



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

July 27, 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 (GNF-A), L.L.C. - NRC INTEGRATED  
INSPECTION REPORT NO. 70-1113/2012-003 AND TEMPORARY  
INSTRUCTION 2600/015 INSPECTION REPORT NO. 070-1113/2012-006**

Dear Ms. Holmes:

The U.S. Nuclear Regulatory Commission (NRC) conducted announced, routine inspections from April 1 through June 30, 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, permanent plant modifications, 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 an exit meeting held on April 5, and June 21, 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 the inspections, no violations of regulatory requirements were identified.

In addition, on May 7 through 10, 2012, the NRC completed a review at GNF-A, LLC, in accordance with Temporary Instruction (TI) 2600/015, "EVALUATION OF LICENSEE STRATEGIES FOR THE PREVENTION AND/OR MITIGATION OF EMERGENCIES AT FUEL FACILITIES." The objective of this TI was to independently evaluate the preventive and mitigative strategies and associated procedures to minimize the consequences of selected safety/licensing bases events and to review the adequacy of those emergency prevention and/or mitigation strategies for dealing with the consequences of selected beyond safety/licensing bases events. Results were discussed on May 10, 2012, with you and other members of your staff.

The NRC's Enforcement Process will be used to further evaluate any identified issues to determine if they are of regulatory significance. You are not required to respond to this letter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures 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>.

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

Enclosure: NRC Inspection Report 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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U.S. NUCLEAR REGULATORY COMMISSION  
REGION II

Docket No.: 70-1113

License No.: SNM-1097

Report Nos.: 70-1113/2012-003 and 70-1113/2012-006

Licensee: Global Nuclear Fuel - Americas, LLC

Location: Wilmington, North Carolina

Dates: April 1 through 5, May 7 through 10, and June 18 through 21, 2012

Inspectors: O. López, Senior Project Inspector (Sections A.1, B.2, C.1, and D.1)  
M. Thomas, Senior Fuel Facility Inspector (Sections B.2 and C.1)  
N. Coover, Fuel Facility Inspector (Sections A.1, C.1, and D.1)  
P. Glenn, Fuel Facility Inspector (Sections C.1 and D.1)  
G. Goff, Fuel Facility Inspector (Section B.2)  
J. Marcano, Structural Engineer (Section D.1)  
P. Startz, Fuel Facility Inspector (Section B.1)

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

Enclosure

## **EXECUTIVE SUMMARY**

Global Nuclear Fuel - Americas, LLC  
NRC Inspection Report No. 70-1113/2012-003 and 70-1113/2012-006

This is a quarterly integrated inspection report that documents routine, announced inspections that were conducted by NRC regional and headquarters inspectors during normal shifts in the areas of operations, permanent plant modifications, 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 IROFS reviewed were properly implemented and maintained in order to perform their intended safety function. (Paragraph A.1)

### **Facility Support**

- The Maintenance and Surveillance of Safety Controls program was implemented in accordance with license and regulatory requirements. (Paragraph B.1)
- The Plant Modifications program was implemented in accordance with the license application and regulatory requirements. (Paragraph B.2)

### **Temporary Instruction**

- The licensee has established strategies and procedures for the prevention and/or mitigation of emergencies at fuel facilities adequate for dealing with the consequences of selected beyond safety/licensing bases natural events. One unresolved item was identified to further evaluate whether the licensee is in compliance with the requirements of 10 CFR 70.62(c) and the performance requirements of 10 CFR 70.61 regarding accident sequences that are a result of natural phenomena events (Paragraphs D.1, D.2, and D.3)

### **Attachment**

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

## **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, North Carolina 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)**

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

On November 29, 2011, the licensee sent a letter to the NRC requesting to reschedule their integrated safety analysis (ISA) action plan milestones and associated completion dates. As part of the request, the licensee committed to conduct detailed reviews of the original supporting analyses, base assumptions and plant configuration, including a verification of items relied on for safety (IROFS) maintenance test records, management measures, and operator instructions. The licensee also stated that if discrepancies were identified during these reviews, the issues would be evaluated, entered into a corrective action program, and reported to the NRC as necessary. The letter stated the completion date for the conversion ISA record reviews and verifications would be March 2012.

