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

October 29, 2013

Mr. Amir Vexler
FMO 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. – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 70-1113/2013-004

Dear Mr. Vexler:

This refers to the inspections conducted from July 1 through September 30, 2013, at the Global Nuclear Fuel – Americas' facility, Wilmington, NC. The purpose of the inspections was to determine whether activities authorized under the license were conducted safely and in accordance with Nuclear Regulatory Commission (NRC) requirements. At the conclusion of the inspections, the results were discussed with members of your staff at exit meetings held on July 25, August 29, and September 19, 2013, for this integrated inspection report. The enclosed report presents the results of these inspections.

During the inspections, the staff examined 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; observations of activities; and interviews with personnel. The inspections covered the following areas: operational safety, radioactive waste management, transportation of radioactive material, effluent control and environmental protection, and follow-ups on any previously identified issues. No findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure 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 No. 70-1113/2013-004
w/Attachment: Supplementary Information

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

W. Lee Cox, III, Chief
North Carolina Department of Health and Human Services
Division of Health Service Regulation
Radiation Protection Section
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U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.:	70-1113
License No.:	SNM-1097
Report No.:	70-1113/2013-004
Licensee:	GLOBAL NUCLEAR FUEL – AMERICAS, L.L.C.
Location:	Wilmington, NC
Dates:	July 1 through September 30, 2013
Inspectors:	C. Rivera, Fuel Facility Inspector (Section A.1) B. Adkins, Senior Fuel Facility Inspector (Section A.1) T. Vukovinsky, Fuel Facility Inspector (Section A.2, C.2, and C.3) N. Peterka, Fuel Facility Inspector (Section A.2, C.2, and C.3) T. Goulding, Fuel Facility Inspector (Section A.2, C.2, and C.3) G. Goff, Fuel Facility Inspector (Section B.1 and C.1) M. Thomas, Senior Fuel Facility Inspector (Sections B.2 and B.3)
Approved by:	M. Sykes, Chief Fuel Facility Inspection Branch 3 Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Global Nuclear Fuel - Americas
NRC Integrated Inspection Report 70-1113/2013-004
July 1 through September 30, 2013

Inspections were conducted by NRC regional inspectors during normal shifts in the areas of safety operations, radiological controls, and follow-ups on any previously identified issues. The inspectors performed a review of licensee activities that were accomplished by a selective examination of procedures and representative records, direct observation of safety-significant activities and equipment, walk-downs of items relied on for safety (IROFS), and interviews with licensee personnel. No safety significant findings were identified.

Safety Operations

- The IROFS selected for reviewed were properly implemented and maintained in order to reliably perform their intended safety function. (Sections A.1 and A.2)

Radiological Controls

- The effluent control and environmental protection program was properly implemented in accordance with the license and regulatory requirements. (Section B.1)

- Radioactive waste activities were performed in accordance with the license and regulatory requirements. (Section B.2)

- Shipments of radioactive materials were prepared and shipped in accordance with regulations and plant procedures. Shipping records were properly completed and maintained in accordance with applicable regulations. (Section B.3)

Other Areas

- Temporary Instruction 2600/017, Review of the Implementation of the Decommissioning Planning Rule (DPR) was completed. (Section C.1)

- Follow-up on previously identified issues. (Section C.2)

- Event follow-up. (Section C.3)

Attachment

Key Points of Contact
List of Items Opened, Closed, and Discussed
Inspection Procedures Used
Documents Reviewed

REPORT DETAILS

Summary of Plant Status

Global Nuclear Fuel-Americas (GNF-A), LLC manufactures uranium dioxide (UO_2) powder, pellets, and light water reactor fuel bundles at its Wilmington, NC facility. The facility converts uranium hexafluoride (UF_6) to UO_2 using a dry conversion process (DCP) and performs UO_2, gadolinium pellet, and fuel fabrication operations. During the inspection period, normal production activities were ongoing.

A. Safety Operations

1. Operational Safety (Inspection Procedure (IP) 88020)

a. Inspection Scope and Observations

The inspectors conducted a general plant tour to determine plant status, equipment condition, and compliance with housekeeping requirements. The inspectors observed plan-of-the day meetings, shift turnover, and control room communications and verified that the licensee exhibited good conduct of operations.

The inspectors interviewed staff and reviewed records associated with the DCP and the hydrogen fluoride (HF) building. The inspectors determined that the specific safety controls reviewed were being adequately implemented and properly communicated as described in the Integrated Safety Analysis (ISA). The inspectors concluded that the licensee is operating safely and in compliance with requirements.

