



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

October 31, 2011

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

**SUBJECT: GLOBAL NUCLEAR FUEL – AMERICAS, L.L.C. - NRC INTEGRATED  
INSPECTION REPORT NO. 70-1113/2011-004 AND NOTICE OF VIOLATION**

Dear Ms. Holmes:

The U.S. Nuclear Regulatory Commission (NRC) conducted announced, routine inspections from August 1 through 4, 8 through 12, 22 through 25, 29 through September 2, and 26 through 29, 2011, at your Wilmington, North Carolina facility. The enclosed report presents the results of these inspections. The purpose of the inspections were to perform routine reviews of the implementation of the operations, radiation protection, effluent and environmental protection, radioactive waste management, transportation, emergency preparedness, 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 August 4, 12, 25, September 2 and 29, 2011.

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

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

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

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.

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 or proprietary information so that it can be made available to the Public without redaction.

If you have any questions, please call me at (404) 997-4629.

Sincerely,

*/RA/*

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

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

Enclosures:

1. Notice of Violation
2. NRC Inspection Report

cc w/encls:

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

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

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**/RA/**  
 Marvin D. Sykes, Chief  
 Fuel Facility Inspection Branch 3  
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 Commerce and Natural Resources  
 Electronic Mail Distribution

PUBLICLY AVAILABLE    NON-PUBLICLY AVAILABLE    SENSITIVE    NON-SENSITIVE

ADAMS:  Yes   ACCESSION NUMBER:ML11304A251    SUNSI REVIEW COMPLETE

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI
SIGNATURE	/RA/	/RA/	/RA/ email	/RA/	/RA/	/RA/	/RA/
NAME	MCrespo	OLópez	JFoster	NCovert	PStartz	SMendez	MThomas
DATE	10/31/11	10/31/11	10/28/11	10/31/11	10/28/11	10/28/11	10/28/11
E-MAIL COPY?	YES   NO	YES   NO	YES   NO	YES   NO	YES   NO	YES   NO	YES   NO

N. Holmes

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Letter to Ms. Nicole Holmes from Marvin D. Sykes dated October 31, 2011

SUBJECT: GLOBAL NUCLEAR FUEL – AMERICAS, L.L.C.- NRC INTEGRATED  
INSPECTION REPORT NO. 70-1113/2011-004 AND NOTICE OF VIOLATION

Distribution w/encls:

M. Sykes, RII  
M. Thomas, RII  
O. López, RII  
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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 on August 8 through 12, 2011, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

10 CFR 70.62(d) requires, in part, that each licensee shall establish management measures to ensure compliance with the performance requirements. The management measures shall ensure that engineered and administrative controls that are identified as items relied on for safety (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.

Contrary to the above, the licensee failed to establish management measures to ensure that IROFS would perform their intended function when needed to comply with the performance requirements as evidenced by the following examples:

- (1) Quantitative Risk Assessment (QRA) - 101, "UF6 Cylinder Handling," Table 4-2, "Management Measures," Revision (Rev.) 0, states, in part, that for IROFS 101-01, UF6 Cylinder Skin Temperature, "Procedures" is one of the assigned management measures.

QRA - 101, "UF6 Cylinder Handling", Table 4-1, "Node 101 IROFS," Rev. 0, states, in part, that the safety function of IROFS 101-01 is to prevent the movement of a cylinder that contains liquid UF6 by verifying the skin temperature is below 60° C prior to movement.

On July 1, 2011, a procedure designated as a management measure for IROFS 101-01 would not have prevented the movement of a liquid uranium hexafluoride (UF6) cylinder by verifying the skin temperature is below 60° C prior to movement. Specifically, Operating Procedure (OP) 1331.00, "DCP Vaporization," Rev. 59, Section 7.3.2, "Removal of Cylinder From Autoclave," stated that "IROFS 101-01 Cylinders that have not been fully vaporized and cold trapped must be < 70° C before being removed from the autoclave."

- (2) QRA - 201, "DCP Vaporization," Table 4-1, "Node 201 IROFS," Rev. 0, designated IROFS 201-19, Portable Wet Scrubber System, and SOLE IROFS 201-08, Vaporization Area Stack Exhaust Shutdown and Wet Scrubber System as administrative IROFS.

On July 1, 2011, the licensee failed to establish management measures for the wet scrubber system to ensure that IROFS 201-19 and SOLE IROFS 201-08 were available and reliable to perform their function when needed.

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.

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

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

Dated this 31 day of October 2011

U.S. NUCLEAR REGULATORY COMMISSION  
REGION II

Docket No.: 70-1113

License No.: SNM-1097

Report No.: 70-1113/2011-004

Licensee: Global Nuclear Fuel - Americas, LLC

Location: Wilmington, North Carolina

Dates: August 1 – 4, 2011  
August 8 – 12, 2011  
August 22 – 25, 2011  
August 29 – September 2, 2011  
September 26 – 29, 2011

Inspectors: Mary Thomas, Senior Fuel Facility Inspector (Sections B.3 and B.4)  
Manuel Crespo, Senior Fuel Facility Inspector (Section A.2)  
Omar López, Senior Fuel Facility Inspector (Section A.1)  
Paul Startz, Fuel Facility Inspector (Section B.2)  
Sandra Mendez, Fuel Facility Inspector (Section C.1)  
Nicole Coover, Fuel Facility Inspector (Section A.1)  
Jennifer Foster, Fuel Facility Inspection (Section B.1)

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

## **EXECUTIVE SUMMARY**

Global Nuclear Fuel - Americas, LLC  
NRC Inspection Report No. 70-1113/2011-004

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, radiation protection, effluent and environmental protection, radioactive waste management, transportation, emergency preparedness, 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, walkdowns of items relied on for safety, and interviews with personnel.

### **Operational Safety**

- The inspectors performed an operational review of the Integrated Safety Analysis (ISA) Project Conversion milestone, which included uranium hexafluoride (UF<sub>6</sub>) cylinder handling, vaporization, and conversion process areas. The inspectors identified a violation with two examples for the failure to implement management measures for items relied on for safety (IROFS) 101-01, 201-08, and 201-19. (Paragraph A.1.b)
- The inspectors performed an operational review of the licensee's corrective actions with respect to the failed Criticality Warning System (CWS). The licensee's voluntary shutdown demonstrated a "safety over production" attitude. The restart evaluations were thorough and broad scope. A questioning attitude was also demonstrated in the subsequent evaluations. One unresolved item was identified involving the compromised CWS. (Paragraph A.2.b)

### **Radiation Protection**

- The radiation protection program reviewed was implemented in accordance with the license application and regulatory requirements. No findings of significance were identified. (Paragraph B.1.b)

### **Effluent and Environmental Protection**

- The inspectors concluded that the licensee implemented its environmental protection program in compliance with NRC regulatory requirements. No findings of significance were identified. (Paragraph B.2.b.)