During the inspection, the inspectors reviewed the completed verification documentation for the conversion process. This review included the licensee's identified discrepancies, associated entries into their corrective action program, and their graded approach to addressing the issues, including the corrective actions and assignment due dates. The inspectors specifically reviewed issues identified with SOLE IROFS and issues that affected multiple IROFS. The inspectors also performed a sampling of IROFS and accident scenarios that the licensee determined that no discrepancies existed during their verification reviews.

The inspectors noted that the ISA record review and verification was a systematic process that the licensee was using to thoroughly evaluate the development and application of their project. However, the inspectors identified a potential vulnerability with the handling of issues identified during the verification process.

The inspectors noted that the licensee identified issues were documented in their corrective action program (CAP), however, the corrective actions due dates were not assigned based upon priority of the issue identified. The inspectors identified corrective actions for SOLE IROFS discrepancies that as written identified concerns that could potentially affect IROFS availability and reliability. The inspectors reviewed each of the issues identified for the SOLE IROFS, performed interviews, and reviewed follow-up documentation, including surveillances performed, procedures, and analysis. When the NRC identified a concern, the licensee investigated the issue and verified that the SOLE IROFS remained available and reliable. The inspectors also noted that the majority of the conversion verification process corrective actions were assigned to a limited number of operations personnel with primarily plant responsibilities. The inspectors discussed with the licensee the vulnerability existed that the licensee would not analyze or address

a potentially degraded or failed IROFS in a timely manner based upon the current approach they were doing to resolve identified discrepancies found during their verification process and reviews.

b. Conclusion

No findings of significance were identified.

**B. Facility Support**

1. Maintenance and Surveillance of Safety Controls (IP 88025)

a. Inspection Scope and Observations

The inspectors interviewed licensee staff to verify that maintenance and surveillance program activities for IROFS and other safety controls are adequate to assure that IROFS and controls were available and reliable to perform their safety function when needed.

The inspectors verified that the licensee's work control program had provisions to ensure the adequate pre-job planning and preparation of work packages to support maintenance and surveillance activities. The inspectors reviewed maintenance and surveillance work packages for accuracy and to ensure that test packages challenged and verified operability of IROFS and safety controls.

The inspectors observed maintenance work activities on selected systems and processes and determined that work activities were conducted in accordance with licensee requirements and approved procedures. The inspectors noted that effective corrective actions were taken when a safety control failed or was degraded. The inspectors verified that post-maintenance testing and calibrations as specified by the licensee requirements were adequately performed prior to restoring equipment to operational status. Completed work packages were adequately reviewed prior to returning equipment to service.

The inspectors reviewed the licensee's problem identification and resolution program to verify that performance issues relating to the maintenance and surveillance of IROFS and safety controls were entered into the CAP and evaluated the adequacy of corrective actions taken.

b. Conclusion

No findings of significance were identified.

2. Permanent Plant Modifications (IP 88070)

a. Inspection Scope and Observations

The inspectors interviewed licensee staff and verified that the licensee established an effective configuration management system to evaluate, implement, and track permanent plant modifications to the site which could affect safety.

The inspectors verified that the licensee's work control program had provisions to ensure the adequate preparation of permanent plant modification design packages. The configuration management system had satisfactory provisions to ensure that permanent plant modifications did not degrade the performance capabilities of IROFS or other safety controls that were part of the safety design basis.

The inspectors reviewed permanent plant modification design packages since the last permanent plant modifications inspection for accuracy. The inspectors verified that applicable post maintenance installation and testing requirements were adequately identified and performed prior to closure of the permanent plant modification design packages. Completed modifications were adequately reviewed prior to implementation and before returning affected equipment to service.

The inspectors verified that the licensee addressed the impacts of modifications to the ISA, ISA Summary, and other safety program information developed in accordance with 10 CFR 70.62.

The inspectors reviewed the licensee problem identification and resolution program and verified that issues related to the preparation and installation of permanent plant modifications were entered into the corrective action program with effective results.

b. Conclusion

No findings of significance were identified.

C. Open Items Review

**(Closed) Unresolved Item (URI) 70-113/2011-004-03:** Tare weight differences of overpacks.

The inspectors observed the operators perform the annual inspection and re-weigh of UX-30 packages and noted that one of the UX-30s, GNFA-081 weighed less than the stamped tare weight. Upon questioning of a quality assurance engineer, the inspectors noted that the overpack had been re-certified by the manufacturer on May 14, 2009, and weighed less than the stamped tare weight, but this information was not readily available to the operators. The inspectors also learned that six other UX-30s purchased new from the manufacturer in 2009, had tare weight differences of 25 to 28 pounds less at GNF-A than the manufacturer's stamped tare weight. Upon discovery in 2009, the licensee pursued these tare weight discrepancies with the manufacturer to the extent that speculation was made about drying out of the polyurethane foam and each other's scales were off. The licensee and the manufacturer were unable to resolve the differences in tare weight.