The inspectors confirmed that engineered controls reviewed were present and capable of performing their intended safety function(s). To complete this confirmation, the inspectors verified the physical presence of passive and active engineered safety controls, evaluated the safety controls to determine their capability and operability, and verified that potential accident scenarios were adequately covered. The following items relied on for safety (IROFS) were reviewed:

- 202-01, Cold Leak Check;
- 202-02, Reactor High Pressure Interlock;
- 202-03, Conversion Room System 1 HF Detector Automatic System Shutdown;
- 202-05, Conversion Room System 2 HF Detector Alarms;
- 202-08, Recycle Dew Point Sensor;
- 202-10, Hydrolysis Steam Temperature;
- 202-11, Hydrolysis Steam Temperature (Hardwire);
- 203-05, Periodic HF Piping and Valve Inspection;
- 203-06, HF Building Detection System; 203-07 HF Recovery Building Emergency Scrubber; and
- 203-12, Hydrolysis Steam Flow.

The inspectors determined that licensee administrative controls were implemented and communicated effectively. The inspectors determined that required actions, as identified in the ISA, were correctly transcribed into written operating procedures. The inspectors evaluated the procedure content with respect to operating limits and operator responses for upset conditions and verified that limits needed to assure safety were adequately described in the procedures.

The inspectors interviewed various operators and technicians and determined that these personnel were adequately implementing the required safety controls. The inspectors observed operators' performance and determined that they were adhering to applicable safety procedures. The inspectors reviewed the postings and operator aids applicable to the tasks being observed and determined that these postings and operator aids were current, reflected safety controls, and were followed by the operators and/or technicians.

Through interviews, document reviews, and direct observations the inspectors verified that the licensee conducted preventive maintenance, calibration, and periodic surveillance as required by the ISA Summary for the selected safety controls. The inspectors reviewed training records for selected operators and technicians to verify that the licensee conducted IROFS specific training as required by the License Application.

The inspectors reviewed the licensee corrective action program entries for the past 12 months and determined that deviations from procedures and unforeseen process changes affecting nuclear criticality, chemical, radiological, or fire safety were documented and investigated promptly. Also, the inspectors evaluated the corrective actions associated with Condition Report #'s 4627, 5458, 6129, 6266, and 7615, and determined that the completed corrective actions were adequate.

The inspectors followed-up on Event Report 49341 to determine if the actions taken by the licensee were consistent with NRC regulations and good conduct of operations practices. On September 13, 2013, Global Nuclear Fuels made a 1-hour report to the NRC IAW 10 CFR 70, Appendix A(a)(4), that no IROFS as documented in the ISA Summary remained available or reliable for a criticality accident sequence. Specifically, the licensee discovered during testing that a level sensor on a pellet press feed tube (sole IROFS) was not fail safe upon a loss of signal. The sensor is credited as a mass control for the prevention of criticality during a large facility fire. As part of their review, the inspectors conducted interviews, attended event follow-up meetings, and reviewed ISA documents to verify that criticality controls remained in-place and at no time was the mass limit exceeded. The inspectors verified that all affected equipment was shut down and remained shut down pending an investigation to determine corrective actions and extent of condition. The inspectors concluded that the licensee did not violate 10 CFR Part 70.61 performance requirements as a result of the event and that a special inspection was not warranted. The licensee later determined that the control remained available and reliable and continued to meet performance requirements and the event was retracted by the licensee.

b. Conclusion

No findings of significance were identified.

2. Operational Safety – Regional Initiative (IP 88020)

a. Inspection Scope and Observations

This inspection was conducted under the Regional Initiative inspection program and did not constitute a core Operational Safety inspection. Though some elements of Operational Safety were covered in this inspection, the core inspection elements scheduled in 2013 covered a more comprehensive evaluation of Operational Safety. The primary focus areas evaluated for this regional initiative involved the assessment of the balance of the plant (BOP) portion of the ISA upgrade project, as well as various event notifications and open enforcement items relating to Operational Safety.

This inspection focused on the last portion of the ISA upgrade project. The ISA upgrade project was completed in March 2013, with the revision to the ISA submitted June 28, 2013 (ML13179A438). The inspectors reviewed newly designated IROFS and sole IROFS associated with the BOP portion of the ISA as well as IROFS Functional Test Instructions (FTIs). The inspectors confirmed that engineered controls reviewed were present and capable of performing their intended safety functions. To complete this confirmation, the inspectors verified the physical presence of passive and active engineered safety controls, evaluated these safety controls to determine their capability and operability, and verified that potential accident scenarios were adequately covered. The inspectors determined that licensee administrative controls were implemented and communicated. The inspectors reviewed several procedures and determined that required actions as identified in the ISA Summary have been correctly transcribed into written operating procedures.

