

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

July 28, 2011

Ms. Nicole Holmes Chief Operating Officer and Facility Manager Global Nuclear Fuel – Americas, L.L.C. P.O. Box 780, Mail Code J20 Wilmington, NC 28402

SUBJECT: GLOBAL NUCLEAR FUEL – AMERICAS, L.L.C. - NRC INTEGRATED INSPECTION REPORT NO. 70-1113/2011-003 AND NOTICE OF VIOLATION

Dear Ms. Holmes:

The U.S. Nuclear Regulatory Commission (NRC) conducted announced, routine inspections from April 11 through 14 and June 12 through 16, 2011, at your Wilmington, North Carolina facility. The enclosed report presents the results of the inspections. The purpose of the inspections were to perform routine reviews of the implementation of the maintenance and surveillance program, the permanent plant modifications program, and to follow-up on previously identified issues. The reviews were performed to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspections, the findings were discussed with members of your staff at exit meetings held on April 14 and June 16, 2011.

The inspections were an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspections consisted of facility walk downs; selective examinations of relevant procedures and records; interviews with plant personnel; and plant observations. Throughout the inspection, observations were discussed with your managers and staff.

Based on the results of these inspections, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html.

The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because the NRC identified the violation.

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken to correct the violation and prevent recurrence and the date when full compliance will be achieved is already adequately addressed on the docket in the enclosed inspection

N. Holmes

report and the letter from GE-Hitachi Global Laser Enrichment, LLC dated May 18, 2011. Therefore, you are not required to respond to this letter unless the description herein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," 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 document 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 call me at (404) 997-4629.

Sincerely,

/RA/

Marvin D. Sykes, Chief Fuel Facility Inspection Branch 3 Division of Fuel Facility Inspection

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

Enclosures:

- 1. Notice of Violation
- 2. NRC Inspection Report w/ attachment

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

Lee Cox, Chief Radiation Protection Section N.C. Department of Environmental Commerce and Natural Resources Electronic Mail Distribution N. Holmes

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*see previous concurrence $\sqrt{PUBLICLYAVAILABLE}$ □ NON-PUBLICLY AVAILABLE

□ SENSITIVE

√ NON-SENSITIVE

ADAMS: √ Yes ACCESSION NUMBER: ML112091889

√ SUNSI REVIEW COMPLETE √ FORM 665 ATTACHED

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI			
SIGNATURE	/RA/	/RA via email/	/RA/	/RA/	/RA/			
NAME	PStartz	NCoovert	SMendez	OLópez	MThomas			
DATE	7/20/2011	7/21/2011	7/27/2011	7/21/2011	7/19/2011	7/ /2011	7/	/2011
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Letter to Ms. Nicole Holmes from Marvin D. Sykes dated July 28, 2011

SUBJECT: GLOBAL NUCLEAR FUEL – AMERICAS, L.L.C.- NRC INTEGRATED INSPECTION REPORT NO. 70-1113/2011-003 AND NOTICE OF VIOLATION

Distribution w/encls: M. Sykes, RII M. Thomas, RII O. López, RII R. Johnson, NMSS C. Ryder, NMSS PUBLIC

NOTICE OF VIOLATION

Global Nuclear Fuel-Americas Wilmington, NC

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

During an NRC inspection conducted on June 12 through 16, 2011, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Title 10 of the Code of Federal Regulations, Part 70, Section 70.61(b) requires that the licensee limit the risk of each credible high-consequence event. Engineered controls, administrative controls, or both, shall be applied to the extent needed to reduce the likelihood of occurrence of the event so that, upon implementation of such controls, the event is highly unlikely.

Contrary to the above, before October 1, 2010, the licensee failed to apply sufficient controls to the extent needed to reduce the likelihood of occurrence of an acute uranium hexafluoride exposure in the Global Laser Enrichment Test Loop facility so that, upon implementation of such controls, the event was highly unlikely.