### **Radioactive Waste Management**

- Radioactive waste activities were performed in accordance with regulatory requirements and procedures. No findings of significance were identified. (Paragraph B.3.b)

**Transportation**

- Shipments of radioactive materials were prepared and shipped in accordance with applicable regulations and plant procedures. Certificates of compliance were maintained current. Shipping records were properly completed and maintained in accordance with applicable regulations. The inspectors identified an unresolved item with respect to tare weight differences of overpacks. (Paragraph B.4.b)

**Emergency Preparedness**

- The inspectors concluded that the licensee's Emergency Preparedness Program was adequately maintained in a state of operational readiness, properly coordinated with offsite support agencies and audited in accordance with requirement and commitments. No findings of significance were identified. (Paragraph C.1.b)

Attachment

List of Persons Contacted

List of Items Opened, Closed, and Discussed

Inspection Procedures Used

List of Acronyms

List of Documents Reviewed

REPORT DETAILS

## 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 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. Plant Operations, Regional Initiative – Integrated Safety Analysis Milestone Review (IP 88020)

##### a. Inspection Scope and Observations

On March 29, 2011, the licensee made an event notification (EN 46710) to notify NRC that the ISA review for the conversion area was completed and 87 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 was going to be completed within 90 days per the ISA Action Plan. On a letter dated July 1, 2011, the licensee notified NRC that the revised ISA for the conversion area had been completed and implemented per the revised ISA action plan schedule.

The inspectors verified the implementation of the new ISA for the UF<sub>6</sub> cylinder handling, vaporization, and conversion process areas. The inspectors reviewed the new ISA methodology as documented in Chapter 3.0, Revision (Rev.) 2, of the ISA Summary, Quantitative Risk Assessments (QRAs), and Process Hazard Analysis (PHAs) for these process areas.

The inspectors specifically reviewed 12 criticality and chemical safety accident sequences, and the applicable IROFS. The inspectors reviewed 20 IROFS that were primarily new or administrative controls. To ensure that IROFS were available and reliable to function when needed, the inspectors reviewed the management measures and verified that new management measures had been established. The inspectors reviewed management measures, required programs, and supporting documentation, including system drawings, interlock logic, functional tests, operating procedures, and training materials. The inspection also included interviews and plant walkdowns.

During the inspection, the inspectors identified that the validation of management measures was not part of the ISA Project. Although this validation was not required for the original ISA project scope, several recent events, both NRC and licensee identified, identified a potential weaknesses in the existing validation process for GNF-A's management measures. Specifically, the inspectors identified three IROFS where the credited management measures were degraded or not in place.

The inspectors noted that QRA-101, "UF<sub>6</sub> Cylinder Handling," Table 4-2, "Management Measures," Rev. 0, designated "Procedures" as a management measure for IROFS 101-01, UF<sub>6</sub> Cylinder Skin Temperature. The inspectors identified that the implementing procedure for IROFS 101-01, UF<sub>6</sub> Cylinder Skin Temperature, stated the incorrect

temperature limit. Qualitative Risk Assessment -101, "UF6 Cylinder Handling," stated that a cylinder could not be moved from an autoclave if the skin temperature was higher than 60° C. The inspectors identified that Operating Procedure (OP) 1331.00, "DCP Vaporization," Rev. 59, Section 7.3.2, "Removal of Cylinder From Autoclave," stated that "IROFS 101-01 Cylinders that have not been fully vaporized and cold trapped must be < 70° C before being removed from the autoclave." This discrepancy in the cylinder skin temperature between OP 1331.00 and the QRA-101 could have resulted in an operator potentially removing a UF6 liquid bearing cylinder from an autoclave and consequently, the failure of an IROFS. The inspectors determined that without IROFS 101-01 the licensee could not meet 10 CFR 70.61 performance requirements for an accident sequence involving the rupture of a liquid UF6 cylinder during handling.

Title 10 of the Code of Federal Regulations (10 CFR) 70.62(d) requires, in part, that each licensee shall establish management measures to ensure compliance with the performance requirements. The management measures shall ensure that administrative controls 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. Contrary to the above, on July 1, 2011, the licensee failed to implement a management measure for IROFS 101-01 to ensure the IROFS was available and reliable to perform its function when needed. The failure to implement a management measure for IROFS 101-01 was identified as one example of a violation (VIO) of NRC requirements, VIO 70-1113/2011-04-01.

The inspectors also noted that QRA-201, "DCP Vaporization," Rev. 0, designated IROFS 201-19, Portable Wet Scrubber System, and SOLE IROFS 201-08, Vaporization Area Stack Exhaust Shutdown and Wet Scrubber System as administrative IROFS. These two IROFS relied on operator actions to manually activate the wet scrubber system to mitigate the consequence of a UF6/HF release to the public. The inspectors identified that the licensee had not identified management measures for the scrubber system to ensure that the IROFS were available and reliable to perform their function when needed. The failure to identify management measures for the wet scrubber system was identified as a second example of violation VIO 70-1113/2011-04-01.

The inspectors determined that the failure to identify management measures for the wet scrubber system was of low safety significance because a preventive maintenance program was in place for the wet scrubber system. However, the licensee had not validated this program as a formal management measure for IROFS 201-19 and SOLE IROFS 201-08.

