



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

April 30, 2012

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 (GNFA), L.L.C. - NRC INTEGRATED  
INSPECTION REPORT NO. 70-1113/2012-002 AND NOTICE OF VIOLATION**

Dear Ms. Holmes:

The U.S. Nuclear Regulatory Commission (NRC) conducted announced, routine inspections from January 1 through March 31, 2012, at your Wilmington, North Carolina facility. The enclosed report presents the results of these inspections. The purpose of the inspections was to perform routine reviews of the implementation of plant operations, fire protection, management organization and control, 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 January 27, 2012, and March 9, 2012.

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 two Severity Level IV violations of NRC requirements occurred. The violations were 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 violations are cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the subject inspection report. The violations are being cited in the Notice because the NRC identified the violations.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

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If you contest the violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to: (1) the Regional Administrator, Region II; and (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and 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>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards 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 No. 70-1113/2012-002  
w/Attachment: Supplementary Information**

**cc w/encl:**

**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**

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PUBLICLY AVAILABLE       NON-PUBLICLY AVAILABLE       SENSITIVE       NON-SENSITIVE  
ADAMS:  Yes      ACCESSION NUMBER: ML12122A825       SUNSI REVIEW COMPLETE  FORM 865 ATTACHED

OFFICE	RII: DFFI	RII: DFFI	RII: DFFI	RII: DFFI	RII: DFFI		
SIGNATURE	/RA/	/RA/	/RA/	/RA by PG for NP/	/RA/		
NAME	NCovert	PGienn	OLópez	NPeterka	MToth		
DATE	4/30/2012	4/27/2012	4/27/2012	4/27/2012	4/27/2012		
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

Letter to Ms. Nicole Holmes from Marvin D. Sykes dated April 30, 2012

Subject: GLOBAL NUCLEAR FUEL – AMERICAS (GNFA), L.L.C. - NRC INTEGRATED  
INSPECTION REPORT NO. 70-1113/2012-002 AND NOTICE OF VIOLATION

Distribution w/encl:

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PUBLIC

## NOTICE OF VIOLATION

Global Nuclear Fuel-Americas  
Wilmington, NC

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

During an NRC inspection conducted between January 1 and March 30, 2012, violations of NRC requirements were identified. In accordance with the NRC Enforcement Policy, the violations are listed below:

- A. 10 CFR 70 Appendix A (a)(4)(i), Reportable Safety Events, states, in part, that licensees shall report events to the NRC Operations Center within 1 hour of discovery, an event or condition such that no IROFS, as documented in the ISA Summary, remain available and reliable to perform their function in the context of the performance requirements in § 70.61(b) and § 70.61(c).

Accident sequence, 3.4.3, A Fixed Combustible Fire Occurs in the Press Area, of Quantitative Risk Assessment (QRA), QRA-401/503, "Fabrication – Press", Revision 0, designates the feed tube level sensor as a SOLE IROFS 503-16 for the Gadolinia (gad) Press. The QRA also states that the failure of the feed tube level sensor IROFS is failure to stop feed when the specified limit is reached.

Contrary to above, at approximately 9:47 a.m. on February 13, 2012, the licensee failed to report to the NRC Operations Center within one hour of discovery an event such that no IROFS, as documented in the ISA Summary, remain available and reliable to perform their function in the context of the performance requirements. Specifically, on February 13, 2012, SOLE IROFS 503-16 failed for approximately one hour. The mass limit of 36 kilograms (kgs) in the gad press feed tube was exceeded when the feed tube level sensor failed to stop feed when the specified limit was reached. As a result, no IROFS remained available and reliable for this high consequence accident sequence, and a one-hour report was required to be performed.

This is a Severity Level IV violation (Section 6.9).

- B. 10 CFR 70.62 (d) Management Measures, states, in part, that management measures shall ensure engineered and administrative controls and control systems that are identified as IROFS are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed, to comply with the performance requirements of § 70.61 of this subpart.

Contrary to above, on February 13, 2012, the licensee failed to ensure that management measures for an engineered control identified as an IROFS was implemented and maintained, as necessary, to ensure that it was available and reliable to perform its function when needed, to comply with the performance requirements. Specifically, during the clean-out and re-installation of the gad press rotary valve and the subsequent start-up of the gad press, management measures were not implemented and maintained for SOLE IROFS 503-16, gad press feed tube level sensor. As a result, the critical mass limit of 36 kilograms was exceeded in the gad press feed tube due to material bypassing the valve that was not fully installed.

This is a Severity Level IV violation (Section 6.2).

Pursuant to the provisions of 10 CFR 2.201, Global Nuclear Fuels-Americas is hereby required to submit a written statement or explanation 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). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time. If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because 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> 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 30<sup>th</sup> day of April 2012

**U.S. NUCLEAR REGULATORY COMMISSION  
REGION II**

**Docket No.:** 70-1113

**License No.:** SNM-1097

**Report No.:** 70-1113/2012-002

**Licensee:** Global Nuclear Fuel - Americas, LLC

**Location:** Wilmington, North Carolina

**Dates:** January 23 through 27, 2012, and March 5 through 9, 2012

**Inspectors:** N. Coover, Fuel Facility Inspector (Section A.1 and C.1)  
P. Glenn, Fuel Facility Inspector (Section B.1 and B.2)  
O. López, Senior Project Inspector (Section A.1, A.2, and C.1)  
N. Peterka, Fuel Facility Inspector (Section B.1)  
M. Toth, Fuel Facility Inspector-in-Training (Section A.2)

**Approved by:** M. Sykes, Chief  
Fuel Facility Branch 3  
Division of Fuel Facility Inspection

## **EXECUTIVE SUMMARY**

Global Nuclear Fuel - Americas, LLC  
NRC Inspection Report No. 70-1113/2012-002

This is a quarterly integrated inspection report that documents routine, announced inspections that were conducted by NRC regional inspectors during normal shifts in the areas of operations, fire protection, management organization and controls, operator training, and to follow-up on previously identified issues. During the inspection period, normal production activities were ongoing. These routine, announced inspections consisted of a selective examination of procedures and representative records, observations of activities, walk-downs of items relied on for safety (IROFS), and interviews with personnel.