The ISA upgrade project completed over several years was implemented in three separate areas (Conversion, Fabrication, and BOP). The inspectors reviewed each section and determined that each was similar in composition and quality. The inspectors reviewed the licensee's corrective action plan (CAP) associated with the ISA Summary upgrade project and determined that the licensee had adequately addressed the described problem statements. The inspectors noted that the criticality accident scenarios were properly categorized as high consequence events and that controls or systems of controls used to meet the performance requirements of 10 CFR 70.61 were properly designated as IROFS. A sampling of accident sequences determined that performance requirements were being adequately addressed as required by 10 CFR 70.61. The inspectors did note that the qualitative risk assessments (QRAs) for the BOP portion contained an appendix summarizing the accident sequence and controls for the respective IROFS which other portions QRAs did not contain. The licensee stated that this was an enhancement and that the Fabrication and Conversion QRAs would be updated in the future to reflect this enhancement.

The inspectors reviewed the "Raise the Bar" program implemented by the licensee. This program is currently focusing on the areas of Operating Training, Human Performance Observation, and Operating Procedures. The licensee has made significant strides in these focus areas and this program will continue to evolve to other areas once these areas have been evaluated to be adequate.

b. Conclusion

Functional test instructions and completed test work packages were completed in accordance with licensee procedures. The ISA upgrade project adequately addressed the weaknesses identified in the Severity Level III violation issued in July, 2010. No findings of significance were identified.

B. Radiological Controls

1. Effluent Control and Environmental Protection (IP 88045)

a. Inspection Scope and Observations

The inspectors reviewed program changes and procedures revised since the last inspection. Inspectors verified that no major personnel changes occurred within the environmental program since the last inspection. Also, inspectors confirmed that operating procedures were reviewed annually as per procedural requirements. The inspectors reviewed four internal audits and verified that issues needing improvement were entered into the licensee's corrective actions system and that corrective action(s) had been/are being adequately implemented.

The inspectors reviewed the January 2013 and August 2013 semi-annual effluent reports and determined that the licensee was in compliance with 10 CFR 70.59 and 10 CFR 20 Appendix B requirements for uranium. In addition, the inspectors reviewed records of airborne effluents and observed filter change-outs of ambient air monitoring stations and certain exhaust stacks. Furthermore, the inspectors reviewed records of liquid effluents and observed sampling activities of the process waste lagoons. As a result, the inspectors verified compliance with the license application, procedures, and 10 CFR 20 Appendix B limits for both airborne and liquid effluent discharges. Also, inspectors noted that liquid and airborne effluent monitors and associated equipment were calibrated and functionally checked in accordance with procedures and 10 CFR 20.1501. The material condition of the lagoons, liquid effluent composite sampling equipment, stack filter equipment, and ambient air monitoring stations was functionally adequate.

To add, inspectors observed three groundwater (well) samplings performed by a contractor and determined that these samplings were performed by procedure. Inspectors confirmed that the 2012 and latest 2013 environmental sampling results for soil, sediment, vegetation, and groundwater were performed in accordance with procedures. Inspectors concluded that results for these areas were well below license application requirements as well as 10 CFR 20 Appendix B limits.

Related to the above, inspectors confirmed that the quality control for laboratory measurements and chain of custody for sample analysis was implemented in accordance with procedures. Inspectors also confirmed that the licensee audits the contractor for environmental sampling and that this contractor has a quality assurance program (QAP).

The inspectors reviewed the public dose assessment and determined that the average annual effluent concentrations released since August 2012 did not exceed the values specified in Appendix B of 10 CFR Part 20. The inspector reviewed the airborne portion

of the public dose assessment and verified that results were in compliance with the As Low As Reasonably Achievable (ALARA) constraint as required by 10 CFR 20.1101(d). The inspectors reviewed the concentrations of liquid releases discharged to the sanitary sewer and verified that the licensee was in compliance with 10 CFR 20.2003. Inspectors reviewed the results for external radiation procured from thermoluminescent dosimeters (TLDs) located along the fence line at the Wilmington Field Service Center (WFSC). Based on these results, inspectors determined that the annual public dose associated with licensed activities was less than 0.1 rem/year, as required by 10 CFR 20.1301.

Inspectors also observed environmentally-related IROFS such as primary high efficiency particulate air (HEPA) filters, secondary HEPA filters, “apitron” filters, and associated equipment (such as differential pressure gauges). Procedures for testing of these IROFS were reviewed and no discrepancies were identified.

b. Conclusion

No findings of significance were identified.