This is a Severity Level IV violation (Section 6.2)

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance was achieved, is already adequately addressed on the docket in this inspection report, No. 70-1113/2011-003, and the letter from GE-Hitachi Global Laser Enrichment, LLC dated May 18, 2011. However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation," 70-1113/2011-003-01, and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region II, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 28th day of July 2011

U.S. NUCLEAR REGULATORY COMMISSION REGION II

Docket No.:	70-1113
License No.:	SNM-1097
Report No.:	70-1113/2011-003
Licensee:	Global Nuclear Fuel - Americas, LLC
Location:	Wilmington, North Carolina
Dates:	April 11 through 14, 2011 June 12 through 16, 2011
Inspectors:	Omar López, Senior Fuel Facility Inspector (Section 3 & 4) Paul Startz, Fuel Facility Inspector (Section 2) Sandra Mendez, Fuel Facility Inspector (Section 3) Nicole Coovert, Fuel Facility Inspector-in-Training (Section 3)
Approved by:	Marvin D. Sykes, Chief Fuel Facility Branch 3 Division of Fuel Facility Inspection

EXECUTIVE SUMMARY

Global Nuclear Fuel - Americas, LLC NRC Inspection Report No. 70-1113/2011-003

This is a quarterly integrated inspection report that includes two routine, announced inspections that were conducted by NRC regional inspectors during normal shifts in the areas of maintenance and surveillance, permanent plant modifications, and follow-up to previously identified issues. During the inspection period, the plant was shut down for annual maintenance and resumed normal production activities upon completion. These routine, announced inspections consisted of a selective examination of procedures and representative records, observations of activities, walkdowns of items relied on for safety, and interviews with personnel.

Maintenance and Surveillance

The inspectors determined that the licensee's maintenance and surveillance program had been implemented in accordance with licensee procedures and license conditions. Maintenance and surveillance testing activities reviewed by the inspectors were performed in accordance with approved functional test instructions that verified the proper operation of safety systems. No findings of significance were identified.

Permanent Plant Modifications

The plant modifications that were reviewed by the inspectors had been adequately evaluated for safe operations. Management measures had been implemented to ensure all safety-related changes would be maintained. No findings of significance were identified.

<u>Attachment</u> List of Persons Contacted List of Items Opened, Closed, and Discussed Inspection Procedures Used List of Acronyms List of Documents Reviewed

REPORT DETAILS

1. <u>Summary of Plant Status</u>

Global Nuclear Fuel - Americas, LLC manufactures uranium dioxide (UO_2) powder, pellets, and light water reactor fuel bundles at its Wilmington, NC facility. The facility converts uranium hexafluoride (UF_6) to UO_2 using a Dry Conversion Process (DCP) and performs UO_2 , gadolinia (GAD) pellet and fuel fabrication operations.

2. Maintenance and Surveillance (IP 88025)

a. Inspection Scope and Observations

The maintenance and surveillance inspection was performed during the annual plant outage. The outage allowed inspectors to follow up on production equipment maintenance and refurbishment activities including samples of work associated with safety controls identified as items relied on for safety (IROFS). The inspectors reviewed samples of emergent work orders and repetitive computer generated surveillance work instructions identified as Functional Test Instructions (FTI). The inspectors determined that emergent work orders and FTIs that were examined had been developed and implemented in accordance with work control implementing procedures. Work order and FTI documents examined by the inspectors had undergone a review and approval process in accordance with facility procedures and license requirements.

Inspectors reviewed samples of work packages to evaluate the adequacy of procedures, pre-job planning, pre-job preparations including chemical piping and equipment flushing and isolation, respirator and PPE requirements, lock-out / tag-out energy isolation, and other radiological and industrial safety requirements. The inspectors concluded that the licensee's work preparations were consistent with licensee's safety procedures and license requirements.

Maintenance, surveillance testing, and calibration activities were conducted by the licensee throughout the facility. The inspectors performed on-site reviews on the following maintenance activities: (a) Replacement of piping in the Dry Conversion Process (DCP) Hydrofluoric Acid Processing Building, change request 7752; (b) GAD scrap recycle, disassemble and replace bowl and liner, work order 360314; (c) Sintering furnace room erection of scaffolding over sintering furnaces to replace lighting fixtures, project 2010-E460; (d) Pressroom center test grinder head clean out, Radiation Work Permit (RWP) 4245; (e) Remove light fixture obstructing fire sprinkler in the Pressroom, RWP 4207; (f) DCP homogenizer annual inspection and maintenance, work orders 360224, 360277, and 360231; (g) Inspection and repairs of fire dampers in the DCP, RWP 4142; (h) Dry scrap blend and vibromills disassembly and internal inspection, work order 363496.

Maintenance and surveillance testing activities reviewed by the inspectors were performed in accordance with approved FTIs and referenced procedures. The inspectors reviewed samples of FTI implementing procedures program requirements and verified that the work control process established the necessary reviews to maintain configuration control, to ensure safe work practices, and to perform post-maintenance testing. No findings of significance were identified.