The UX-30 SAR Chapter 8, "Acceptance Tests and Maintenance Program," Revision (Rev. 1), Step 8.2.5.1 Miscellaneous Tests, stated that "overpacks are to be weighed every 12 months to determine if water has leaked into the overpack. A weight gain of more than 25 pounds per base or lid is reason for rejection." The licensee's implementing procedure contained similar language. The UX-30 SAR, Rev. 0, Appendix 2.10.3, Weight Variance Analysis, did not address underweight packages, but did give a minimum tare weight of 1,460 pounds. The overpack, GNFA-081, was at the minimum



tare weight. The inspectors identified an URI with respect to tare weight differences of overpacks, URI 70-1113/2011-004-03. The licensee entered this issue into their CAP as CAR Report 56158.

The inspectors reviewed the licensee's and the manufacturer's corrective actions for the tare weight difference of UX-30 overpacks. The manufacturer had been leaving cribbing on the scale and not taring the scale while weighing the overpacks. The nameplates on the affected overpacks will be replaced. This item is closed.

**(Closed)** Violation (VIO) 070-01113/2011-006-07: Failure to notify the NRC within 24 hours for the loss of mass control when the sinter test grinder HEPA filter exceeded the mass control limit of 25 kilograms of uranium dioxide.

The inspectors reviewed the correction actions in a letter to the NRC, Reply to Notice of Violation, dated July 29, 2011. For this violation, the licensee documented the following long term corrective actions were taken:

- (1) Additional training was provided for area engineers, applicable environmental health and safety staff, supervisors, and area managers regarding procedural compliance, conservative decision making, escalation of issues and questioning attitude.
- (2) Internal event communication and notification work instruction was revised to clarify the double contingency reporting requirements.

The inspectors performed interviews and reviewed the training materials, attendance sheets, internal event communication, and revised notification work instruction. The inspectors determined that the corrective actions and implementations adequately addressed the violation to prevent recurrence. This item is closed.

**(Closed)** Inspector Followup Item (IFI) 070-01113/2011-005-01: Verify corrective actions for biennial exercise October 26, 2011.

During the NRC's inspection of the biennial emergency preparedness exercise conducted at GNF-A on October 26, 2011, there were several licensee identified deficiencies observed with respect to protecting plant workers. Observations were made in the areas of access control, radiological monitoring, contamination control, and the use of personnel protective equipment. The deficiencies identified were entered into the licensee's CAP.

The inspectors interviewed the emergency preparedness manager and assessed the status of corrective actions resulting from the biennial exercise. The inspectors reviewed a large sample of corrective actions and determined that the corrective actions were adequate to address the deficiencies documented during the exercise. The inspectors reviewed training provided to various members of the emergency organization (EO) and emergency response organization (ERO), including field teams. The inspectors also reviewed revised procedures and noted that the licensee is moving towards responsibility based procedures instead of event based procedures in an effort to more clearly communicate roles, responsibilities, and instructions during an emergency.

Additionally, the licensee is enhancing the training program for the EO and ERO to include qualification requirements via qualification cards, lesson plans for training, and requalification guidance and requirements.

Based upon the sample of corrective actions reviewed, interviews conducted, and documents reviewed, the inspectors have reasonable assurance that the licensee continues to implement all corrective actions and has a clear and timely path forward for completion. This item is closed.

**D. TI 2600/015, “Evaluation of Licensees Strategies for the Prevention and/or Mitigation of Emergencies at Fuel Facilities”**

1. Evaluation of licensing basis for accident sequences and consequences associated with natural phenomena hazards.

a. Inspection Scope and Observations

The inspectors performed a review of licensing basis documents and the ISA to determine the facility design and licensing bases as they related to natural phenomena hazards (NPHs). Specifically, the inspectors evaluated the following; earthquakes, high winds, flooding, and extended loss of utilities.