2. Radioactive Waste Management (IP 88035)

a. Inspection Scope and Observations

The inspectors evaluated whether the licensee had established and maintained adequate procedures and QAPs 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 procedures and observed performance of tasks related to radioactive waste. The procedures were clearly written and adequately delineated responsibilities related to radioactive waste management. The operators were familiar with their responsibilities and performed their tasks in accordance with facility procedures.

The inspectors reviewed the QAP for radioactive waste management and determined that the licensee was performing the required audits. The findings from these audits were entered into the licensee’s CAP for resolution.

The inspectors reviewed the licensee’s program for classifying low-level radioactive waste. The inspectors reviewed the procedures for classifying waste as well as records relating to waste. The inspectors reviewed the licensee’s program for ensuring that waste was properly packaged to ensure the waste form met the requirements of 10 CFR 61.56.

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 and specified actions to be taken should the shipments not reach the intended destination in the time specified. Additionally, the inspectors reviewed the procedures for placement, inspection, and repackaging of radioactive waste.

The inspectors performed walk-downs of selected radioactive material 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 their contents and were in good physical condition.

b. Conclusion

No findings of significance were identified.

3. 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 during the receipt, packaging, delivery, and private carriage of licensed radioactive materials. The inspectors also evaluated whether transportation activities were in compliance with the applicable 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 records to ensure that the licensee had administered 49 CFR 172.704 hazardous materials transportation training to affected personnel as required by the Department of Transportation and their license. The inspectors observed the refurbishment of RAJ-II packages and the respective procedure for same reason. The inspectors reviewed shipping records and surveys for the previous fuel assembly, powder, and heeled cylinder shipments. The inspectors observed a survey of a powder shipment.

The inspectors verified that the licensee met the 10 CFR 71.21 conditions required to use the general license provision for transport of licensed material. The inspectors reviewed audits of the transportation program and determined the licensee was performing periodic audits of the program as required. The audit findings were appropriately addressed in the CAP.

The inspectors reviewed the corrective actions taken for recent 10 CFR 71.95(a)(3) reports related to the UX-30 and the RAJ-II packages, ADAMS Accession Numbers ML13198A020 and ML13155A024, respectively. The licensee has taken the corrective actions stated in the reports.

b. Conclusion

No findings of significance were identified.

C. Other Areas

1. Temporary Instruction (TI) 2600/017, Review of the Implementation of the Decommissioning Planning Rule (DPR)

Based on the results of the environmental inspection documented in Section B.1 the inspectors verified that the licensee maintained adequate radiological control programs to minimize the introduction of radiological contamination into the site environment and had a program to ensure that releases of radioactivity to the environment are promptly identified and characterized. In addition, the inspectors verified that the licensee recorded radiological survey data to identify the location and concentrations or quantities of contamination that may require remediation at the time of license termination and was reporting updated financial assurance as required by the DPR. As part of this TI, the inspectors walked down an area that had ceased production operations. The inspectors determined that the systems and equipment were not operating and, hence, no additional radiological wastes had been introduced into the waste streams.

2. Follow-up on Previously Identified Issues

a. (Closed) Violation (VIO) 70-1113/2013-002-01: ChemMet Hydrogen Piping:

The inspectors reviewed the Licensee's short term and long term corrective actions which have all been completed. An extent of condition was performed for the hydrogen supply piping and no similar conditions were discovered and no other issues or affected areas were identified with inadequate leak protective measures. The licensee's configuration management program has been revised to add guidance that changes to flammable gas utilities must be evaluated for impacts to adjacent process areas by both fire protection and criticality safety personnel. This item is closed.

b. (Closed) Unresolved Item (URI) 70-1113/2012-002-01: Further evaluate whether the licensee is in compliance with the performance requirements regarding Dry Conversion Process (DCP) fire safety accident sequences with criticality safety consequences.

