.202, Powder Receipt Facility, Normal Operations (Outer Area), Rev. 2, dated October 19, 2017
 OP 2200.00.203, Powder Receipt Facility, Startup (Inner Area), Rev. 0, dated October 10, 2016
 OP 2200.00.204, Powder Receipt Facility, Normal Operations (Inner Area), Rev. 1, dated October 22, 2018
 OP 2200.00.205, Powder Receipt Facility, Shutdown, Rev. 0, dated October 10, 2016
 OP 2200.00.206, Powder Receipt Facility, Abnormal Operations, Rev. 0, dated October 10, 2016
 OP 2200.00.300, Powder Receipt Facility, Process Information, Rev. 0, dated October 10, 2016
 TOP 27069 Cleaning of Conversion Room after Major Seal/Packing Leak, Rev. 0, dated November 20, 2018
 WI-18-104-02, Internal Nuclear Safety Audits, Rev 3.0, dated May 16, 2016
 WI-20-107-07, ISA Training, Rev 1.0, dated March 25, 2015
 WI-20-107-08, FMO New Employee Training Program, Rev 0.0, dated May 18, 2015

Condition Reports Written as a Result of the Inspections:

None

Condition Reports Reviewed:

CR 28280, CR 28291, CR 28382, CR 28535, CR 28953, CR 29084, CR 29140, CR 29395, CR 29416, CR 29470, CR 29872, CR 29880, CR 30115, CR 30232

Other Documents:

Conversion Walkthrough LS 202.04, dated November 16, 2018
 Conversion Walkthrough LS 202.04, dated November 17, 2018
 DCP Shift Rounds LS 200.11, dated November 16, 2018
 DCP Shift Rounds LS 200.11, dated November 17, 2018
 GNF-A Plant Org Chart, dated January 25, 2019
 GNF SNM-1097, Consolidated License Application, dated October 26, 2018
 IROFS 204-03 Favorable Geometry Hybrid Container, dated November 30, 2018
 IROFS 204-04 Process Equipment Barrier- Powder Outlet, dated November 30, 2018
 IROFS 207-01 FBS-FRs/LIMS-Powder Pack, dated October 31, 2018
 IROFS 207-02 Safe Geometry- Powder Pack Process, dated October 31, 2018
 IROFS 207-03 Process Equipment Barrier- Powder Pack Eq, dated October 31, 2018
 IROFS 207-04 FBS Control of Mass of U- Powder Pack, dated October 31, 2018
 IROFS Verification: IROFS 801-06 4-Can Lift Mechanical Stops, dated October 31, 2018
 IROFS Verification: IROFS 802-02 Scrap/Utility Hood, dated November 30, 2018
 SCALE 6.1/KENO-VI Monte Carlo Code Validation Report, Rev. 3
 WI-27-104-01, Nuclear Safety and Security Event Communication and Notification, Rev. 10
 WI-27-104-07, Nuclear Safety Release Requirements, Rev. 2.1