The inspectors identified a potential weakness related to chemical accident sequence 3.1.1 "Loss of Containment in Conversion Area," in QRA-202, "DCP – Conversion." This accident sequence had two accident scenarios; one for the worker and one for the public. In addition, the initiating event frequency for the accident sequence included two IROFS 202-01, "cold leak check," and IROFS 202-02, "reactor high pressure interlock." The QRA did not document the specific failure probability for these two IROFS, and did not state how much credit each IROFS was given toward the initiating event frequency. As written, if one of the two IROFS (202-01, 202-02) were to fail, the QRA did not directly state how this failure would affect GNF's ability to meet the performance requirements. Per discussions with members of the licensee's staff, if one of these IROFS failed, a hand calculation would be required to demonstrate that the accident sequence remained highly unlikely. Therefore, the immediate impact of the failed

IROFS would not be readily accessible and could delay the licensee's response to a potential situation where the performance requirements are not being met. During the inspection, there was no indication that either IROFS 202-01 or 202-02 had actually failed.

b. Conclusion

The inspectors performed an operational review of the ISA Project Conversion milestone, which included UF6 cylinder handling, vaporization, and conversion process areas. The inspectors identified a violation with two examples for the failure to implement management measures for IROFS 101-01, 201-08, and 201-19, VIO 70-1113/2011-04-01.

2. **Plant Operations, Regional Initiative - Criticality Warning System (IP 88020)**

a. Inspection Scope and Observations

The inspectors evaluated the licensee's response to a series of criticality warning system (CWS) issues. On July 12, GNF-A identified a CWS horn in the ChemMet lab was inaudible. Subsequently, the issue was reported to the NRC pursuant to 10 CFR 70.50(b)(2), EN 47047. During the evaluation into the inaudible alarm on July 14, GNF-A identified that the CWS system was exhibiting a three minute delay before the enunciators would sound. This issue compromised the effectiveness of the CWS and was also reported to the NRC pursuant to 10 CFR 70.50(b)(2), EN 47061. Upon further review on July 17, the licensee determined that the delay may have been present as early as May, 2011. The licensee reported this aspect to the NRC on July 17, EN 47066. Following the identification of the delay, the licensee evacuated the controlled access area (CAA) and all operations were shutdown. Access to the CAA was limited until the operability of the CWS could be confirmed. The licensee recognized that they had failed to recognize the significance of the delay and properly prioritize its resolution. Therefore, the licensee began investigations into the issue, included conducting a root cause evaluation using the Management Oversight and Risk Tree method.

Section 5.3.2.5 of the license application, "Criticality Warning Systems (CWS) Design and Performance Requirements," states that the "criticality accident alarm system initiates immediate evacuation of the facility." The significant delay in the CWS activation resulted in the failure to meet this requirement. However, the licensee's root cause analysis was on going and the results were not available for review during the inspection. As a result, the inspectors were not able to determine the depth and extent of the issue before determining if a one or more violations had occurred. Therefore, this issue will be tracked as URI 70-1113/2011-004-02, Delay in CWS annunciation.

Before the licensee authorized the restart of any processes, an assessment plan was developed to ensure that safety systems, especially those potentially similar to the CWS, were properly evaluated to ensure they would perform their safety function. To track this effort, GNF-A developed Temporary Operating Procedure (TOP) 8213, "FMO Self-Assessment for Readiness to Startup Following Crit Warning System Failure." The TOP included, in part, reviews of procedures, maintenance, radiation protection, nuclear criticality safety (NCS), open work orders, and organizational checks. One of the actions for TOP 8213 was the "FMO Readiness Assessment Report," which categorized items

or areas of the plant that warranted a specific engineering reassessment. The assessment focused on older systems that could have been vulnerable to the same type of failures that resulted in the CWS failures, namely ambiguously written criteria and aged equipment nearing the end of its operating life. The review also focused on systems that contained IROFS, active engineered controls (AECs), or functional test instructions (FTIs) that did not have system redundancy and where documentation lacked depth or may not yet be up-to-date. The systems chosen for the assessment included, but not limited to, the in-line pipe detectors, the Gadolinium Dry Scrap Recycle (GDSR) system, and the hydrogen and hydrofluoric acid (HF) detection systems. All the “higher risk” systems were chosen for the review, and then several lower risk systems were chosen to validate the risk ranking that had been conducted.

The inspectors reviewed the in-line uranium pipe detector and GDSR assessments. The pipe detector assessment consisted of system walkdowns, review of the regulatory requirements, FTIs, verification and calibration Job Plans, and maintenance order backlogs for the “Common HF,” “Rad Waste” and “Laundry Waste” pipe detectors. The assessment also involved a failure mode and effects analysis to identify failure modes that would be difficult to detect. The inspectors also reviewed the GDSR assessment which evaluated the adequacy of Nuclear Safety Release/Requirements (NSR/Rs), FTIs, and any engineered controls from the master IROFS list. The licensee did not identify any significant issues and the inspectors noted no issues with the assessments.

The inspectors attended one of the WSRC meetings that discussed the actions due for TOP 8213. The inspectors noted a questioning attitude and conservative approach with regard to the results and conclusions being presented. In addition, the inspectors noted that the root cause analysis team has submitted interim results that were mostly incorporated into the TOP.

The inspectors noted that the licensee has been seeking input from the plant staff to identify other potential vulnerabilities. Plant management was in the process of making modifications to operating procedures based on comments received from extensive operator reviews conducted the week of the inspection. While not a requirement for restart, the inspectors noted that the licensee had begun conducting “Human Performance Fundamentals” training for operators and managers. The training lessons communicated in these sessions represent immediate corrective actions to improve human performance. The training provides the employees with tools and guidance on how to maintain situational awareness and focus on having a questioning attitude.

The inspectors reviewed training records for implementation of the new IROFS for the DCP and noted that training adequately assessed the knowledge of operators.

The inspectors observed one of the NCS/radiation protection walkdown verifications that toured the scrap packaging services areas. The inspectors noted that the audit was thorough, and the individuals performing the audits were knowledgeable of the requirements for the areas.

b. Conclusion

The inspectors performed an operational review of the licensee’s corrective actions with respect to the failed CWS. The licensee’s voluntary shutdown demonstrated a “safety over production” attitude. The restart evaluations were thorough and broad scope. A

questioning attitude was also demonstrated in the subsequent evaluations. One URI was identified involving the compromised CWS.

**B. Radiation Controls**

1. Radiation Protection (IP 88030)

a. Inspection Scope and Observations

The inspectors interviewed staff, reviewed procedures and reports, and observed staff perform their routine workplace activities in order to verify compliance with chapter 4 of the license application and 10 CFR Part 20.

The inspectors interviewed staff on the implementation of the Radiation Protection program. The inspectors determined that the radiation safety function was independent from production responsibilities and maintained the authority in the organization to shutdown potentially unsafe operations as required by the license application. The inspectors reviewed the annual As Low As Reasonably Achievable (ALARA) report and the self assessment audit of the radiation protection program and determined that the radiation program content and implementation were reviewed at least annually, as required by 10 CFR 20.1101.