In 2012, an URI was identified to further evaluate whether the licensee was in compliance with the performance requirements regarding DCP fire safety accident sequences with criticality safety consequences. The same human error failure used for cylinder handling was applied to the DCP combustible control program (CCP). This is more credit than was given for the Fabrication CCP. It was determined that because of the difference in facilities, in that the DCP facility is a Moderator Restricted Area (MRA) and Fabrication is a Moderation Controlled Area (MCA), the additional credit was justified when applying the CCP to the DCP area. In general, the DCP area has limited opportunities for equipment damage due to fires. Therefore, the criticality consequences differ between the DCP MRA and the Fabrication MCA, and the licensee is in compliance with the performance requirements. This item is closed.

c. (Closed) Escalated Enforcement Issue (EEI) 70-1113/ 2011-007-01, Criticality Warning System Exhibited a 3 Minute Delay

The corrective actions taken and planned to correct the violation and prevent reoccurrence and the date when full compliance will be achieved have been addressed on the docket in a letter from GNF-A dated October 28, 2011 (ADAMS Accession

Number ML113040087). Management Oversight and Risk Tree (MORT) root cause investigation combined corrective actions associated with the sinter test grinder and the delay in the criticality warning system are described in Escalated Enforcement Item; EEI 70-1113/2011-010-01, Failure to maintain mass control within UO_2 sinter test grinder. These corrective actions have been reviewed and closed out in Inspection Report 70-1113/2012-005-05 dated January 24, 2013 (ADAMS Accession Number ML13024A238). This item is closed.

d. (Closed) VIO 70-1113/2011-006-06, Failure to Vacuum out Sinter Test Grinder High Efficiency Particulate Air Filter

The maintenance operating procedure has been revised to clarify cleanout and inspection requirements following a filter change out. Additionally, guidance has been included to request a radiation dose rate survey post cleanout as a back up to the inspection requirement. Specific radiation dose rates have been established with required actions when the set points have been exceeded. A record of the net weight of the material removed from the filter is maintained. This item is closed.

e. (Closed) VIO 70-1113/2010-002-01, Failure to report IAW 10 CFR 70 Appendix A section (b)(2) degradation of an IROFS that resulted in the failure to meet performance requirements of 10 CFR 70.61(b).

The inspectors reviewed licensee procedure Work Instruction (WI)-27-104-01, Nuclear Safety and Security Event Communication and Notification, Revision (Rev.) 2, and concluded that adequate clarification had been incorporated into the procedure to ensure accurate and timely assessment of reportable conditions. The licensee originally credited manual operator actions in assessing the adequacy of the IROFS although these manual actions were not formally identified and documented as being credited. The licensee committed to revising local operating procedures to include manual operator actions as part of the identified IROFS 30206. Based upon further evaluation, the licensee modified this long term corrective action. The slugger and granulator process equipment provide a barrier to external moderator leaking into the uranium material and now has been designated as an IROFS (502-09). Operators have been trained to inspect these barriers prior to use and report any degradation. This item is closed.

f. (Closed) URI 70-1113/2012-002-02: Evaluation of licensee adherence to quality requirements of 10 CFR 71.

During January 2012, an URI was identified to verify licensee compliance with 10 CFR Part 71.125 as it relates to the use of calibrated equipment when performing a valve torque check on multiple 30B UF_6 cylinders in the licensee's possession over a two month period in late 2011. The inspectors reviewed the calibration records for the torque wrench that was used during the torque on UF_6 cylinders in question and determined that the torque wrench was in tolerance during the period of use. This item is considered closed.

g. (Closed) EEI 09-268: Three violations of NRC requirements:

(1) VIO 70-1113/2010-003-01, Failure to identify credible accident scenarios as required by the license;

(2) VIO 70-1113/2010-003-02, Failure to characterize criticality accident scenarios in the ISA as high consequence events as required by the license; and
(3) VIO 70-1113/2010-003-03, Failure to designate engineered or administrative controls as IROFS when necessary to comply with the performance requirements of 10 CFR 70.

The main elements of an ISA program are: (1) identification of credible accidents; (2) determination of the consequences of those accidents; and, (3) identification of IROFS to limit the risk associated with those accidents. The above violations were a programmatic concern because the ISA program at GNF-A failed in each of these elements. Specific examples of ISA program failures were identified for the nuclear criticality, fire, and chemical safety disciplines.

In this case, no actual consequences resulted from these violations because there were no incidents and no existing safety controls were identified as degraded. However, the NRC considered the violations to be of significant regulatory concern because the ISA program, as required by Subpart H of 10 CFR Part 70, was established to improve confidence in the margin of safety for facilities regulated under Part 70.

As a result of the above programmatic issues, GNF-A instituted an ISA Review Plan to address the identified programmatic ISA issues. The licensee developed a schedule to provide a phased implementation approach to bring the ISA program into full compliance with the license and regulations. The ISA review project was broken down into three areas: (1) Conversion; (2) Fabrication; and (3) Balance of Plant. The licensee conducted detailed reviews of the original supporting analyses, base assumptions, and plant configurations, including a verification of IROFS maintenance test records, management measures, and operator instructions.