### **Safety Operations**

- The inspectors reviewed the Integrated Safety Analysis (ISA) methodology, the new verification process, and performed a sampling of the fabrication milestone IROFS. No findings of significance were identified. (Paragraph A.1)
- The fire protection systems were adequately maintained in accordance with site procedures. However, an unresolved item, URI 070-01113/2012-002-01, was identified to further evaluate whether the licensee was in compliance with the performance requirements. (Paragraph A.2)

### **Facility Support**

- The inspectors reviewed the licensee's management organization and controls at Global Nuclear Fuels - America and identified one unresolved item requiring further NRC review. (Paragraph B.1)
- The training program was implemented in accordance with the license application and regulatory requirements. (Paragraph B.2)

### **Special Topics**

- The inspectors performed an event follow-up inspection for the February 13, 2012, loss of mass control event when a SOLE IROFS 503-16, gadolinia (gad) press tube feed sensor, was disabled during a routine enrichment cleanout evolution. The inspectors identified two Severity Level IV violations for the failure to implement established management measures and the failure to report to the NRC Operations Center, within one hour of discovery, an event in which no IROFS remained available and reliable for a high consequence accident sequence. (Paragraph C.1)

### **Attachment**

List of Key Persons Contacted  
List of Items Opened, Closed, and Discussed  
Inspection Procedures Used  
List of Acronyms  
List of 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.

#### **A. Safety Operations**

##### **1. Operations Safety (IP 88020) – Regional Initiative for Integrated Safety Analysis (ISA) Project Fabrication Milestone Review**

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

On August 31, 2011, the licensee made an event notification (EN 47225) to the NRC that the Integrated Safety Analysis (ISA) review for the fabrication area was completed and 125 existing safety controls were designated as items relied on for safety (IROFS). The EN stated that implementation of the revised safety basis, IROFS, and application of management measures to the new IROFS would be completed within 90 days, per the ISA action plan. In a letter dated February 2, 2012, the licensee notified the NRC that the revised ISA for the fabrication area had been completed and implemented per the revised ISA action plan schedule. The licensee also referenced in this letter, changes to the ISA action plan that were made and documented in a letter to the NRC, dated November 29, 2011. As part of the change, the licensee committed to conduct detailed reviews of the original supporting analyses, base assumptions and plant configuration, including a verification of IROFS maintenance test records, management measures, and operator instructions. The licensee also stated that if discrepancies were identified during these reviews, they would be evaluated, entered into a corrective action program, and reported to the NRC as necessary.

During the inspection, the inspectors identified that although the implementation of the fabrication milestone was completed, the verification process, as described above, had just started. In addition, at the time of the inspection, the conversion milestone verification process was completed; however, the inspectors identified that only the identification of issues had been completed and the documentation of the issues in the licensee's corrective action program was just beginning. As a result, the majority of the conversion verification issues identified had not been resolved nor was there an established timeline when the corrective actions would be completed. The licensee was in the process of resolving these actions as part of their ISA project plan.

As a result of the licensee's status of the ISA project action plan and the different stages that were on-going, the inspectors focused on the implementation of the ISA methodology, the new verification process, specifically as it related to the conversion milestone because it was mostly completed, and performed a sampling of the fabrication milestone IROFS. The inspectors did not perform an intensive review of the fabrication IROFS at this time because the verification stage had not been completed. A further review of the fabrication milestone will be performed at a later inspection in 2012.

For the ISA methodology, the inspectors reviewed how the licensee developed the basis for the probabilistic risk determinations made as they related to initiating event frequencies and credit for IROFS reliability. The inspectors identified that some of the input data for the licensee's basis came from their corrective action program, logs, site operating experience, and/or generic industry failure data. The inspectors identified that a potential vulnerability may exist when using data that was not specific to a fuel facility site or using data that may not be all inclusive or maintained with rigorous programmatic quality control. This observation included the initial input data being used to determine initiating frequency, IROFS reliability, and success/failure outcome determinations. The inspectors also noted the lack of a formal method to ensure that future events or lower level occurrences with the same root causes would be re-entered into the input data to ensure that the analysis remained accurate. This observation was discussed with the licensee.

The inspectors also reviewed the new verification process, specifically as it related to the conversion milestone because it was mostly completed. The inspectors identified that the licensee had an initiative to conduct more thorough reviews of the supporting analysis, plant configuration, and IROFS. The licensee created a systematic process to perform vertical slice analyses of the supporting documentation and controls to verify the assumptions made were valid and the controls credited were implemented as intended. The inspectors determined that this was a good process to ensure accuracy in the development and application of the project. However, the inspectors identified a potential vulnerability with the handling of issues identified during the verification process.