The inspectors reviewed samples of work packages related to the calibration and functional testing of IROFS. The work packages included requirements for safe work practices permits, worksite hazard assessment and preparations, performance specifications, and configuration control elements. Personnel implementing IROFS calibration and testing protocols demonstrated acceptable techniques. No findings of significance were identified.

The inspectors reviewed procedures associated with the measuring and test equipment (M&TE) program and discussed the control of M&TE with cognizant personnel. The inspectors found that M&TE calibration records were current and that responsible personnel were knowledgeable of their responsibilities and the importance of maintaining proper control of M&TE.

b. Conclusions

The inspectors determined that the licensee's maintenance and surveillance program had been implemented in accordance with licensee procedures and license conditions. Maintenance and surveillance testing activities reviewed by the inspectors were performed in accordance with approved functional test instructions that verified the proper operation of safety systems. No findings of significance were identified.

3. <u>Permanent Plant Modifications (IP 88070)</u>

a. Inspection Scope and Observations

The inspectors performed a review of the integrated safety analysis (ISA) changes and permanent plant modifications (PPMs) that were made during the last year in the DCP and fuel manufacturing areas. The inspectors reviewed thirty three change request (CR) packages, which included normal facility changes, emergency facility changes, setpoint changes, and calibrations, to determine if the modifications were performed and authorized according to the applicable procedures, and to verify compliance with 10 CFR 70.62 and 70.72. The CRs reviewed also included revisions to procedures, technical basis documents, and temporary operating procedures.

In addition, the modifications were reviewed to ensure that any potential modifications to an accident sequence were properly accounted for and addressed. The inspectors walked down and reviewed PPMs to verify that the "as built" drawings agreed with the field configuration. For the reviewed PPMs, the inspectors verified that operating procedures were updated to reflect the modifications and that training on the modifications was provided, as necessary. The inspectors verified that the licensee had management measures in place to ensure that IROFS affected by facility changes were capable of performing their intended safety function before approving the modification for operation. The inspectors identified minor documentation issues in five CRs, specifically CRs 1832, 4498, 5766, 7120, and 5766, which were discussed with the licensee's staff. No findings of significance were identified.

b. Conclusions

The plant modifications that were reviewed by the inspectors were adequately evaluated for safe operations. The licensee implemented adequate management measures to ensure all safety related changes would be maintained. No findings of significance were identified.

4. Follow-up on Previously Identified Issues

<u>(Closed) Licensee Event Report 2010-004-0</u>: Accident evaluation improperly analyzed in the integrated safety analysis. The event involved failure to identify IROFS for accident sequences involving the potential loss of UF₆ or hydrogen containment resulting in a high consequence event. The licensee identified the issue as part of the corrective actions related to Notice of Violation EA-09-268 (IR 70-1113/2010-003). As a corrective action the licensee implemented the following IROFS:

- IROFS #10221: Hydrogen Alarm with Hydrogen Valve Isolation Control
- IROFS #10221: Hydrogen Alarm with Manual Hydrogen Valve Isolation
- IROFS #10223: Conversion Room Crane Administrator Control

The inspectors verified that management measures were implemented to ensure the availability and reliability of these IROFS. The inspectors also interviewed operators to verify that they understood the actions required by the new IROFS. The inspectors determined that the implemented IROFS were adequate to limit the risk of a high consequence event as a result of a hydrogen explosion. This item is considered closed.

(Closed) Unresolved Item (URI) 70-1113/2009-002-01: Further review to determine if the location of HF detectors (IROFS # TL-HF-01 and TL-HF-02) was appropriate to alert personnel of a release.

The inspectors noted that the Global Laser Enrichment Test Loop facility personnel had not evaluated whether a short-term exposure (less than 10 minutes), from a UF₆ release, to a worker between the source and the nearest HF detector (approximately 13 feet from the source) would exceed the 10 CFR 70.61 performance requirements. The inspectors questioned whether the HF detectors would be able to detect and alert the workers in the required time period to prevent/mitigate the consequence of the exposure.

In response to the inquiry, the licensee conducted an analysis to determine if a worker directly in the path of a release from the process equipment would be exposed to UF_6 in levels that exceeded the 10 CFR 70.61 performance requirements. The licensee was unable to definitively determine that in the event of a catastrophic release of gas from the process equipment, a worker would be fully protected from an acute chemical exposure in concentrations that exceed the performance requirements. Therefore, the inspectors determined that the licensee could not take credit for the HF detectors to protect the workers from an acute chemical exposure.