The inspectors reviewed a sample of procedures revised in the past year and determined that they were in compliance with the license application and NRC regulations.

The inspectors observed the semi-annual calibration of a hand-held alpha detector completed by an instrument technician. The inspectors determined that the instrument technician actions were in accordance with approved procedures. The inspectors verified that the radioactive sources used during the calibration were National Institute of Standards and Technology (NIST) traceable sources as required by the license application.

The inspectors observed daily operability checks performed on a sample of laboratory counting instruments. The inspectors reviewed the background and instrument efficiency reports generated daily for the laboratory counting instruments and determined that they were in compliance with the license application.

The inspectors reviewed the 2010 personnel dosimeter results as submitted to the licensee by their contractor and determined that the Lens Dose Equivalent (LDE) and Shallow Dose Equivalent (SDE) results were less than the regulatory limit. The inspectors verified that the personnel working in the controlled access area, who may receive more than ten percent of the regulatory limit, were required to wear individual monitoring devices as required by 10 CFR 20.1502. The inspectors verified that the personnel dosimeters are processed by a NVLAP-accredited vendor as required by the license application.

The inspectors reviewed the exposure record for a declared pregnant worker and for the fetus and determined that the exposure results were less than the regulatory limit. The inspectors verified that the licensee was monitoring the declared pregnant worker monthly in accordance with 10 CFR 20.1208. The inspectors interviewed radiation

protection staff and determined that no minor workers had been permitted into the controlled access area and that there had been zero planned special exposures in the last year.

The inspectors reviewed the Total Effective Dose Equivalent (TEDE) results and determined that they were less than the regulatory limit of 5 rem/year. The maximum TEDE exposure in 2010 was 0.45 rem/year. The inspectors verified that the licensee maintained a total exposure action level in approved procedures which is used to restrict an individual's work activities as required by the license application. The licensee's maximum TEDE exposure in 2010 was less than this action level.

The inspectors interviewed radiation protection staff on the use of the Radioactive Data Management System (RDMS) computer program and database which maintained air sampling results, urinalysis results, and in-vivo lung counting results and calculated the annual internal dose results. The inspectors determined that intakes were assigned to individuals based on air sampling, urinalysis, and in-vivo lung counting as required by the license application. The inspectors determined that the licensee determination of internal dose was in compliance with 10 CFR 20.1204.

The inspectors observed the collection of stationary air sampler filters by a radiation technician and verified that this activity was in accordance with approved procedures. The inspectors verified that the air samples were continuous samples, the rotameters were within calibration, and that the filters were changed every shift as required by the license application. The inspectors observed the technician set up the filter samples in the detector and reviewed the detection results. The inspectors interviewed the technician on the investigation levels applicable to the stationary air sample results and determined that the investigation levels were consistent or more conservative than the action levels stated in the license application.

The inspectors toured the urinalysis laboratory and interviewed the laboratory technician on the detection of uranium in urine samples. The technician demonstrated how they typically processed the urine samples and analyzed the samples for uranium using the Kinetic Phosphorescence Analyzer. The inspectors verified the action level for soluble uranium as determined by urinalysis results, as stated in the approved procedure, was less than the regulatory limit. The inspectors interviewed the technician on the laboratory interface with the RDMS program and determined that the urinalysis program was adequately producing and incorporating the results into the final internal dose calculation.

The inspectors observed the in-vivo lung counting laboratory and interviewed staff. The inspectors determined that the minimum counting frequency for workers and action levels used to restrict work were in compliance with the license application.

The inspectors reviewed the respiratory protection program and determined that the program required a medical examination and an annual mask fit re-evaluation as required by the license application. The inspectors verified that the respiratory equipment utilized by the workers was NIOSH-approved as required by the license application. The inspectors verified that the protection factors used for estimating personnel exposures was the same or more conservative than 10 CFR 20 Appendix A. The inspectors determined that the respiratory protection program adequately identified

potential hazards and was used in the estimation of dose as required by 10 CFR 20.1703.

The inspectors toured the controlled access area and verified that areas were appropriately posted in accordance to 10 CFR 20.1902. The inspectors verified that the NRC Form 3, "Notice to Employees," was posted in a high traffic area in accordance with 10 CFR 19.11. The inspectors noted that the facility did not have high radiation or very high radiation areas at the time of the inspection.

The inspectors observed a radiation technician perform a series of removable contamination surveys and determined that the technician's actions were in accordance to approved procedures. The inspectors determined that the technician was knowledgeable in the health physics principles and used the action levels cited in the approved procedure. The inspectors determined that the surveys evaluated the magnitude and extent of radiation levels including the potential radiological hazards and concentrations of radioactive material as required by 10 CFR 20.1501.

The inspectors reviewed a sample of dose reports for individual workers, interviewed staff, and reviewed procedures. The inspectors verified that that the licensee was notifying workers annually of their yearly dose received if the worker received above

100 mrem/ year, was terminated, or requested the dose report. The inspectors determined that the licensee was in compliance with 10 CFR 19.13.

The inspectors reviewed the NRC event notification database, interviewed staff, and reviewed items in the corrective action program and determined that there was not an event, which met the reportability guidelines in the area of radiation protection in the past year.

The inspectors reviewed the 2010 Annual ALARA Review and determined that the exposures at the plant were neither increasing nor decreasing. The inspectors noted that action levels and thresholds used by the radiation protection program were conservative and effective in maintaining plant exposures ALARA.

b. Conclusion

The radiation protection program reviewed was implemented in accordance with the license application and regulatory requirements. No findings of significance were identified.

2. Effluent Control and Environmental Protection (IP 88045)

a. Inspection Scope and Observations

The inspectors observed the collection of stack effluent samples at various stack monitoring stations and interviewed staff on the analysis of the samples. Samples of operating procedures were reviewed, results of laboratory analysis were reviewed, and equipment calibration compliance was evaluated. The inspectors concluded that the activities had been conducted in accordance with the applicable procedures and at the required frequency. The air sample data from the stacks indicated that airborne

effluents released were below the limits specified in the license and ALARA limits required by 10 CFR 20.