The licensee stated in the letter to the NRC, dated November 29, 2011, that during the verification process, identified discrepancies would be evaluated, entered into the licensee's corrective action program (CAP), and reported to the NRC as necessary. The inspectors identified that the licensee was not immediately entering the identified issues into CAP. Instead, the licensee was waiting until the end of the process area verification to bin and enter the issues into CAP to minimize duplication. The licensee was using a screening process to review issues for potential immediate action. The inspectors identified that the screening committee was not consistently attended by operations department and the NRC identified two examples of IROFS related issues that were not discussed at the screening committee or not handled in a timely manner. These examples included IROFS 503-07, Press Hood Level Sensor, identified as potentially not automatically shutting off the powder feeder if the height of the powder on the hood floor exceeded two inches. The second issue involved a functional test, FTI 1331-10, for IROFS 201-07, that was extended past its maximum allowable time limit. The licensee immediately investigated both of these issues, and discussed the findings with the NRC. In both examples, neither concern affected the availability and reliability of the IROFS. However, the potential vulnerability was discussed with the licensee regarding the need for timely and consistent operational reviews for IROFS related issues to ensure none of the issues identified result in a failed or degraded IROFS.

b. Conclusion

The inspectors reviewed the ISA methodology, the new verification process, and performed a sampling of the fabrication milestone IROFS. No findings of significance were identified.

## 2. Fire Protection Annual (IP 88055)

### a. Inspection Scope and Observations

The inspectors reviewed licensee procedures; toured plant areas containing IROFS; and assessed the material condition of fire protection equipment, systems, and features. The inspectors verified that flammable materials were stored in marked cabinets as specified in approved procedures and that housekeeping and the control of combustible materials were adequate and consistent with approved procedures. The inspectors verified that the cutting, welding, and hot work program was implemented in accordance with approved procedures.

The inspectors walked down IROFS 101-08 (transient combustible control) and 101-09 (passive vehicle barrier) associated with the DCP UF<sub>6</sub> staging pad. No findings of significance were identified.

From a review of preventive maintenance records and walk-downs, the inspectors determined that fire dampers, doors, penetration seals, and detectors were maintained in a condition that ensured availability and reliability to perform their safety function. The inspectors determined that fire hoses and portable extinguishers were provided in locations throughout the facility process areas with unobstructed access and that the material condition was adequate.

The inspectors reviewed the pre-fire plan and interviewed personnel from the Emergency Response Organization (ERO). The interview questions focused on how the ERO responded to different types of fires in various areas, including the differences between Moderator Controlled Areas (MCA) and Moderator Restricted Areas (MRA). The inspectors verified that the off-site fire support organizations were offered an opportunity for site orientation and training. The inspectors noted communication equipment was available and verified that the members of the Emergency Response Team had access to their own portable radio communications while they were on duty.

The inspectors reviewed the Quantitative Risk Assessment (QRA) for fire accident sequences within DCP and questioned why the event tree analyses did not incorporate the combustible control program (CCP) in the initiating event (IE) frequency as did the QRA for fabrication. The inspectors also questioned why the IE frequencies for fire sequences within DCP were smaller ( $5.1 \times 10^{-3}$  for DCP versus  $1.0 \times 10^{-2}$  for fabrication) without any controls in place. The licensee stated that DCP IE frequencies were lower than fabrication and did not include the CCP because of differences regarding building construction, type of operations, equipment robustness, availability of moderators, and size of fire necessary to cause equipment damage. The inspectors performed walk-downs of the different process areas and review additional documentation regarding IE frequencies determination to validate licensees' bases for the DCP IE frequencies. No findings of significance were identified.

The inspectors noted that several DCP fire sequences involving chemical and criticality safety consequences utilized IROFS 202-31, the conversion CCP (an administrative control), at a 0.01 failure probability. However, the inspectors noted the ISA supporting calculations stated that the conversion CCP applied only to UF<sub>6</sub> cylinder areas and thus may not be applicable for fire sequence analyses in non-UF<sub>6</sub> cylinder areas.

Furthermore, the supporting calculations stated that the failure probability of 0.01 was assigned to this IROFS due to the precise control measures that were in place for UF<sub>6</sub> cylinder areas and that no credit was given for the general site CCP.

The inspectors also noted that the CCP IROFS requirements between DCP non-UF<sub>6</sub> cylinder areas and fabrication were equivalent. The inspectors questioned why in the DCP non-UF<sub>6</sub> cylinder areas, the licensee assigned a failure probability of 0.01 to the conversion CCP when there were no precise control measures beyond the general site CCP for these areas or measures that exceeded the Fabrication CCP IROFS requirements. The inspectors noted that the licensee was relying on design features (no water lines or sprinkler system, equipment design, etc.) and other controls to justify the IROFS failure probability and these controls were not considered part of the CCP IROFS or designated as additional IROFS.

10 CFR 70.61(b) states, in part, the risk of each credible high or intermediate consequence event must be limited such that engineered controls, administrative controls, or both, shall be applied to the extent needed to reduce the likelihood of occurrence of the event or such that it will meet the performance requirements. The inspectors determined that if the 0.01 failure probabilities for the DCP non-UF<sub>6</sub> cylinder areas IROFS could not be justified, additional IROFS would be required to meet the performance requirements where these IROFS were utilized as a safety control. An unresolved item, URI 070-01113/2012-002-01, was identified to further evaluate whether the licensee was in compliance with the performance requirements regarding conversion fire safety accident sequences with criticality safety consequences.

b. Conclusion

An unresolved item, URI 070-01113/2012-002-01, was identified to further evaluate whether the licensee was in compliance with the performance requirements regarding DCP fire safety accident sequences with criticality safety consequences.