The GNF-A facility is located in Wilmington, North Carolina. The fuel manufacturing operations facility/fuel manufacturing operations extension (FMO/FMOX) is a steel structure with rolled-steel columns and steel roof trusses. The exterior walls are composed of concrete block and insulated aluminum siding. A built-up roof consists of a metal deck and insulation which is topped with asphalt and gravel. A chemical/metallurgical laboratory is connected to the south side of the fuel manufacturing building, partially separated by a 10-foot wide enclosed corridor. The laboratory is constructed of concrete slab siding with the same roof construction as the other main buildings. The DCP is a three story building attached to the north side of the fuel manufacturing facility. It is constructed with reinforced concrete walls, ceiling and roof. Adjacent to the DCP is the hydrogen fluoride (HF) building. The HF is a steel-framed building with a diked floor and double-skin metal siding walls.

A summary of the evaluated events and potential consequences is presented below:

Earthquake

The licensee stated in the ISA that the Uniform Building Code (UBC) identified the location of the facility as Zone 1 and considered seismic events of minor magnitude (Mercalli VI, Richter 5.5 –6.0). The licensee also stated that GNF-A facilities were constructed in accordance with the UBC and federal, state, and local requirements and that adherence to these codes provided adequate protection against natural phenomena for the Wilmington area. Based on the U.S. Geological Survey, documented historical events, the UBC design criteria, and the design margins, the licensee determined that it was highly unlikely that an earthquake would affect the structures at the Wilmington facility in such a way as to cause an accident scenario resulting in consequences exceeding the performance criteria in 10 CFR 70.61.

The inspectors requested the licensee to provide design documentation to verify the design input criteria for the seismic design of structures and components. At the time of the inspection, the licensee had not provided design information for the facilities (i.e. FMO/FMOX, DCP, and HF) to verify the seismic capacity of the structures. The inspectors performed a review of drawings that provided references to the codes and standards used for the design of the facilities, however no actual calculations were available for review. The information reviewed on the drawing notes stated that the FMO/FMOX buildings were constructed in 1967 and 1973 respectively, both buildings had the North Carolina Building Code as the code reference in the structural drawings. The DCP and HF buildings were constructed in 1995 and the code of reference was the Standard Building Code.

The inspectors noted that GNF-A determined that due to their facility being built in accordance with the UBC, accident scenarios associated with an earthquake were considered highly unlikely. Based on the lack of design information, the inspectors could not verify that the licensee considered all of the potential accident sequences as a result of credible natural phenomena events during the development of the ISA. In addition, the inspectors could not verify whether potential damage could occur to IROFS or failure of IROFS due to ground movement and/or the seismic response of adjacent or interior IROFS. This issue is considered part URI 70-113/2012-06-01, which is discussed in the next section.

### High Winds

The licensee stated that the UBC for this region specified that buildings were to be designed for 120-mph winds and that the buildings at GNF-A were designed and constructed to handle a wind of this minimum strength. The licensee stated that the FMO/FMOX buildings were designed for the 120-mph "fastest wind speed" in effect at the time of construction. Although the wind-speed standard used for design had changed several times since initial construction (basically substituting "3-second gust" for the "fastest wind speed"), the forces used for design were still within the current criteria for this area. The DCP and HF buildings were designed according to the 1995 North Carolina State Building Code and for a basic wind velocity of 120 mph, Exposure C.

Based on the UBC design requirements, historical analysis of locally damaging tropical hurricane, and because the facility had consistently withstood storms without sustaining structural damage, the licensee concluded that it was highly unlikely that a hurricane or tornado would create an accident scenario producing a consequence of concern, as defined in 10 CFR 70.61.

The inspectors noted that the method used by the licensee to evaluate the design basis for tornadoes did not follow the guidance provided in NUREG/CR-4461, "Tornado Climatology of the Contiguous United States." The licensee only considered tornado strikes probability per square mile with respect to the actual physical area of the facility. The guidance provided in NUREG/CR-4461 considered the probability of a tornado striking a point and the conditional probability of exceeding a given wind speed assuming that a tornado strike occurs, which were used to estimate the total probability of a structure being struck by a tornado with winds exceeding the design wind speeds.

The inspectors reviewed an analysis performed by HALLIBURTON NUS Environmental Corporation titled "Horizontal Reviews of External Events," July 27, 1992, in which the contractor concluded that the design input for the FMO/FMOX buildings, 120 mph design wind speed, had a high probability of being exceeded for the location of the site. Also the report stated that the FMO/FMOX buildings might be susceptible to damage and structural failure because of the size and flat roof construction of the buildings.