As each of the portions of the ISA review plan was implemented, inspections were conducted by the NRC to determine if the corrective actions implemented by the licensee were adequate. The BOP was the last portion of the project to be completed and was the focus of the inspectors during this inspection period. The inspectors reviewed a sampling of newly designated IROFS for the BOP ISA along with the associated accident sequences. The inspectors also reviewed the SOLE IROFS associated with accident sequences for the BOP ISA. The inspectors reviewed each section and determined that they were similar in composition and quality. Additionally, the criticality aspects of the ISA revision were reviewed by criticality safety inspectors and are documented in inspection report 70-1113/2013-202 (ML13233A268). The inspectors did note that the QRA for the BOP portion contained an appendix summarizing the accident sequence and controls for the respective IROFS that the other portions QRAs did not contain. The licensee stated that this was an enhancement and that the Fabrication and Conversion QRA's would be updated in the future to reflect this enhancement. No findings of significance were found during the BOP ISA review. The above three violations are closed.

3. Event Follow-up

a. (Closed) Licensee Event Report (LER) 70-1113/2013-003-0, EN 48807: Sole IROFS pressure mat did not function.

During post maintenance testing of a sole IROFS in the swarf press area, it was discovered that a pressure mat designed to ensure operator presence did not function as designed. The press was immediately shut down and the event was reported within one hour of discovery as required by 10 CFR 70 Appendix A (a)(4). At no time was an unsafe condition present at the press. It was discovered that a mechanical failure of the clutch mechanism caused the IROFS to become inoperable. This failure mechanism was corrected and a common cause evaluation was conducted to ensure any additional presses did not have the same condition. Although not specifically identified in the accident sequence, mass control to the swarf press was present and available. This control is designated as an IROFS in other accident sequences and was available to mitigate an accident condition at the swarf press. With this additional IROFS in place, performance requirements of 10 CFR 70.61 were maintained at all times. As part of the corrective actions, the licensee added mass control in addition to the existing pressure mat to the accident sequence in the latest BOP ISA revision. With the addition of this mass control, the sole IROFS designation of the pressure mat has been removed from this accident sequence. This item is closed.

b. (Closed) LER 70-1113/2012-006-0, EN 48202: Overweight Pellet Boat

On August 17, 2012, it was discovered that only one IROFS remained in place for the accident of concern as described in the ISA to prevent a criticality event in the Ceramics area of the Fuel Manufacturing Operations (FMO) facility. The failed IROFS was due to an overweight pellet boat. The pellet boat in question was slightly over the mass limit of 15 kg. A second IROFS from the accident sequence remained in place at all times. This IROFS is the cleanup of spills before they become moderated by external sources in the unlikely occurrence of an event involving a fire suppression sprinkler activation or pipe break. The accident of concern is a loss of geometry control due to a spill of one or more pellet containers. Mass, moderation, and geometry are the controls used to prevent a potential criticality after the pellet press boat loading occurs. Immediate corrective actions involved the removal of the above limit pellets and the verification of the other pellet boats to be within limits. An administrative limit was established of 14 kg to provide additional margin to the analysis limit. Operator training and procedural enhancements were made to prevent reoccurrence. This item is closed.

c. (Closed) LER 70-1113/2012-005-0, EN 48100: Criticality Horns Rendered Inoperable

On August 10, 2012, GNF-A submitted a 30 day written report as amended in response to EN 48100. The immediate and short term corrective actions were completed for this event. The licensee's initial plan was to submit a licensee amendment to the NRC to remove the criticality warning alarm requirements from the Wilmington Field Service Center (WFSC) with a scheduled completion date of December 28, 2012. GNF-A has revised this plan to install a physical barrier consisting of a chain link fence with controlled access to separate the WFSC licensed activities from NRC licensed activities and to prevent additional movements of special nuclear material (SNM) to the WFSC

areas. The physical barrier is scheduled to be installed during the fourth quarter of 2013 and the criticality warning system (CWS) coverage from the WFSC areas is scheduled to be discontinued after the fence installation is complete. This item is closed.

E. Exit Meeting

The inspection scope and results were presented at exit meetings held on July 25, August 29, and September 19, 2013, with you and your staff. No dissenting comments were received from the licensee. Proprietary information was discussed, but not included in the report.