**B. Facility Support**

1. Management Organization and Controls (IP 88005)

a. Inspection Scope and Observations

The inspectors interviewed senior managers, managers, and supervisors to verify that the management team contained an understanding of the plant policy for safety and management responsibilities. The inspectors reviewed changes in personnel responsibilities and functions that occurred within the past year. The inspectors verified that the personnel selected met the qualifications as required by the license application. Through interviews, the inspectors verified that the newly appointed individuals were aware of and implemented their assigned responsibilities.

The inspectors verified the licensee's control of procedures through discussions with licensee staff. The inspectors reviewed four procedures which had been changed in the past year to ensure that they were reviewed and approved in accordance with approved procedures.

The inspectors reviewed the licensee's problem identification and resolution program to determine if the program was being conducted in accordance with approved procedures and the license application. The inspectors observed a management meeting in which the status of open items in the corrective action program (CAP) were discussed in limited detail due to maintenance on the CAP tracking software. The inspectors reviewed the internal and external audits of the following programs: Radiation Safety, Criticality Safety, Chemical & Industrial Safety, Environmental, and Fire & Explosion Protection and determined that the audits were conducted at the appropriate frequency.

The inspectors reviewed safety committee meeting minutes and verified that the committees operated per the associated charter and implementing procedures.

The inspectors verified that the licensee's quality assurance program was being implemented in accordance with the license application. Through examination of records, the inspectors determined that the licensee performed the appropriate tests on systems and components important to safety.

A unresolved item was identified to verify licensee compliance with 10 CFR Part 71.125 as it relates to the use of calibrated equipment when performing a valve torque check on multiple 30B UF<sub>6</sub> cylinders in their possession over a two month period in late 2011.

The inspectors reviewed the circumstances surrounding an event that occurred on January 01, 2012, involving a small release of UF<sub>6</sub> from a 30B cylinder in a DCP autoclave prior to vaporization. The release was caused by a loose valve which rotated when an operator was tightening the valve's packing nut prior to a leak test. During the review, the inspectors learned from the licensee of a previous cylinder valve which leaked during vaporization and of two cylinders that were found with loose valves and were subsequently tagged out of service and placed on the cylinder pad. The inspectors also learned from the licensee that based on these three instances of loose cylinder valves, the area manager for Dry Conversion and Powder Preparation had instructed his staff to perform a valve torque check on multiple cylinders in the licensee's possession to assure tightness of the valves. These checks occurred over a period of approximately two months from early November to late December 2011. The operators performing the check were provided a pre-job brief and a torque wrench without documented calibration. No procedure was written for this check; however, documented instructions were provided with the pre-job brief. The instructions were to set the torque wrench to 200 foot-pounds (ft. lbs.) and if there was no valve movement when 200 ft. lbs. was reached, the valve was marked acceptable and could be used.

The inspectors questioned whether the licensee was aware of the requirements in American National Standards Institute (ANSI) N14.1 which stated that the valve shall only have torque applied between 200 and 400 ft. lbs. The licensee was aware of the requirements; however, they were under the assumption that they were not challenging the cylinder integrity because they were only applying 200 ft. lbs. of torque and were not near the upper limit of 400 ft. lbs. The inspectors' questioned this logic based on the evidence of the cylinder which leaked on January 01, 2012, after the torque valve check and because the torque wrench was not calibrated. The licensee was unable to produce documentation which demonstrated that the torque wrench was calibrated. Therefore, there was no assurance the torque applied during the checks was actually at 200 ft. lbs and not at a greater or lesser amount. The inspectors verified that the instances of loose cylinder valve identification were entered into the licensee's corrective action program.

b. Conclusion

No violations of significance were identified. However, an unresolved item, URI 070-1113/2012-002-02, was opened to further evaluate licensee adherence to quality requirements of 10CFR 71.

2. Operator Training (IP 88010)

The inspectors reviewed the Operator Training program and evaluated the program against the license application. The inspectors interviewed the licensee on changes to the training program in the past year and reviewed applicable procedure revisions. The inspectors determined that changes made were in accordance with the license application. It was noted that the licensee was in the process of developing a more robust training program for operators in an effort to make the training process more repeatable and reliable.

While conducting walk-downs in the process areas, the inspectors conducted interviews and discussed training with selected staff in a variety of positions in the DCP and fuel manufacturing operations (FMO) areas. The inspectors also observed remediation training conducted by a shift lead with select employees. The inspectors interviewed class participant(s) on the content of the remediation training material and their understanding. Additionally, the inspectors interviewed the training instructor and determined that the training was in accordance with the license application and approved procedures.

The inspectors reviewed lesson plans and examinations. The inspectors verified that key points from the lesson plans were incorporated in the examinations. The inspectors determined that trainee understanding and command of learning objectives were evaluated as required. The inspectors reviewed nuclear criticality safety and radiation protection training and determined that the training was being administered at the required frequency and included the requirements in 10 CFR 19.12.

The inspectors reviewed the training history of several new and seasoned employees in the DCP and FMO areas to verify that training, including on-the-job training, was being conducted and that operator proficiency was being maintained. Additionally, the inspectors observed shift turnover and verified that non-qualified operators were provided training instructions and paired with a qualified operator.

b. Conclusion

No findings of significance were identified.

C. Special Topics

1. Event Follow-Up (IP 88075) - Gadolinia (Gad) Press Rotary Valve Event

a. Inspection Scope and Observations

On February 13, 2012, the licensee conducted an enrichment cleanout of the gad press rotary valve and associated equipment, as required by operating procedure (OP)

1070.26, Manual Open Dump Press Feed Station – Gad Warehouse, Revision 15. Based upon operator interviews and log reviews, the inspectors determined that the enrichment cleanout of the gad press rotary valve was considered a routine evolution, occurring approximately every three days.