The inspectors noted that the ISA credited the HF detectors and "Sense and Flee" (IROFS # TL-HF-03) as two independent IROFS to protect the workers from an acute chemical exposure that could exceed the performance requirements. In addition, the

ISA stated that the potential consequences for the workers from this type of accident sequences were assumed to be high.

Title 10 of the Code of Federal Regulations, Part 70, Section 70.61(b) requires that the licensee limit the risk of each credible high-consequence event. Engineered controls, administrative controls, or both, shall be applied to the extent needed to reduce the likelihood of occurrence of the event so that, upon implementation of such controls, the event is highly unlikely. The inspectors noted that without the protection of the HF detectors the likelihood of occurrence of these accident sequences would not be highly unlikely. Therefore, the inspectors determined that the failure to apply sufficient controls to the extent needed to reduce the likelihood of occurrence of an acute UF₆ exposure in the Global Laser Enrichment Test Loop facility so that, upon implementation of such controls, the event was highly unlikely was considered a violation of NRC requirements, VIO 70-1113/2011-003-01.

As a corrective action, the licensee re-analyzed these accident sequences and implemented additional IROFS to protect the worker from a short term acute chemical exposure. The new IROFS implemented by the licensee included:

- IROFS #TL-HF-03: Pressure Relief Devices
- IROFS #TL-HF-05: Crane Lift Control
- IROFS #TL-HF-06: Combustible Control
- IROFS #TL-HF-07: Protective Cover Over Process Equipment

The inspectors determined that the implemented IROFS were adequate to limit the risk and consequence of a UF_6 release and the management measures were implemented to ensure the availability and reliability of these IROFS. This item is considered closed.

5. Exit Meeting

The inspection scope and results were summarized on April 14 and June 16, 2011, with S. Murray, Manager, Licensing & Liabilities and other members of your staff. Although proprietary information and processes were reviewed during this inspection, proprietary information is not included in this report.

ATTACHMENT

1. <u>LIST OF PERSONS CONTACTED</u>

Title
Manager, Fuels Environmental Health and Safety
Manager, Licensing & Liabilities
Licensing & Liabilities Engineer
Radiation Safety program Manager
Manager, Emergency Preparedness and Site Security
Manager, Integrated Safety Analysis
Manager, Criticality Safety Program
Manager, GLE TL Operations
Manager, GLE Licensing
GEH Manager, Nuclear Safety Programs
FMO Operations Leader

Other licensee employees contacted included engineers, technicians, production staff, and office personnel.

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u> URI 70-1113/2009- 002-01	<u>Status</u> Closed	Description Review to determine if the location of HF detectors was appropriate to alert personnel
LER 2010-004-0	Closed	Accident evaluation improperly analyzed in the integrated safety analysis.
VIO 70-1113/2011- 003-01	Opened/Closed	Failure to apply sufficient controls to the extent needed to reduce the likelihood of occurrence of an acute UF_6 exposure in the Global Laser Enrichment Test Loop facility so that, upon implementation of such controls, the event was highly unlikely.

3. INSPECTION PROCEDURES USED

IP 88025	Maintenance and Surveillance
IP 88010	Permanent Plant Modifications

4. LIST OF ACRONYMS

ADAMS	Agencywide	NRC	Nuclear Regulatory	
	and Management System		Commission	
AEC	Active Engineered Control	NSI	Nuclear Safety Instruction	
CR	Change Request	NSR/R	Nuclear Safety Release/ Requirement	
DCP	Dry Conversion Process	OP	Operating Procedure	
EA	Enforcement Action	PPM	Permanent Plant Modifications	
FMO	Fuel Manufacturing Organization	QRA	Quantitative Risk Analysis	
FTI	Functional Test Instructions	RWP	Radiation Work Permit	
GAD	Gadolinium	SNM	Special Nuclear Material	
HF	Hydrofluoric Acid	TL	Test Loop	
HVAC	Heating, Ventilation, Air Conditioning	ТОР	Temporary Operating Procedure	
IR	Inspection Report	TR	Technical Report	
IROFS	Items Relied on for Safety	UF ₆	Uranium Hexafluoride	
ISA	Integrated Safety Analysis	UIR	Unusual Incident Report	
LER	Licensee Event Response	UO ₂	Uranium Oxide	
M&TE	Measurement and Test Equipment	URI	Unresolved Item	
NOV	Notice of Violation	VIO	Violation	