SUPPLEMENTARY INFORMATION

1. KEY POINTS OF CONTACT

Name	Title
F. Beaty	FMO Operations
C. Buddin	Manager, Chemet Lab
R. Crott	Manager, NSE
C. Davidson	EHS Specialist
M. Gaul	Risk Assessment Engineer
D. Hart	GEH EHS Leader
J. Head	GM Regulatory Affairs
A. Hilton	Manager, FAB
B. Howell	Manager, Plant Production and Shop Support
M. Huntley	Nuclear Measurements
U. Latham	Sr. Admin Specialist, Licensing
S. Murray	Manager, Licensing
S. O'Connor	EHS Specialist
P. Ollis	Licensing Engineer
L. Paulson	GLE Manager, EHS/Nuclear Safety
J. Reynolds	Manager, Environmental Remediation and Decommissioning Projects
J. Rohner	Manager, Criticality Safety Program
V. Rizzo	Logistics Leader
E. Saito	EHS Manager
R. Skalski	CAP Condition Review Group, Regulatory Affairs
A. Vexler	FMO Operations Leader and Facility Manager

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

1. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Description
VIO 70-1113/2013-002-01	CLOSED	ChemMet Hydrogen Piping
URI 70-1113/2012-002-01	CLOSED	Further evaluate whether the licensee is in compliance with the performance requirements regarding Dry Conversion Process (DCP) fire safety accident sequences with criticality safety consequences
EEI 70-1113/ 2011-007-01	CLOSED	Criticality Warning System Exhibited a 3 Minute Delay
VIO 70-1113/2011-006-06	CLOSED	Failure to Vacuum out Sinter Test Grinder High Efficiency Particulate Air Filter

VIO 70-1113/2010-002-01	CLOSED	Failure to report IAW 10 CFR 70 Appendix A section (b)(2) degradation of an IROFS that resulted in the failure to meet performance requirements of 10 CFR 70.61(b)
URI 70-1113/2012-002-02	CLOSED	Evaluation of licensee adherence to quality requirements of 10 CFR 71
EEI 09-268	CLOSED	Three violations of NRC requirements:
LER 70-1113/2013-003-0	CLOSED	Sole IROFS pressure mat did not function
LER 70-1113/2012-006-0	CLOSED	Overweight Pellet Boat
LER 70-1113/2012-005-0	CLOSED	Criticality Horns Rendered Inoperable

2. INSPECTION PROCEDURES USED

IP 88020, Operational Safety
IP 88035, Radioactive Waste Management
IP 88045, Effluent Control and Environmental Protection
IP 86740, Inspection of Transportation Activities

3. DOCUMENTS REVIEWED

Records:
Process Waste Water Field Analysis Record, dated August 27, 2013
Quarterly calibration records for the following liquid effluent equipment:
- North Final Process Lagoon Weir Box pH
- North Final Process Lagoon "IN" Flow Recorder
- South Final Process Lagoon Weir Box pH

South Final Process Lagoon "IN" Flow Recorder
Site Dam pH Indicator and Alarm Calibration
Semi-Annual Effluent Monitoring Report, February 27, 2013 & August 23, 2013
Stack Calibration Records: 449108, 449119, 449120, 449121, 449126, 449127, 449135, 449136, 449137, 449138, 463378, 463379
Ambient Air Monitor Calibration Records: 459514, 459516, 459517, 459520, 459547, 05-63963

Procedures:
COI-613.00, Determination of Fluoride Collected on Stack Filters, Revision (Rev.) 5, dated November 24, 2009
COI-618.00, Determination of Total Solids, Total Suspended Solids, and Total Dissolved Solids in Water or Wastewater, Rev. 3, 11/24/09
COI-6002, Measurement of Trace Uranium in Wastewater using Kinetic Phosphorescence Analyzer (KPA-11), Rev. 0, dated November 19, 2004
COI-6003, Determination of Anions in Water and Waste Water using Ion Chromatography, Rev. 4, dated November 19, 2004
EPI-E-2.0, Environmental Agency Notification Environmental Releases, Rev. 28, dated October 25, 2012