At the time of the inspection, the licensee could not provide design information to validate that structure, systems, and components were built to the wind loading requirements of the applicable codes (as described above). The inspectors noted that GNF-A determined that due to their facility being built in accordance with the code of record at the time of construction, accident scenarios associated with an earthquake and wind were considered highly unlikely.

Based on the lack of design information, the inspectors could not verify that the licensee considered all potential accident sequences as a result of credible natural phenomena events during the development of the ISA. For example, the licensee had not analyzed for potential damage to IROFS or failure of IROFS due to ground movement and/or the seismic response of adjacent or interior IROFS. As a result, the consequence and the likelihood of occurrence of each potential accident sequence related to NPHs were not determined. The inspectors were also unable to verify that an earthquake would not render any of the IROFS associated with preventing an inadvertent nuclear criticality from performing their safety functions.

10 CFR 70.62(c) states, in part, that each licensee shall conduct and maintain an ISA, that is of appropriate detail for the complexity of the process that identifies:

- potential accident sequences caused by credible external events, including natural phenomena;
- the consequence and the likelihood of occurrence of each potential accident sequence identified and the methods used to determine the consequences and likelihoods; and
- each IROFS identified pursuant to § 70.61(e), the characteristics of its preventive, mitigative, or other safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of § 70.61.

An unresolved item, URI 70-1113/2012-006-01, was opened to further evaluate whether the licensee is in compliance with the requirements of 10 CFR 70.62(c) and the performance requirements of 10 CFR 70.61 regarding accident sequences that are a result of natural phenomena events.

### Flooding

The licensee stated in the ISA that the GNF-A nuclear manufacturing buildings were located on a reasonably high bluff and outside the 100-year ( $10^{-2}$ ) and 500-year ( $2 \times 10^{-3}$ ) flood plains. In addition, there are no dams in the vicinity that could initiate a rapid flood situation. The plant site is outside any storm surge associated with hurricanes. Given the 100- and 500-year floodplain data, the 10 – 15 feet of elevation

margin from historical floods, the mitigating effects of container integrity, and plenty of warning for shutdown of operations, the licensee concluded that the effects of a flood creating an accident scenario with consequences that fail to meet performance criteria of 10 CFR 70.61 are considered highly unlikely.

The inspectors reviewed drawings that showed the elevation of the site as well as drawings with the elevation 100-year ( $10^{-2}$ ) and 500-year ( $2 \times 10^{-3}$ ) flood plains for the area. No issues were identified.

#### Extended Loss of Power and Water

The licensee evaluated loss of power and determined that it would not lead to accident sequences with an unacceptable risk due to consequences of concern. The licensee had in place emergency generators and UPS to provide backup power for critical loads, including crucial process equipment; emergency lighting systems; chemical scrubbers; fire alarm; hazard alarm; criticality accident alarm system; and other designated safety alarm systems. Through a review of maintenance activities and documentation, drawings, and interviews, the inspectors identified that the licensee was adequately testing the back-up power sources availability. In addition, process interlocks were designated to fail safe upon loss of power and procedures were in place to secure hazardous materials and shutdown the process.

At the time of the inspection, the licensee did not have an emergency operating procedure to address total loss of offsite power or procedural electrical line-ups for troubleshooting or restoration during loss of power events. However, the licensee did have multiple back-up power sources and/or electrical configuration capabilities to physically address an extended loss of power event.

The licensee relied on power and water to ensure that chemical fumes from the fuel manufacturing process were safely removed. The inspectors noted that exposure to chemical fumes was analyzed in the ISA and could result in consequences to the workers and public. The inspectors noted that IROFS were in place to mitigate the consequences. Based on documentation reviewed and interviews, the inspectors determined that extended loss of power and water would not exceed the performance requirements thresholds for public safety.

#### b. Conclusion

The inspectors were not able to verify earthquake and wind design specifications for existing buildings. An unresolved item, URI 70-113/2012-006-01, was opened to further evaluate whether the licensee is in compliance with the requirements of 10 CFR 70.62(c) and the performance requirements of 10 CFR 70.61 regarding accident sequences that are a result of natural phenomena events.

2. Verification of the adequacy of emergency prevention and/or mitigative strategies for the consequences for safety/licensing bases events.

a. Inspection Scope and Observations

The inspectors verified that procedures, personnel, and equipment credited in the licensee's mitigation strategy for each of the licensing bases events were properly implemented. In addition, the inspectors verified that the licensee ensured that the emergency prevention and/or mitigation strategy for the consequences from each selected licensing bases event were appropriate.