The configuration of the gad press equipment was such that a feed hood was located in the room above the gad press. The operators would load powder into the feed hood and the rotary valve below would feed powder into the feed tube leading to the gad press. The feed tube had three level sensors (low, high, and high-high) on the tube that would initiate the rotary valve to feed material if the low level was received, or stop the rotary valve if the high level was received. The high level sensor was designated as SOLE IROFS 503-16 for a fire accident sequence involving a fixed combustible fire in the gad press area. When the high-high level sensor activated, a blue light in the area would notify the operators of a problem; however, the sensor did not have any credited safety function.

On February 13, the licensee reassembled the gad press rotary valve after an enrichment cleanout was performed. The operators did not have the procedures while performing this evolution, nor was it required. During the task, the rotary valve did not seat properly, which went unnoticed by the operating crew.

Following the disassembly and reassembly of the gad press rotary valve, the operators were required to verify rotary valve operation per OP 1070.26. Specifically, Step 23, Cleanout Steps, in Section D., stated that the press operator would manually run the feeder and the setup operator would independently inspect the feeder by visually verifying that the thrust end plate was tight against the feeder housing, all t-bolts were installed and were securely fastened, and rotor operated without excessive noise and appeared to function normally.

On February 13, the operator reassembled the valve but the thrust end plate was not tight against the feeder housing. Due to the physical location of the valve, this error was not easily identifiable; however, the procedure requirements that would have independently verified proper reassembly were not performed in their entirety as required.

In addition, Step 11, Normal Operations, in Section D. of OP 1070.26, stated that when starting a new blend, performing specific steps would prevent overfilling of the feed tube to the gad rotary press. These steps included dumping a maximum of two cans when first starting the blend and verifying with the press operator that the powder was not leaking through the mechanical feeder. On February 13, both of these steps were not performed as required. The operator loaded three cans of material, approximately 43 kilograms(kgs) of material, into the feed hood. Due to the improper seating of the rotary valve, the material was able to enter the feed tube. At the time the third can was emptied, the operator realized that the material was not staying in the feed hood and the blue light associated with the high-high level sensor came on.

10 CFR 70.62 (d) Management Measures, states, in part, that management measures shall ensure engineered and administrative controls and control systems that are identified as IROFS are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed, to comply with the performance requirements of § 70.61. Quantitative Risk Assessment (QRA) 401/503, "Fabrication – Press", Revision 0, established maintenance as the

management measure for IROFS 503-16, gad press feed tube level sensor. Operating procedure 1070.26, was the procedure used to perform maintenance, specifically for the rotary valve clean-out, which was the valve directly controlled by IROFS 503-16, gad press feed tube level sensor. The failure to implement management measures for IROFS 503-16 was considered a violation (VIO 70-1113/2012-002-03) of NRC requirements. This violation was discussed at the exit meeting on March 9, 2012, and the licensee concurred with the results.

The licensee determined that the IE probability for fire accident sequence, 3.4.3, A Fixed Combustible Fire Occurs in the Press Area, was  $7.0 \times 10^{-4}$ . In order to meet the performance requirements of 10 CFR 70.61, the licensee chose to use the high level sensor on the feed tube as a SOLE IROFS 503-16. The IE probability and the SOLE IROFS allowed the licensee to meet the performance requirements of 10 CFR 70.61 using their ISA methodology.

Based on the ISA methodology and the overall short duration that the mass limit of 36 kgs was exceeded, approximately one hour from the time the event occurred until the time the material was removed from the tube, the inspectors determined that the overall probability of the fire accident scenario and the potential resulting criticality remained highly unlikely. However, because a SOLE IROFS failed to remain available and reliable to perform its function in the context of the performance requirements, the inspectors determined that the event was reportable to the NRC.

10 CFR 70 Appendix A (a)(4)(i), Reportable Safety Events, states, in part, that licensees shall report to the NRC Operations Center within one hour of discovery, an event or condition such that no IROFS, as documented in the ISA summary, remain available and reliable to perform their function in the context of the performance requirements in § 70.61(b) and § 70.61(c). Accident sequence 3.4.3, in QRA-401/503, stated, in part, that the failure mode of the feed tube level sensor, IROFS 503-16, was the failure to stop feed when the specified limit was reached. As a result, at 9:47 a.m. on February 13, 2012, one hour from discovery of the event, the licensee should have reported the failure of SOLE IROFS 503-16 to the NRC Operations Center when the licensee had identified that no IROFS remained available and reliable for this high consequence accident sequence. The licensee notified the NRC Region II office as a courtesy call approximately 28 hours later but did not report the event within the time required to the NRC Operations Center. The failure to report an event per 10 CFR 70 Appendix A (a)(4)(i) was considered a Violation (VIO 70-1113/2012-002-04) of the NRC requirements. This violation was discussed at the exit meeting on March 9, 2012, and the licensee did not concur with the results based upon their interpretation of the 10 CFR regulations and the overall probability of the fire accident scenario and the potential resulting criticality remained low.

b. Conclusion

The inspectors performed an event follow-up inspection for the February 13, 2012, loss of mass control event when SOLE IROFS 503-16, gad press tube feed sensor, was disabled during a routine enrichment cleanout evolution. The inspectors identified two Severity Level IV violations for the failure to implement established management measures and the failure to report to the NRC Operations Center, within one hour of discovery, an event in which no IROFS remained available and reliable for a high consequence accident sequence.



**D. 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 January 27, 2012, with senior management and staff and on March 9, 2012, to Ms. Nicole Holmes and staff. The issue related to the one hour report was discussed at the exit meeting on March 9, 2012, and the licensee did not concur with the results based upon their interpretation of the 10 CFR regulations and the overall probability of the fire accident scenario. Proprietary information was discussed but not included in the report.