EPI-O-3.0, Sample Collection at GE River Dock and Castle Hayne, Rev. 38, dated May 30, 2013
EPI-O-6.0, Stack Sampling Program, Rev. 68, dated June 26, 2013
EPI-O-7.0, Soil, Ditch, Vegetation, and State Split Sampling Programs, Rev. 39, dated June 6, 2013
EPI-O-8.0, Sample Collection from Site Wells at the GE/GNFA Wilmington Site, Rev. 52, dated August 26, 13
EPI-O-9.0, Environmental Ambient Air Sampling Stations, Rev. 33, dated March 5, 2013
FTI 1336.11, Detection of HF Vapors in the HF Building Turns on Alarm Lights and Horn Emergency Scrubber is activated at Correct Action Levels, dated November 28, 2012
FTI 1336.13, System 2 Detection of HF Vapors in the HF Building Turns on Alarm Lights and Horn. Emergency Scrubber is activated at Correct Action Levels, Rev. 1
FTI 1332-17, Steam Supply Interlocks, Rev. 3, dated April 23, 2013
FTI 1332-19, Detection of HF Vapors in Conversion Area turns on Alarms Lights on 2nd and 3rd floor and interlocks process valves, Rev. 3., dated April 22, 2013
FTI 1336-14, Closing of the UF6 feed to the reactor if the condenser temperature is too low, Rev. 0, dated September 19, 2013
FTI 1336-01, Low Chilled Water flow through the condenser stops UF6 Flow by closing valve, dated September 18, 2013
FTI 1332-20, Conversion Recycle Valve, dated August 14, 2012
FTI 1332-02, Closing of the double block valves and opening the bleed valves to stop the pyro-hydrolysis steam to the kiln if the reactor core drops below 150^{o}C
FTI 1332-20, Conversion Recycle Valve- Prevent excess moderation in the recycle feed container by closing XV#2908 when moisture detection probes exceed high limit of 10^{o}C for 5 minutes
FTI 1332-08, Closing of the double block valves to stop the hydrolysis steam supply to the reactor if the hydrolysis superheated steam safety temperature drops below 150^{o}C, Rev. 5, dated April 19, 2013
FTI 1332-09, Closing of the double block valves to stop the hydrolysis steam supply to the reactor if the hydrolysis steam safety temperature drops below 200^{o}C, dated April 19, 2013
OP 1336.00.210, HF Treatment – Alarm Response and Emergency Operations, Rev. 0
OP 1336.00.201, HF Treatment – Pre-startup, Rev. 0
OP 1336.00.211, HF Treatment – Basic Operator Maintenance, Rev. 2
OP 1332.00.209, DCP Conversion Basic Operator Maintenance, Rev. 2
SESDPROC-301-R2, Groundwater Sampling, dated October 28, 2011

Condition Reports:
Condition Report #6266, dated April 30, 2013
Condition Report #4627, dated January 11, 2013
Condition Report #5458, dated March 13, 2013
Condition Report #6129, dated April 22, 2013
Condition Report #7615, dated August 16, 2013

Other Documents:
2012 Wilmington Radiological Notebook
2013 Wilmington Radiological Notebook
E-mail—WFSC Site Boundary TLD Monitor, dated August 28, 2013
Functional Test Instruction (FTI) for IROFS: 1331-02a, 1331-02b, 1331-01, 1331-04a, 1331-04B, 1331-10
HVAC QRA-803/804, Rev. 1, dated July 19, 2013

Internal Chain of Custody Form, dated August 27, 2013
PHA-803, Rev. 0, p. 34-35 (for environmentally related IROFS)
Quarterly Audits – October 9, 2012, January 7, 2013, March 28, 2013, July 16, 2013
NRC Regulatory Guide 3.13, “Design, Construction, and Inspection of Embankment Retention Systems at Fuel Cycle Facilities”, Rev. 1, dated July 2010
Sheet – Radioactivity to ppm for uranium
Site-Specific Evaluation of Decommissioning Planning Rule Implementation, dated August 12, 2013
WSRC ALARA Meeting 2012, Environmental Monitoring & Effluent Reporting
P01-1332, Conversion Steam P&I Diagram, Rev. 11
P0011331, Vaporization Line 1 P&ID, Rev. 13
P00-1332, Conversion Line 1 P&I Diagram, Rev. 20
CRR No. 04.0088, Criticality Safety Analysis, HF Recovery and Storage, Rev. 5
Nuclear Safety Release/Requirements (NSR/R) #15.02.09, Rev. 45
Calibration Work Order #441081, Annual Calibration: Calibration Pressure PT221099 Hydrolysis, dated April 19, 2013
Calibration Work Order #441069, Annual Calibration: Calibration FT2218 Hydrolysis Steam Flow, dated April 20, 2013
Calibration Work Order # 462985 and #0466072, Monthly Calibration HF Detector Line 2 Conversion, dated August 27, 2013
Training Records for Badge #31259
TD 401-16, Press Feed System with heat detector and isolation, Rev. 0
TD 401-15, Feed Tube Level Sensor, Rev. 1
QRA-202, DCP – Conversion, Rev. 6, dated July 19, 2013
QRA-203, DCP – HF Recovery, Rev. 3, dated July 19, 2013
ISA, 10-20-A, Integrated Safety Analysis, Rev. 3, dated June 14, 2012
TR 1332.00, Technical Report Dry Conversion Process, Rev. 16
TR 1336.00, Technical Report Hydrofluoric Acid Recovery, Rev. 24