The inspectors performed a safety walk down of the final treatment system utilized for processing liquid waste discharges. The material condition of the treatment system including tanks, aeration basins, lagoons, and final liquid effluent composite sampling devices was determined to be functionally adequate. The inspectors observed sampling activities of the lagoons, operation of the composite samplers, and concluded the activities had been conducted in accordance with the licensee's procedures and at required frequency. A review of calibration records confirmed that the licensee had maintained a program that ensured sampling devices had been maintained in an accurate and functional state. The inspectors reviewed summaries of uranium analytical data results for July 2010 through June 2011, and determined that the monthly averages had been less than the values described in 10 CFR 20 Appendix B.

The inspectors reviewed the licensee's assessment of dose received by members of the public during calendar year 2010. The inspectors reviewed the annual average liquid and airborne effluent concentrations and concluded that they were below the 10 CFR 20 Appendix B values. The inspectors reviewed the 2010 external dose fence line TLD results and verified that they remained very low. The inspectors reviewed the airborne effluent-specific public dose calculation, calculated using the COMPLY code, and determined that the results remained less than the ALARA constraints on air emissions as required in 10 CFR 20.1101. The inspectors determined that the annual public dose associated with licensed activities remained less than 100 mrem/year as required by 10 CFR 20.1301.

The inspectors observed the receipt, preparation, and the uranium analysis of liquid samples conducted in the analytical laboratory. The inspectors noted that the quality control methods utilized in the management of samples and the laboratory analysis process were consistent with licensee procedures.

The inspectors reviewed previous audits of the environmental program. The inspectors noted that the deficiencies identified during the audits had been entered into the corrective action program and corrective action items were being tracked to completion. The inspectors reviewed a sample of procedures and verified that the procedures had continued to properly implement license and regulatory requirements.

b. Conclusion

The inspectors concluded that the licensee implemented its environmental protection program in compliance with NRC regulatory requirements. No findings of significance were identified.

3. Radioactive Waste Management (IP 88035)

a. Inspection Scope and Observations

The inspectors evaluated whether the licensee has established and was maintaining adequate and controlled procedures and quality assurance (QA) programs to ensure compliance with the requirements of 10 CFR Part 20 and 10 CFR Part 61 applicable to

low-level radioactive waste form, classification, stabilization, and shipment manifests/tracking.

The inspectors reviewed written procedures and observed operators performing tasks related to radioactive waste. The procedures were clearly written and delineated responsibilities related to radioactive waste management. The operators were cognizant of their responsibilities and the requirement to perform tasks in accordance with facility procedures. No findings of significance were identified.

The inspectors reviewed the QA program for radioactive waste management and determined that the licensee was performing audits as specified in the license application. The findings from these audits were appropriately being entered into a corrective action program for resolution. The inspectors reviewed the licensee's program for classifying low-level radioactive waste (LLRW). The inspectors reviewed the procedures for classifying waste as well as records relating to waste. The inspectors determined that the licensee had an effective program for determining the classification of low-level waste.

The inspectors reviewed the licensee's program for ensuring that the waste form meets the requirements of 10 CFR 61.56. The licensee had adequate procedures in place to ensure that waste was packaged in compliance with the regulations.

The inspectors also evaluated whether the licensee stores and/or disposes of LLRW safely and in accordance with license conditions.

The inspectors reviewed the licensee's procedures for labeling waste shipments and tracking radioactive waste. The procedures were adequate to ensure that radioactive waste was properly labeled based on the contents of the shipment, and the procedures specified actions to be taken should the shipments not reach the intended destination in the time specified.

The inspectors reviewed the procedures for placement, inspection, and repackaging of radioactive waste. The licensee had programs in place to ensure that solid waste was being placed in specific storage areas based on the type of waste. The licensee also had requirements for periodic inspection and repackaging of waste. No findings of significance were identified.

The inspectors performed walk-downs of selected licensee radioactive storage areas. The storage areas had adequate postings to ensure that the proper material was being stored in the area and the material was safely stored in accordance with the nuclear criticality safety requirements. The containers were properly labeled to reflect the material within the containers and the containers were generally in good physical condition. No findings of significance were identified.

b. Conclusion

Radioactive waste activities were performed in accordance with regulatory requirements and procedures. No findings of significance were identified.

4. Inspection of Transportation Activities (IP 86740)

a. Inspection Scope and Observations

The inspectors evaluated whether the licensee had established and was maintaining an effective program, to ensure radiological and nuclear safety in the receipt, packaging, delivery to a carrier and, as applicable, the private carriage of licensed radioactive materials. The inspectors also evaluated whether transportation activities were in compliance with the applicable NRC (10 CFR Parts 20 and 71) and Department of Transportation (DOT) (49 CFR Parts 171-178) transport regulations.

The inspectors reviewed a number of shipping records involving the shipment and receipt of special nuclear material products and waste disposal. The licensee ensured that the appropriate documentation accompanied the packages being shipped. The licensee recorded the required information on the packaging and shipping orders including the transportation index, package activity, labeling, and placards. The inspectors reviewed the training of the transportation staff to ensure they had received the proper training as specified by the license.

The inspectors reviewed audits of the transportation program and determined the licensee was performing periodic audits of the transportation program as required. The results of the audits were being appropriately addressed in the corrective action program.

The inspectors observed the licensee load UF6 into UX-30B cylinders for domestic transport. The personnel loading the packages followed the appropriate procedures. The inspectors also interviewed the radiation protection and transportation personnel and verified they were knowledgeable of NRC and DOT requirements.

The inspectors reviewed the licensee's process for an export to Japan of uranium oxide powder using the TNF-XI packaging design. The licensee uses the TNF-XI package certified under the French Certificate of Competent Authority F/381/AF-96 (Bc) and revalidated by the DOT for import and export use only to and from the United States under DOT Competent Authority Certification Certificate USA/0653/AF-96, Rev. 4, dated July 23, 2007. The licensee is granted a general license under 10 CFR 71.21, "General license: Use of foreign approved package," to transport, or deliver for transport, licensed material in a package, the design of which has been approved in a foreign national competent authority certificate, that has been revalidated by DOT as meeting the applicable requirements of 49 CFR 171.12.