The inspectors verified that the licensee had established procedures to respond to NPHs events. The procedures reviewed included, but were not limited to, procedures credited for safe shutdown of the facility during emergencies, event based emergency response procedures for criticality, severe weather, radiological, chemical/toxic hazards, fire and explosion, and imminent threat. In addition, the inspectors reviewed ERO procedures and performed interviews with ERO members regarding activation and site-wide accountability, specifically during multiple site-wide events.

The inspectors verified that personnel had been trained on the procedures and equipment referenced in the procedures, including the IROFS and applicable ISA accident sequences associated with different areas and processes. The inspectors also noted that part of the emergency response training and drills included sessions on techniques for dealing with two concurrent severe events and the development of effective mitigative strategies.

With the exception of the procedures for hurricane response, criticality, and transportation events, the ERO procedures were overall generic in nature and did not specifically address how to execute actions or provide specific details for event response. The licensee had self identified this issue during a 2010 self assessment and from drill lessons learned and was in the process of making ERO procedure improvements. In addition, the licensee had just implemented a new seismic event response procedure and had not run any drills on the changes.

The inspectors verified that agreements and contracts with offsite authorities were in place for establishing conditions needed to mitigate the consequences of natural events.

b. Conclusion

The inspectors determined that procedures and strategies credited by the licensee for responding to natural phenomena events were adequate to mitigate potential consequences.

3. Evaluation of beyond licensing basis for accident sequences and consequences associated with NPHs.

a. Inspection Scope and Observations

The inspectors postulated and selected a sample of beyond safety/licensing bases events. The reviewed events were selected based on licensee's safety analysis, engineering analyses, and safety/licensing information. The postulated events included:

- An event that resulted in the loss of electrical power and plant water and the inability of the local fire department to respond to the facility.
- A seismic event resulting in the simultaneous gas release of HF and anhydrous ammonia.
- A Category 4 Hurricane hit the facility and resulted in chemical releases and a criticality accident.

For the postulated beyond safety/licensing bases events, the inspectors evaluated:

- (1) Whether the emergency equipment needed to prevent and/or mitigate the consequences for the selected beyond safety/licensing bases events would be available and functional.
- (2) Whether existing procedures would be sufficient to prevent and/or mitigate the consequences for the selected beyond safety/licensing bases events.
- (3) Training and qualifications of operators, on-site emergency response personnel and support staff needed to implement procedures for the selected beyond safety/licensing bases events.
- (4) Whether the requirements or commitments for offsite support or assistance, including agreements and contracts would be sufficient to address the consequences for the selected beyond safety/licensing bases events.

b. Conclusion

The inspectors did not identify any issues of significance with the reviewed beyond safety/licensing events. However, the inspectors could not fully validate reliability of certain structures due to the lack of design information.

**E. 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 April 5, May 10, and June 21, 2012, with senior management and staff. Proprietary information was discussed but not included in the report.

## **SUPPLEMENTARY INFORMATION**

### **1. LIST OF PERSONS CONTACTED**

N.Holmes	Facility Manager, GNF-A Chief Operating Officer
A. Mabry	Program Manager, Radiation Safety
S. Murray	Manager, Licensing & Liabilities
P. Ollis	Licensing Engineer, Licensing & Liabilities
J. Reeves	Manager, Integrated Safety Analysis
J. Rohner	Program Manager, Criticality Safety
M. Venters	Manager, Emergency Preparedness
K. Walsh	GNF Chief Executive Officer
A. Holbrook	Facilities Engineer
S. Riemersma	Manager, Facilities
T. Best	GEH Facilities Leader
A. Kennedy	Manager, ISA Program
F. Beaty	DCP Engineer
J. Head	General Manager, Regulatory Affairs
N. Andrew	President, Andrew Consulting Engineers
J. Olivier	Licensing Manager
M. Campbell	Manager, Industrial Safety
M. Dodds	Sr. Criticality Safety Engineer
J. Reynolds	Manager, Fuels EHS
C. Savage	FMO Maintenance
M. Short	PP & SS Manager

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

### **2. LIST OF ITEMS OPENED AND CLOSED**

<b><u>Item Number</u></b>	<b><u>Status</u></b>	<b><u>Description</u></b>
URI 70-1113/ 2012-006-01	Opened	Further evaluate whether the licensee is in compliance with the requirements of 10 CFR 70.62(c) and 10 CFR 70.61 regarding accident sequences that are a result of natural phenomena events (Paragraph D.1)
URI 70-1113/ 2011-004-03	Closed	Tare weight differences of overpacks.
NOV 70-1113/ 2011-006-07	Closed	Failure to notify the NRC within 24 hours for the loss of mass control when STG HEPA filter exceeded the mass control limit of 25 kgs UO <sub>2</sub>