## SUPPLEMENTAL INFORMATION

### 1. LIST OF PERSONS CONTACTED

<u>Name</u>	<u>Title</u>
F. Beaty	Manager, DCP Area
A. Brotman	Lead, Training Improvement/Curriculum Development
M. Coston	Shift/Team Lead, Conversion
M. Dodds	Sr. Criticality Safety Engineer
D. Doliber	Fire Protection Engineer
M. Grimstead	Manager, Training
S. Hamilton	General Manager Quality
J. Head	General Manager Regulatory Affairs
A. Hilton	Manager, FAB
N. Holmes	GNF-A Chief Operating Officer/Facility Manager
B. Howell	Vaporization Engineer
A. Kennedy	Program Manager, ISA
D. Livengood	Gad Ceramics Process Engineer
S. Murray	Licensing and Liabilities Manager
D. Nay	Shift/Team Lead, Fabrication
P. Ollis	Licensing Engineer, Licensing and Liabilities
A. Raines	Fire Safety and Emergency Response Coordinator
J. Reeves	Manager, Integrated Safety Analysis
J. Rohner	Criticality Safety Program Manager
M. Short	Area Manager, DCP/Powder Prep
D. Snell	Transportation
M. Venters	Emergency Preparedness Manager

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

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

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
URI 70-1113/ 2012-002-01	Open	Further evaluate whether the licensee is in compliance with the performance requirements regarding DCP fire safety accident sequences with criticality safety consequences.
URI 70-1113/ 2012-002-02	Open	Further evaluate licensee adherence to quality requirements of 10CFR 71.
VIO 70-1113/ 2012-002-03	Open	Failure to implement management measures for SOLE IROFS 503-16.

VIO 70-1113/ 2012-002-04	Open	Failure to perform one-hour report for loss of SOLE IROFS for a high consequence accident sequence.
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### 3. INSPECTION PROCEDURES USED

IP 88020, Operations Safety  
 IP 88055, Fire Protection Annual  
 IP 88005, Management Organization and Controls  
 IP 88010, Operator Training  
 IP 88075, Event Follow Up

### 4. LIST OF DOCUMENTS REVIEWED

#### Corrective Action Program Documents

1. ATS 3916, 3917, 3918, 3939
2. Event ID: 550, 350, 561
3. UIR No.: FAB-0812, FAB-0810, FAB-0804, FAB-0812, FAB-0403, FAB-0307, FAB-0301, FAB-0213, FAB-0202, FAB-0834, FAB-1001

#### Records, Procedures, and other Documents

1. Quantitative Risk Assessment (QRA) for Fabrication--Press, QRA 401/503, Revision 0
2. QRA for Fabrication – Sinter; QRA 405/504, Revision 0
3. QRA for Fabrication – Grind; QRA 406/505, Revision 0
4. QRA for Fabrication – UO2/Gad Rod Processing; QRA 407/506, Revision 0
5. QRA for Fabrication – GAD Vibromill/Slugger; QRA 501/502, Revision 0
6. OP 1070.26, Manual Open Dump Press Feed Station – Gad Warehouse, Revision 15
7. Integrated Safety Analysis (ISA), Chapter 3.0, Revision 2, 11/30/10
8. Functional Test Instructions (FTI) 1331-10 Rev. 2, 1070.35 Rev. 1.2
9. Technical Report 1730.00, DCP Integration Gad Rotary Press, Rev. 3 and 4
10. NS-11-008, Event Frequency for Uranium Spills in Fabrication Area, June 3, 2011
11. NS-11-00, Event Frequency for Powder Spills in DCP and DSR, February 16, 2011
12. ISA Training, Node 203: Gad Press, Rev 10/18/11
13. TOP 9286, Supplemental Gad Press, Slugger and Swarf Press Instructions, Rev. 0
14. OP 1002.00, Combustible Material Control Fabrication, Rev. 0
15. OP 1080.02, Combustible Material Control UF6 Storage and Handling, Rev. 3
16. OP 1300.00, Combustible Material Control DCP and Powder Receipt, Rev. 0
17. CP-27-108, Combustible Control Program, Rev. 2
18. GE Wilmington Pre-Fire Plan
19. F-01, Hot Work Procedure, Rev. 9
20. F-03, Inspection and Maintenance of Fire Fighting Equipment, Rev. 4
21. Radiological Contingency and Emergency Plan, #6, Rev. 23
22. FHA 1320.00, DCP Fire Hazards Analysis, Rev. 0
23. QRA-022, Rev. 1
24. FM Global Risk Report (Oct 2011)
25. Nuclear Insurance Inspection Report (Dec 2011)
26. PRI 20-04, Issued 5/31/05
27. PowerPoint presentation-Welcome to ISA Training Fabrication Area, 1/24/12,