Certain conditions of 10 CFR 71.21 are required to be met in order to use the general license provision for transport of licensed material. The inspectors verified that the provisions in 10 CFR 71.21 were met by the licensee. A minor discrepancy was observed with respect to the outer plug bayonets for the TNF-XI package in that, the safety analysis report (SAR) operating procedure did not reflect the SAR drawings. Step 2 of Section 7.1.1, "Preparation of the TNF-XI for Loading" required that the operator "Visually inspect the four outer plug bayonets in each well for damage." Drawing 10799-SARNP, Sheet 1, Rev. 0, listed four outer plug bayonets, whereas Sheets 2 and 4, Rev. 0, each showed six outer plug bayonets. The licensee's implementing procedure checklist, LS-1339.17, "TNF-XI Inspection Checklist," Table 6, Outer Box Body, Item 2 instructs the operator to "Visually inspect the 6 outer plug bayonets in each well for

damage.” The inspectors observed the operators perform the TNF-XI inspection to confirm that the TNF-XI was built with six outer plug bayonets. The licensee had not communicated this minor discrepancy to the package owner. The licensee entered this issue into their corrective action program (CAP) as Corrective Action Request (CAR) Report 56159.

The inspectors also 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 QA engineer, the inspectors learned that this particular 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,” Rev. 1, Step 8.2.5.1 Miscellaneous Tests, acceptability of the foam states 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 contains similar language. The UX-30 SAR, Rev. 0, Appendix 2.10.3, Weight Variance Analysis does not address underweight packages, but does give a minimum tare weight of 1,460 pounds. The overpack in question, 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 licensee uses the NPC package to export uranium oxide powder to Japan. The NPC is a GNF-A owned package. The inspectors confirmed that the licensee was using the most current version of the DOT Competent Authority Certificate USA/9294/AF-96, Rev. 9. The inspectors verified that the licensee’s implementing operations and maintenance procedures conformed to those in the NPC safety analysis report.

b. Conclusion

Shipments of radioactive materials were prepared and shipped in accordance with applicable regulations and plant procedures. Certificates of compliance were maintained current. Shipping records were properly completed and maintained in accordance with applicable regulations. The inspectors identified an unresolved item with respect to tare weight differences of overpacks.

**C. Facility Support**1. Emergency Preparedness (IP 88050)a. Inspection Scope and Observations

The inspectors reviewed changes to the Emergency Plan (EP), organization, facilities, and equipment to assess the impact on the effectiveness of the program. Since the last inspection (August 2010), changes were made to the EP and the assignment of personnel to the emergency organization. The inspectors determined the changes reviewed and discussed did not result in a negative impact on the state of emergency preparedness.

The inspectors reviewed documentation from the annual independent audit performed by the QA staff and determined that the audit met the requirements described in Section 7.5 of the EP. The audit provided an adequate assessment regarding the state of readiness of the emergency preparedness program and identified opportunity areas that the licensee entered into their CAP and has been addressing.

The inspectors reviewed several implementing procedures, revised since the last inspection, to determine the adequacy of the implementation of the EP. The inspectors noted that procedures were revised to reflect items identified in the audit, and editorial changes. The reviewed changes did not result in a decrease in the effectiveness of the program or any inconsistencies between the Plan and implementing procedures. The inspectors reviewed a representative sample of the hard copy procedures and found that the copies reviewed were adequately maintained.

The inspectors reviewed emergency response training to determine if the licensee had provided training to key response personnel in accordance with Section 7.2 and Table 7.1 of the EP and various implementing procedures. For training reviews, the inspectors selected the names of individuals from the emergency call-list filling various emergency response organization positions and determined that, personnel were being trained in accordance with Section 7.2 and Table 7.1 of the EP.

Key emergency response personnel were trained in accordance with the EP. The combination of drills and instructions pertaining to the EP and procedure changes provided an adequate level of training to maintain the proficiency of emergency personnel regarding response to postulated site accidents. The inspectors reviewed emergency response training documentation and conducted staff interviews including a table top exercise which disclosed that training included both performance based training via drills, and instructions regarding changes to the EP and implementing procedures.

The previous emergency preparedness inspection documented an observation about the documentation for initial training for the Emergency Director (ED) and Interim Emergency Director (IED) positions. The observation stated that there are training records and ED qualification signoffs to support that the ED have taken initial training, but no documentation to support what the initial training consisted of. The inspectors found the same situation during this inspection and that the initial audit tracking system item (Finding ID : 1898), was closed into other items identified in the audit (Finding ID : 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2218, 2221). The item 2214, addresses

directly a development of guidance/training material for used by the individual Emergency Organization members conducting the IED/ED qualification interviews. The Item was closed in June 30, 2011, without the development of guidance/training material. In the interim process an individual got qualified as an IED in November 2010. This finding is considered a minor violation since no instances have been identified at which an individual is not qualified to performed the assigned role. The individual recently qualified had adequate experience and was certified by qualified personnel. The licensee re-opened item 2214 and committed to ensure that specific criteria is developed for those performing qualification sign-offs for IED/ED that is required to be qualified. The licensee set an assigned closure date of December 2011, for this item.

The inspectors reviewed licensee activities in the areas of training, agreements, and exercises to determine if the licensee was periodically involving offsite support groups in EP activities. The inspectors visited the New Hoover County Emergency Management to discuss with the contact the emergency planning interface with the licensee on training, response to events, and periodic participation in drills. The inspectors observed that agreement letters with the offsite support agencies described in the EP were current.

Based on documentation and discussions with an offsite contact, the inspectors determined that the site Emergency Preparedness Coordinator maintained frequent contact with offsite support organizations on matters involving emergency preparedness to include training, site tours, agreement updates, and participation in exercises.

The inspectors reviewed documentation for drills and exercises to determine the level of challenges presented to the emergency organization, and to verify that key emergency response personnel were participating during drills and/or exercises. Critiques were assessments of the response and items requiring corrective actions were being tracked. The inspectors observed planning meetings related to the upcoming emergency drill.

The inspectors examined several locations where emergency equipment was stored to determine whether the emergency response equipment, instrumentation, and supplies were maintained in a state of operational readiness.

The inspectors conducted an inventory of select equipment and supplies for adequacy in responding to various postulated accidents around the site. All equipment operated as designed. No problems were noted with instrument operability or calibration. The inspectors observed the licensee use their equipment in an actual smoke detection response and found that the equipment performed as designed.

Based on operability checks, and a review of surveillance documentation, the inspectors determined that emergency response equipment, instrumentation, and supplies were being maintained in sufficient quantities and in an adequate state of operational readiness.

b. Conclusion

The inspectors concluded that the licensee's Emergency Preparedness Program was adequately maintained in a state of operational readiness, properly coordinated with offsite support agencies and audited in accordance with requirement and commitments. No findings of significance were identified.