### **3. INSPECTION PROCEDURES USED**

IP 88020	Operations Safety
IP 88025	Maintenance and Surveillance of Safety Controls
IP 88070	Permanent Plant Modifications
TI 2600/015	Evaluation of Licensee Strategies for the Prevention and/or Mitigation of Emergencies at Fuel Facilities

### **4. LIST OF DOCUMENTS REVIEWED**

#### Procedures

- CP-16-106, Change Management Process, Rev. 1, 11/17/2011
- LS 1323.01, DCP Planned Power Outage Checklist, Rev. 7
- NSR/R #: 15.02.07, (New Moisture Probe), Rev. 10, 4/4/2012
- OP 1001.00, "Fabrication General," Rev. 54
- OP 1030.10, "Sintering Furnaces 1, 3, 4, and 6," Rev. 45
- OP 1080.90, "HF Neutralization at W-T," Rev. 8
- OP 1081.01, "Incinerator," Rev. 21
- OP 1081.01, "Incinerator," Rev. 21
- OP 1320, DCP General, Rev. 71
- OP 1331, "Vaporization," Rev. 61
- OP 1332, "Conversion," Rev. 58
- OP 1334, "DCP Homogenization," Rev. 75
- OP 1335.05, "Tumbling," Rev. 23
- OP 1336, "HF," Rev. 44
- Section #2, Environmental – Chemical/Toxic Hazards, Rev. 27
- Section #3, Communications (External), Rev. 20
- Section #4, Imminent Threat, Rev. 25
- Section #5, Criticality, Rev. 30
- Section #6, Fire and Explosion, Rev. 23
- Section #7, Radiological, Rev. 24
- Section #8, Severe Weather, Rev. 26
- Section #9, Transportation, Rev. 27
- TOP 6562, "Revise Cooling Hooper Moisture AEC Trip Point from +10.0 Deg C for Line 2 Powder Outlet," Rev.0
- TOP 7860, Use TMX-412 for Oxygen Detection in Powder Pack Inner Room, Rev. 2, 4/28/2011 – 05/5/2011
- TOP 9073, Test CWS DAMS to Demonstrate Ability to Signal Autocall and Fire Watch, Rev. 0, 12/29-2011 - 12/29/2012
- TOP 9077, "Radiation Safety Coordinator and Field Monitoring Team Checklist," Rev. 2, 4/7/2011
- WI-20-108-01, Emergency Organization Initial Qualification and Requalification Training, Rev. 0, 3/12/2012
- WI-20-108-01, Emergency Organization Guides, Rev.0, 3/12/2012
- WI-27-104-30, CWS Horn Audibility, Surveillance Testing, and Maintenance, Rev. 4, 5/31/2012
- WI-27-106-14-F01, EHS Screening Checklist, Rev. 0, 5/4/2012
- WI-28-114-07, Communication Advisor, Rev. 0

- WI-28-114-15, Emergency Organization Activation, Rev. 1
- Wilmington Practices and Procedures, 10-10 Rev. 21, 5/10/2012