28. Raise the Bar - Process Excellence PowerPoint, 1/12/12
29. GNF-A ISA schedule PowerPoint, 1/12/12
30. DCP Verification Progress PowerPoint
31. P&P No. 40-16, Rev. 19. Issued 6/11/08, Pg. 1-6
32. Ceramics Operator Role Requirements Report Printed for various operators, pg. 1-2
33. PR&R 20 Training (Quality Related), 10/30/09
34. CP-06-120 Rev. 0, 6/13/11
35. Administrative Guideline for Proctoring Assessments Version 1 .0, 6/29/11
36. Administrative Guideline for Training Lesson Plan Content and Format, 6/29/11
37. Administrative Guideline for Training Document Plan Content and Format, 6/29/11
38. CP-20-107 Rev. 0, 12/2/11
39. CP-20-107-F01, Area Manager Checkout Card, Rev. 0, 11/14/11
40. List of Employee Transfers to DCP
41. Ceramics New Hires January 2012
42. Ceramics Fabrication-986 Roster 1/20/12
43. PAI 20-13 Issued 12/12/06
44. PRI 06-15 eCM PPQP 12/01/04
45. Training Checkout Card-General Ceramic Shop Operations
46. Training Checkout Card-Pellet Grinding
47. Training Checkout Card-Vibromill Operations
48. Training Checkout Card-Press Operations
49. Training Checkout Card-GAD Dump Station Operations
50. Training Checkout Card-Press Feed Dump Operations
51. PowerPoint presentation-GNF-A Radiation Worker Training June 2011-Annual and REDBAR Refresher
52. Criticality Safety, June 2011
53. Wilmington Safety Review Committee 2<sup>nd</sup> and 3<sup>rd</sup> Quarter 2011
54. Special Wilmington Safety Review Committee – Installation of FMO DA Header (2011)
55. Change Request (CR)-9025, Updating five sintering furnace ops
56. CR-6214, Combustible controls – Op update
57. CR-7728, 30 month Op Review of OP-1340.00
58. CR-7729, 30 month Op Review of OP-1338.00
59. GNFA Tri-annual Radiation Protection Program Review (November 15-18, 2010)
60. GNFA Tri-annual Environmental Assessment (November 15-18, 2010)
61. GNFA Triennial Independent Audit of Fire and Explosion Protection Program
62. GNFA Triennial Independent Audits: Chemical Safety and Industrial Safety (2010)
63. Triennial Criticality Safety Audit of GNF-A (November to December 2010)
64. Nuclear Safety Quarterly Audit of Tech Lab, NML, WeldDev Lab, Chem. Auto Lab, FIV Areas, C&IS (01/03/12)
65. Nuclear Safety Quarterly Audit of Decon, Radwaste, DVRF, Laundry, Hot Maintenance, URU, Chemical, FDL, PTL, and CDL (01/10/12)
66. Nuclear Safety Quarter Audit of FMO-Roof, Chiller, DCP Utilities, DCP HVAC, URU HVAC, N<sub>2</sub> Supply, H<sub>2</sub> Supply (01/17/12)
67. OP 1331.00, DCP
68. TOP 9091, Inspect Cylinder and Secure for Short Term Storage, Rev. 0, 01/02/12
69. TOP 9112, Remove/Replace Cylinder Valves on 30B Cylinders, Rev. 0, 01/15/12
70. PP 10-10, Configuration Management Program-Nuclear Manufacturing Operations, Rev. 20
71. PRI 6-09, FMO and WFSC Operating Procedure
72. PRI 6-14, QCII-SQ
73. CP-16-01, Corrective Action Process

74. CP-18-02-02, RO Audit/Survey Report  
 75. PP 40-01, Wilmington Safety Review Committee, Rev. 20  
 76. PP 40-12, Incident Classification and Investigation, Rev. 19

5. **LIST OF ACRONYMS AND INITIALISMS**

ADAMS	Agency-wide Documents Access and Management System
CAP	Corrective Action Program
CCP	Combustible Control Program
CFR	Code of Federal Regulations
CoC	Certificate of Compliance
CP	Common Procedures
DCP	Dry Conversion Process
ED	Emergency Director
EN	Event Notification
ECC	Emergency Control Center
EP	Emergency Plan
FMO	Fuel Manufacturing Organization
GNFA	Global Nuclear Fuel – Americas
HF	Hydrofluoric Acid
IE	Initiating Event
IP	Inspection Procedure
IR	Inspection Report
IROFS	Items Relied on for Safety
ISA	Integrated Safety Analysis
LER	Licensee Event Response
OP	Operating Procedures
NRC	Nuclear Regulatory Commission
OP	Operating Procedures
PHA	Probabilistic Hazards Analysis
QRA	Quantitative Risk Assessment
Rev.	Revision
UF <sub>6</sub>	Uranium Hexafluoride
UO <sub>2</sub>	Uranium Oxide
URI	Unresolved Item
VIO	Violation



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

May 8, 2012

(b)(7)(C)

SUBJECT: CONCERNS YOU RAISED TO THE NRC REGARDING GLOBAL NUCLEAR FUEL-AMERICAS - ALLEGATION REPORT RII-2012-A-0029

Dear (b)(7)(C)

The NRC has completed its follow up in response to Concern 1 which you brought to our attention on February 14, 2012, and supplemented during subsequent telephone conversations on February 15 and February 24, 2012, regarding Global Nuclear Fuel-Americas (GNF-A). You were concerned about the failure to make a one-hour report to the NRC when the licensee failed to maintain availability and reliability of a sole Item Relied On for Safety (IROFS). The enclosure to this letter restates Concern 1 and describes the NRC's review and conclusions with regard to that concern.

The NRC did not receive the additional information we requested on March 2, 2012, regarding Concern 2, therefore, no further NRC action is warranted at the time.

Allegations are an important source of information in support of the NRC's safety mission. We take our safety responsibility to the public seriously and will continue to do so within the bounds of our lawful authority. We believe that our actions have been responsive to your concerns.

Should you have any additional questions or if the NRC can be of further assistance, please call me at the regional office toll-free number 1-800-577-8510 extension 4629 or you may provide information to me in writing at P. O. Box 56274, Atlanta, GA 30343. You may also communicate with me by electronic mail, if you so choose. However, when doing so, please call me in advance or provide your phone number in your e-mail message so that I can confirm that you are the source of the information. Also, please be advised that the NRC cannot protect the information during transmission on the Internet and there is a possibility that someone could read your response while it is in transit. My e-mail address is [Marvin.Sykes@nrc.gov](mailto:Marvin.Sykes@nrc.gov).