**D. Special Topics****1. Follow-up on Previously Identified Issues**

- a. (Closed) Inspector Follow-up Item (IFI) 2011-002-02: Licensee lacks an effective program for detecting and maintaining ventilation duct in the incinerator building. The inspectors verified that the section of ventilation duct, located in the incinerator building and utilized for the packaging of incinerator ash, had been replaced and corrective actions were completed. The new ventilation duct was free from corrosion and perforations. The inspectors interviewed staff regarding the inspection of the equipment and reporting procedures for equipment that was in poor material condition or was degraded. The staff, including area operators and maintenance staff, verified that they would continue to report degraded equipment in the future. The inspectors determined that the licensee maintained an effective program for detecting and maintaining ventilation ducts. This item is closed.
- b. (Closed) Licensee Event Report (LER) 2010-007: IROFS missing for Dry Scrap Recycle accident sequence, Event Number 45976. The licensee identified an issue in the Dry Scrap Recycle in which an accident sequence had insufficient number of IROFS identified to meet risk requirements. The licensee implemented two additional IROFS to correct the issue; IROFS 20113 – Feed Hood HVAC Dropout Leg Geometry and (walked down the equipment) IROFS 20114 – HVAC Dropout Leg Accumulation Inspections. The inspectors conducted a walkdown of IROFS 20113 and spoke to an operator for the area. The inspectors noted he was familiar with the requirement to inspect the accumulation points. This issue was considered as part of the corrective actions related to Notice of Violation (NOV) EA-09-268 (IR 70-1113/2010-003). The inspectors determined that the implemented IROFS were adequate to limit the risk of a high consequence event. This item is closed.
- c. (Closed) Licensee Event Report 2011-003: Failure of material transaction led to a can in wrong station, EN 46663. This event was a failure of the moderation control designed to prevent vacuum material from being placed on the conveyor. The licensee tested the material and determined that the moisture content was less than one percent of the moderation limit. Therefore, the actual safety significance of the procedural violation was minor. The inspectors reviewed the licensee's investigation and discussed the issue with nuclear criticality safety representatives and the area manager. The inspectors noted that the licensee had provided new instructions to operators for vacuum bag disposal. The new instructions explicitly detailed the steps involved with handling vacuum bag disposal and the actions to take regarding the can generated as a result. The inspectors determined that the corrective actions were reasonable to prevent re-occurrence. Therefore, the significance of failing to place the can in the correct location was determined to be of minor significance and not subject to formal enforcement. Note, the event was also evaluated by NRC Material, Control, and Accounting inspectors. The results of that inspection were documented in IR 70-1113/2011-202. This item is closed.
- d. (Closed) LER 2011-006: HF Dermal Exposure in HF building. On April 13, during a pipe replacement project in the HF building (and after the draining and flushing of the system), a maintenance person accidentally spilled on himself residual material, EN 46749. The spilled material passed through the zipper of the worker's personal protective equipment (PPE) onto his abdomen. The employee was treated with calcium

gluconate and later transported to the hospital. The hospital later released him with no restrictions.

The inspectors reviewed the licensee's investigation into the event. The inspectors also reviewed the subsequent lesson plans developed to augment the training of operators on the new requirements for donning PPE. The inspectors also reviewed the TOP that required a more thorough flushing and draining of the lines in the HF Building. The inspectors reviewed the additional guidance that formed a set of operating procedures (Ops 1336.01, "Administrative Requirements for Repair of Acid and Caustic Lines, Tanks, and Pumps" and Ops 1336.02 "Administrative Requirements for Line Breaking"). These procedures together constituted the new IROFS 203-10. The inspectors reviewed the new IROFS (PPE use and the HF exposure response procedure) and accident sequences developed to address these issues. The inspectors also spoke with shift supervisor for DCP regarding these new controls. The inspectors determined that the implemented IROFS were adequate to limit the risk of a high consequence event. This item is closed.

- e. (Closed) LER 2011-007: Criticality Accident Alarm System Degradation EN 47047, 47061, 47066. The licensee's investigation into the cause of the delay determined that a failed capacitor had caused the delay. Following the replacement of the capacitor, and to confirm the operability of the CWS, the licensee conducted a revised test plan for the CWS, TOP 8198, "Supplemental CWS System Operability Checks." The revision added clarifying acceptance criteria; specifically that the horns will sound within two seconds of confirmation of the appropriate radiation levels. The original procedure did not contain criteria for the time the horns should take to sound once the appropriate radiation levels were met. The inspectors reviewed the Wilmington Safety Review Committee (WSRC) meeting minutes that approved the limited access for testing. The procedure also formalized required activities, such as environmental sampling and fire watch rounds, which required access to the plant. These activities were controlled via TOP 8208, "Limited-Access Personnel into the Controlled Access Area."

Before access to the CAA was returned, the licensee wrote and performed a CWS re-qualification check, documented as TOP 8205, "Functional CWS System Operability Checks." The inspectors reviewed the procedure and noted that it consisted of testing of the various loss-of-power conditions for the sub-components of the CWS. In addition, it tested if the alarm sounded if one detector was in the failed state and the other detected the appropriate radiation level. Following the successful completion of the TOP, the WSRC approved full access to the CAA on July 31. The inspectors noted one upgrade in that a security guard was now continuously posted in the emergency control center to monitor the criticality alarm panel. Should the horns fail to enunciate, the guard will manually activate the evacuation alarm. The inspectors interviewed one of the guards and noted he was familiar with the responsibility. Based on the licensee's corrective actions for the specific issues involving LER 2011-007 for ENs 47047, 47061, and 47066 are closed. This item is closed.

- f. (Closed) URI 2009-011-01: Reassessment of credibility of a 30B cylinder rupture. The URI involved the review of the licensee's analysis to determine if a rupture of a cylinder containing liquid UF<sub>6</sub> was a credible event and if IROFS were needed to ensure compliance with the performance requirements. The licensee determined that it was credible to remove a liquid UF<sub>6</sub> cylinder from an autoclave. As a corrective action the licensee implemented the following IROFS:

- IROFS 101-01: UF6 Cylinder Skin Temperature – to prevent the movement of a liquid cylinder.
- IROFS 101-02: UF6 Cylinder Design – to ensure the containment of licensed material and the prevention of in-leakage of moderator.