5. LIST OF DOCUMENTS REVIEWED

Calibration procedure for DCP HF line, DCP HF Common (AEC), Radiation Waste (AEC), and Laundry Pipe Detector (AEC), 07/16/07 NSI E-4.0, Criticality Safety Analysis Methods and Verification, Revision 41, Issue Date 02/10/2011 NSI E-3.0, Nuclear Safety Reviews, Revision 36, Issue Date 10/15/2010 NSI O-15.0, Procedure to Surveys, Exhibit 12, Revision 12/2006 NSR/R # 02.15.04, 12/22/99 NSR/R # 02.15.12, 09/26/06 NSR/R #15.04.05, 06/25/04 QRA 15.11, DCP – Conversion Hydrogen Leak, Revision 0, September 2010 QRA 35.3, DSR Oxidation Furnace Operations, Revision 2, Issue Date 01/29/10 QRA 29.7, High Concentration of Uranium in the HF Concentrated Storage Tanks, Revision 0, 08/13/08 QRA 80.4, Decontamination Facility – Waste Drum Control, Revision 0, 08/27/08 TR 1336.00, Dry Conversion Process Hydrofluoric Acid Recovery, Revision 22 UIR # PP&SS-1002, 02/07/10

Change Requests Reviewed

6041, 6056, 6609, 6642, 4362, 2397, 6799, 5766, 5907, 5532, 4438, 7036, 5740, 7826, 7833, 7120, 6765, 6697, 6698, 6682, 4498, 4444, 6563, 6562, 1832, 7631, 8030, 6765, 6697, 6698, 6682, 7196, 5893, 6780, 6018, 7120

Work Orders Reviewed

318064, 318064, 327935, 370984, 320691, 335542, 345805

Procedures

OP 1332.00, DCP UF6 to UO2 Conversion, Revision 54OP 2301.00, FMO HVAC Maintenance Operation, Revision 9 OP 1080.20, Decon Facility Operations, Revision 32 OP 1210.00, Dry Recycle Oxidation Furnace, Revision 22 OP 1333.00, DCP Powder Outlet, Revision 66 OP 1338.00, DCP Material Handling and Movement, Revision 34 OP 1336.00, DCP HF Recovery, Revision 40 PRI 6-09, revised on October 26, 2010, Procedural Responsibilities and Instruction PRI 5-05, Functional Test Instruction, Issue Date 10/29/2010 P/P 10-10, Configuration Management Program – Nuclear Manufacturing Operations, Revision 18. Issue Date 04/19/2011 P/P 40-04, Nuclear Safety Design Criteria, Revision 17, Issue date 07/27/2009 FMO 10-10, Revision 17, Configuration Program TOP 4540, Operating Instruction for Grinder #3, Start Date 04/30/2009 TOP 6562, Revise Cooling Hopper Moisture AEC Trip Point From +10.0 to 0.0 Deg C. Revision 0, Start Date 07/30/2010 TOP 8030, Continuation of (7631) Lock/Tag Out Recycle Doors for All Lines of Conversion, Start Date 06/13/2011

Maintenance Documentation

FTI 1320-01, Backflow Prevention-DCP Nitrogen Supply, Revision 3 FTI 1336.04, Primary Pipe Detectors, conducted 1/31/2011, Revision 4 FTI 1230-02, Dry Recycle Blender, high moisture reject, Revision 4.1 FTI 1336-15, Common Pipe Detector, divert test, Revision 0 FTI 1336-05, Primary Pipe Detector, high trip, Revision 5 FTI 1332.04, Kiln low temperature trip to close UF6 valve, Revision 4 FTI 1210.04, Dry Recycle Furnace Powder Discharge: High Moisture Powder is Rejected into the 3-Gallon Can Reject Powder Hood, Revision 2 and Revision 2.2 FTI 1331-01, Shutdown of UF6 (G) Feed to the Kiln if the Kiln Pressure Exceeds the UF6 Feed Line Pressure, Revision 5 FTI 1332-10, Closing of the Double Block Valves to Stop the Pyro-hydrolysis Steam Supply to the Kiln, Revision 5 FTI 1332-22, Closing of the Hydrogen and UF6 Supply Valves and Providing Alarm to Control Room Operators if a Hydrogen Leak is Detected in the Conversion Room, Revision 0

FTI 1333-01a, Powder Outlet Cooling Hoppers CE#.U0.V.001 & V.002, Revision 5 FTI 1333-01a2, Powder Outlet Cooling Hoppers CE#.U0.V.001 & V.002, Revision 0 FTI F1, Pellet Grinder #3, Revision 2

FTI F2, Pellet Grinder #3, Revision 3

FTI F3, Pellet Grinder #3, Revision 3.1