Sincerely,

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

Enclosure: As stated

CERTIFIED MAIL NUMBER (b)(7)(C)  
RETURN RECEIPT REQUESTED

Information in this record was deleted  
in accordance with the Freedom of Information  
Act, exemptions b7C  
OIA 2013-0002

B/1

**GLOBAL NUCLEAR NUCLEAR-AMERICAS**

**RESPONSE TO CONCERNS**

**ALLEGATION NUMBER RII-2011-A-0029**

**Concern 1:**

The licensee failed to maintain availability and reliability of a sole Item Relied On For Safety (IROFS), as described in the facility Integrated Safety Analysis (ISA), which was required to meet the performance requirements of 10 CFR 70.61. The provisions of Appendix A to 10 CFR 70 require a one hour report to the NRC in this case. The licensee failed to make the required NRC report as they maintain that the performance requirements were met based on post event calculation and analysis. You disagree with the licensee's analysis and feel that a report should have been made to the NRC for this event.

**Response to Concern 1:**

On March 5, 2012, NRC inspectors followed up on the February 13, 2012, Gadolinium (Gad) press feed tube event where the licensee failed to ensure that sole IROFS 503-16, feed tube level sensor, was available and reliable to stop UO<sub>2</sub> feed when the specified mass limit was reached. As a result, the specified mass limit of 36 kilograms for the feed tube was exceeded for approximately one hour. IROFS 503-16 was the only IROFS credited for Accident Sequence 3.4.3, A Fixed Combustible Fire Occurs in the Press Area, to prevent an inadvertent criticality accident. The inspectors reviewed the Fabrication Quantitative Risk Analysis (QRA) and discussed the accident sequence assumptions with the licensee. The inspectors also discussed with the licensee whether there were others IROFS listed in the Fabrication QRA that could be applied to ensure that Accident Sequence 3.4.3 remained highly unlikely. The inspectors determined that there were no other listed IROFS that could be applied to Accident Sequence 3.4.3 to ensure that the performance requirements were met. The inspectors also interviewed the Gad press operators, and reviewed OP 1070.26, Manual Open Dump Press Feed Station -- Gad Warehouse, Revision 15, log books, and the licensee's reportability procedure.

The inspectors determined that at 9:47 a.m. on February 13, 2012, one hour from discovery of the event, the licensee had not reported the failure of sole IROFS 503-16 to the NRC Operations Center when no IROFS remained available and reliable for this high consequence accident sequence.

**Conclusion:**

The inspectors substantiated Concern 1 through independent inspection and determined that the licensee did not report to the NRC Operations Center within one hour of discovery an event such that no IROFS, as documented in the ISA Summary, remained available and reliable to perform their function in the context of the performance requirements. During the NRC inspection of this matter, a violation of NRC requirements was identified. A Notice of Violation (Notice) was documented in NRC inspection report 70-1113/2012-002 (ML12122A825) and involves the licensee's failure to report the referenced condition within one hour of discovery as required by Appendix A to Part 70-Reportable Safety Events. GNF-A is required to inform us of the corrective actions it has taken or plans to take regarding the identified violation. Our inspectors will continue to monitor GNF-A's activities to ensure proper resolution of this matter.

Enclosure

MAY 8, 2012

(b)(7)(C)

**SUBJECT: CONCERNS YOU RAISED TO THE NRC REGARDING GLOBAL NUCLEAR FUEL-AMERICAS - ALLEGATION REPORT RII-2012-A-0029**

Dear (b)(7)(C)

The NRC has completed its follow up in response to Concern 1 you brought to our attention on February 14, 2012, and subsequent telephone conversations on February 15 and February 24, 2012, regarding Global Nuclear Fuel-Americas (GNF-A). You were concerned about the failure to make a one-hour report to the NRC when the licensee failed to maintain availability and reliability of a sole Items Relied On for Safety (IROFS). The enclosure to this letter restates Concern 1 and describes the NRC's review and conclusions with regard to that concern.

The NRC did not receive any additional information regarding Concern 2, therefore, no further NRC action is warranted.

Allegations are an important source of information in support of the NRC's safety mission. We take our safety responsibility to the public seriously and will continue to do so within the bounds of our lawful authority. We believe that our actions have been responsive to your concerns.

Should you have any additional questions or if the NRC can be of further assistance, please call me at the regional office toll-free number 1-800-577-8510 extension 4629 or you may provide information to me in writing at P. O. Box 56274, Atlanta, GA 30343. You may also communicate with me by electronic mail, if you so choose. However, when doing so, please call me in advance or provide your phone number in your e-mail message so that I can confirm that you are the source of the information. Also, please be advised that the NRC cannot protect the information during transmission on the Internet and there is a possibility that someone could read your response while it is in transit. My e-mail address is Marvin.Sykes@nrc.gov.

Sincerely,

IRA/

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

Enclosure: As stated

**CERTIFIED MAIL NUMBER**

(b)(7)(C)

**RETURN RECEIPT REQUESTED**

OFFICE	RII:DFFI	RII:EICS			
SIGNATURE	<i>[Signature]</i>	<i>[Signature]</i>			
NAME	Lopez	DeMiranda			
DATE	<i>5/7/12</i>	<i>5/7/12</i>			
E-MAIL COPY?	( ) YES (x) NO	( ) YES ( ) NO			