#### Other Documents

- 2010 GNF-A Radiological Contingency and Emergency Plan – Audit and Assessment
- 2011 Lessons Learned - 2011 Evaluated Exercise Documentation and Email Communication
- 2012 Emergency Organization Requalification Training Presentation
- 2012 Emergency Organization - Field Monitoring Training Presentation
- Building Manager Training- Position Fundamentals, 4/10/2012
- Certificate of Calibration (Moisture Probe)
- E-mail, GNF G. Dittmer Easidew IS (Gerald Dittmer and Frank Beaty), 8/12/2011
- E-mail, Testing of CWS-> Fire Alarm Connection (Frank Beaty), 10/13/2011
- Emergency Work Order #380805, Mount Fire Alarm Module and Connect Contact from Crit DAM to Fire Alarm, 9/9/2011 – 10/28/2011
- FMOX RECO Project No. 71147 “Specifications Vol. 1”
- FTI WI-27-104-28, Rev. 4, CWS General System Monitoring, Outages, and Severe Weather
- FTI WI-27-104-29, Rev .1, CWS Detector calibration, Zone Coverage, and Maintenance
- FTI WI-27-104-30, Rev. 2, CWS Horn Audibility, Surveillance Testing and Maintenance
- Global Nuclear Fuel – Americas, LLC, Draeger-Tube and Pump Training Program Presentations, 7/11/2008
- Global Nuclear Fuel – Americas, LLC Radiological Contingency and Emergency Plan, Rev. 16
- HNUS-3N71-012 “Horizontal Review of External Hazards,” 7/27/1992
- IROFS Modification Assessment Form, CR 8354, Version 1, 9/7/2011
- ISA Training Materials – Conversion Area for ERO
- Mutual Agreements for:
  - New Hanover County Department of Emergency Management, 7/22/2011
  - New Hanover County Fire & Rescue, 6/1/11
  - New Hanover Regional Medical Center and Emergency Medical Services, dated 12/5/2011
  - Office of Sheriff – New Hanover County Sheriff, 8/21/2009
- PRI 5-05, Functional Test Instruction (FTI), Conversion Recycle Valve, Rev. 0, 12/5/2011
- Print-out of corrective actions specific only to IROFS since 08/08/2011
- Project #59700 “G.E.-Wilmington UPMP Structural Steel Calcs” FMOX
- QN-00642, “ICAMS – New Verification Limits for Both the ABM and ACM,” Rev. 3
- QRA 44.11, “GAD Dry Scrap Furnaces Criticality,” Rev. 3
- QRA-202, Table 4-2, Management Measures: 202-DCP Conversion, Rev. 3
- R051 – Selected Transactions, Recycle run with the new moisture probe, 12/7-12/2011
- RC&EP Event Documentation Critique with 2011 Biennial Exercise Objective Failure (Gensuite ID 475) Package, 11/15/2011
- RECO 78064 “GECO Design Calculations”
- Routine Work Order #385826, Install Easidew Transmitter Per CR 83544, 10/27/2011

- SMP No. DCP194, "Return Moisture Probe Setpoints to +10 oC Shutdown and Execute FIT 1332-10a to Verify Operation
- Software Maintenance Request (SMR) #50424027 to modify FBS to change the mass limits
- Specification No. 33712-2100-001 "FMOX Expansion"
- Specification No. 33712-2700-00-11 "FMOX Expansion"
  - State of North Carolina EMS Agency License # 1154, expires 7/2015
- Technical Report 1323.00, Dry Conversion Process Utilities, Rev. 17
- QRA and PHA for UF<sub>6</sub> Cylinder Handling; QRA 101 Rev. 0 and PHA 101 Rev. 0
- QRA and PHA for Vaporization; QRA 201 Rev. 0 and PHA 201 Rev. 0
- QRA and PHA for Conversion; QRA 202 Rev. 0 and PHA 202 Rev. 0
- WI-20-108-03-F01, GEH/GNF-A/GLE/GE Aviation - EO Position Qualification Guide - EO-01-QG "Emergency Director / Interim Emergency Director", Rev. 0, 3/12/2012
- WI-20-108-03-F01, GEH/GNF-A/GLE/GE Aviation - EO Position Qualification Guide - EO-09-QG "Radiation Safety Coordinator", Rev. 0, 3/12/2012
- WI-20-108-03-F01, GEH/GNF-A/GLE/GE Aviation - EO Position Qualification Guide - EO-11-QG "Field Monitoring Team Member", Rev. 0, 3/12/2012
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#### Work Orders

407700, 405759, 405760, 391241, 407710, 405765, 405766, 391247, 406927, 405762, 405763, 391244, 407758, 407786, 397919, 407762, 407788, 397921, 408950, 408516

#### Change Requests

7860, 8295, 8354, 8865, 7549, 7687, 7686, 7658, 8872, 6652, 7647, 7351, 8793, 6764, 7298, 6909, 7798, 8525, 8537, 8505, 8409, 7191

#### Drawings

8000E92, 8006E96, H12376 Rev. C, E-31-EL50 Rev. 4, E-05-EL50, Rev. 10, 2041E8601, CC5008 Rev. 3.0, E-31-EL50 Rev 4, 6868 U1, 6868U1X, A01-AR50, 7130-E-78, A&S 282-490, 7021-E-07, 07-17692, S3, 7017BD93, 6868-S104, 6868-S104U1, 2022D05, 2171E96-022, 2171E96-092, P00 1332