The inspectors verified that management measures were implemented to ensure the availability and reliability of these IROFS. The inspectors also interviewed operators to verify that they understood the actions required by the new IROFS. With the exception of the management measure issue identified for IROFS 101-01 in Section 2.a the inspectors determined that the implemented IROFS were adequate to limit the risk of a liquid UF6 cylinder rupture. This item is closed.

#### **E. Exit Meeting**

The inspection scope and results were summarized on August 4, 11, 25, and September 2, 2011, with S. Murray, Manager, Licensing & Liabilities and other members of your staff. Although proprietary information and processes were reviewed during this inspection, proprietary information was not included in this report.

## ATTACHMENT

### 1. LIST OF PERSONS CONTACTED

<u>Name</u>	<u>Title</u>
J. Reynolds	Manager, Fuels Environmental Health and Safety
S. Murray	Manager, Licensing & Liabilities
P. Ollis	Licensing & Liabilities Engineer
A. Mabry	Radiation Safety program Manager
M. Venters	Manager, Emergency Preparedness
J. Reeves	Manager, Integrated Safety Analysis
J. DeGolyer	Manager, Criticality Safety Program
B. Hines	Manager, GLE TL Operations
J. Olivier	Manager, GLE Licensing
L. Paulson	GEH Manager, Nuclear Safety Programs
M. Campbell	Manager, Industrial Safety
P. Mathur	Environmental Engineer, EH&S
S. O'Conner	Environmental Engineer, EH&S
C. Davidson	Environmental Specialist, EH&S
M. Dodds	Sr. Criticality Safety Engineer
D. Eghbali	Criticality Safety Engineer
RA. Crate	Program Manager, Fuels Growth Projects
P. Jenny	Security
B. Bellamy	Security

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 2011-004-02	Open	Delay in CWS annunciation
URI 2011-004-03	Open	Tare weight differences of overpacks
VIO 2011-004-01	Open	Failure to implement a management measures for IROFS
IFI 2011-002-02	Closed	Licensee lacks an effective program for detecting and maintaining ventilation duct in the incinerator building
LER 2010-007	Closed	IROFS missing for Dry Scrap Recycle accident sequence, EN 45976
LER 2011-003	Closed	Failure of material transaction led to a can in wrong station, EN 46663
LER 2011-006	Closed	HF Dermal Exposure in HF building, EN 46749
LER 2011-007	Closed	Criticality Accident Alarm System Degradation ENs 47047, 47061, 47066
URI 2009-011-01	Closed	Reassessment of credibility of a 30B cylinder rupture

### 3. INSPECTION PROCEDURES USED

IP 88020	Operations
IP 88030	Radiation Protection
IP 88035	Radioactive Waste Management
IP 88045	Effluent and Environmental Protection
IP 88050	Emergency Preparedness
IP 86740	Transportation

### 4. LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AEC	Active Engineered Control
ALARA	As Low As Reasonably Achievable
CAA	Controlled Access Area
CAP	Corrective Action Program
CAR	Corrective Action Request
CFR	Code of Federal Regulations
CWS	Criticality Warning System
DCP	Dry Conversion Process
DOT	Department of Transportation
ED	Emergency Director
EN	Event Notification
EP	Emergency Plan
FMO	Fuel Manufacturing Organization
FTI	Functional Test Instructions
GAD	Gadolinium
GDSR	Gadolinium Dry Scrap Recycle
GNFA	Global Nuclear Fuel – Americas
HF	Hydrofluoric Acid
IED	Interim Emergency Director
IFI	Inspector Follow-up Item
IP	Inspection Procedure
IR	Inspection Report
IROFS	Items Relied on for Safety
ISA	Integrated Safety Analysis
LER	Licensee Event Response
LDE	Lens Dose Equivalent
LLRW	Low-Level Radioactive Waste
NCS	Nuclear Criticality Safety
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
NSR/R	Nuclear Safety Release/ Requirement
NVLAP	National Voluntary Laboratory Accreditation Program
OP	Operating Procedure
PHA	Process Hazard Analysis
PI&R	Problem Identification and Resolution
PPE	Personal Protective Equipment
QA	Quality Assurance

QRA	Quantitative Risk Analysis
RDMS	Radioactive Data Management System
Rev.	Revision
SAR	Safety Analysis Report
SDE	Shallow Dose Equivalent
SNM	Special Nuclear Material
TEDE	TOTAL Effective Dose Equivalent
TOP	Temporary Operating Procedure
UF6	Uranium Hexafluoride
UO2	Uranium Oxide
URI	Unresolved Item
VIO	Violation
WSRC	Wilmington Safety Review Committee

## 5. **LIST OF DOCUMENTS REVIEWED**

- ISA Training, Node 101: UF6 Cylinder Handling, Rev. 5/18/11
- ISA Training, Node 201: Dry Conversion Process (DCP) – Vaporization, Rev. 5/18/11
- OP 1331.0, DCP Vaporization, Rev. 59
- Quantitative Risk Assessment (QRA) and Process Hazard Analysis (PHA) for UF6 Cylinder Handling; QRA 101 Rev. 0 and PHA 101 Rev. 0
- Quantitative Risk Assessment (QRA) and Process Hazard Analysis (PHA) for Vaporization; QRA 201 Rev. 0 and PHA 201 Rev. 0
- Temporary Operating Procedure 8213, FMO Self-Assessment For Readiness To Startup Following Crit Warning System Failure, Rev. 0
- TOP 8198, “SUPPLEMENTAL CWS SYSTEM OPERABILITY CHECKS,”
- TOP 8205, “Functional CWS SYSTEM OPERABILITY CHECKS,” dated July 31, 2011
- TOP 8208, “LIMITED-ACCESS PERSONNEL INTO THE CONTROLLED ACCESS AREA,” dated July 26, 2011
- UX-30 SAR Chapter 8, “Acceptance Tests and Maintenance Program,” Rev. 1
- UX-30 SAR, Rev. 0, Appendix 2.10.3, Weight Variance Analysis
- Technical Report, TR 1010.97, FMO Roof Scrubber No. 542, Rev. 2, December 2003
- Nuclear Safety Release/Requirements (NSR/R) #: 15.02.02
- Nuclear Safety Release/Requirements (NSR/R) #: 15.02.05, Rev 06, DCP – Conversion