June 11, 2010

EN 45785

Mr. Sean M. Fuller
COO & Facility Manager
Global Nuclear Fuel - Americas, LLC
P.O. Box 780
Wilmington, NC 28402

SUBJECT: INSPECTION REPORT NO. 70-1113/2010-201

Dear Mr. Fuller:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine announced nuclear criticality safety (NCS) inspection of your facility in Wilmington, North Carolina, from May 10-13, 2010. The purpose of the inspection was to determine whether operations involving special nuclear material were conducted safely and in accordance with regulatory requirements. Inspection observations and findings were discussed with members of your staff and management throughout the inspection. An exit meeting was conducted at the conclusion of the inspection on May 13, 2010.

The inspection, which is described in the enclosure, focused on the most hazardous activities and plant conditions; the most important controls relied on for safety and their analytical basis; and the principal management measures for ensuring controls are available and reliable to perform their functions relied on for safety. The inspection consisted of analytical basis review, selective review of related procedures and records, examinations of relevant NCS-related equipment, interviews with NCS engineers and plant personnel, and facility walkdowns to observe plant conditions and activities related to safety basis assumptions and related NCS controls. Throughout this inspection, observations were discussed with your managers and staff.

In accordance with 10 CFR 2.390 of NRC's "Rules of Practice," a copy of this letter and the enclosure will be made publicly available in the public electronic reading room of the NRC's Agency-Wide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/ADAMS.html.

If you have any questions concerning this report, please contact Thomas Marenchin, of my staff, at (301) 492-3209.

Sincerely,

/RA/

Patricia A. Silva, Chief
Technical Support Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Docket No.: 70-1113

Enclosures: Inspection Report No. 70-1113/2010-201

Attachment: Supplementary Information

cc: w/enclosures: Scott Murray
Global Nuclear Fuels - Americas, LLC

cc: w/o enclosures: Beverly O. Hall
North Carolina Department of Environmental
Health and Natural Resources

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U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

Docket No.:	70-1113
License No.:	SNM-1097
Report No.:	70-1113/2010-201
Licensee:	Global Nuclear Fuel - Americas, LLC
Location:	Wilmington, North Carolina
Inspection Dates:	May 10-13, 2010
Inspector:	Thomas Marenchin, Criticality Safety Inspector Christian Fisher, Criticality Safety Inspector
Approved:	Patricia A. Silva, Chief Technical Support Branch Division of Fuel Cycle Safety and Safeguards Office of Nuclear Material Safety and Safeguards

Enclosure

EXECUTIVE SUMMARY

Global Nuclear Fuel - Americas, LLC Fuel Fabrication Facility
NRC Inspection Report 70-1113/2010-201

Introduction

Staff of the U.S. Nuclear Regulatory Commission (NRC) performed a routine and announced nuclear criticality safety (NCS) inspection at Global Nuclear Fuel - Americas (GNF), LLC, fuel fabrication facility in Wilmington, North Carolina, from May 10-13, 2010, included an on-site review of the licensee NCS program, NCS analyses, NCS-related audits and investigations, and plant operations. The inspection focused on risk-significant fissile material processing activities including the dry conversion process (DCP), dry scrap recovery, gadolinium scrap recovery, pellet pressing operations, outside storage pads, bundle assembly areas, sintering furnaces, gadolinium processing, waste recovery, and ceramics.

Results

- No safety concerns were identified during review of the NCS program or NCS analysis.
- No safety concerns were identified during review of NCS audits
- No safety concerns were noted regarding licensee identified NCS-related events.
- No safety concerns were identified during facility walkdowns.
- No safety concerns were identified during review of the criticality warning system (CWS).

REPORT DETAILS

1.0 Plant Status

GNF manufactures uranium dioxide (UO_2) powder, pellets, and light water reactor fuel bundles at its Wilmington, NC facility. During the inspection, the facility was converting uranium hexafluoride (UF_6) to UO_2 with a DCP and performing normal powder, UO_2 and gadolinia pellet and fuel fabrication operations. Waste operations consisted primarily of packaging and storage of dry waste and processing of wet sanitary waste.

2.0 Nuclear Criticality Safety Program (IP 88015 & 88016)

a. Inspection Scope

The inspectors reviewed NCS analyses to determine that criticality safety of risk-significant operations was assured through engineered and administrative controls, with adequate safety margin and preparation and review by qualified staff. The inspectors accompanied NCS and other technical staff on walkdowns of NCS controls in selected plant areas. The inspectors reviewed selected aspects of the following documents:

- CSA [Criticality Safety Analysis] 1081.01, "Fuel Support Incinerator General," Revision 2, January 8, 2010
- "CSA – UO_2 Sintering Furnace," Revision 3, dated September 1, 2009
- "CSA – Spring Insertion," Revision 0, March 16, 2010
- "CSA – Storage of RAJ-II Inner Containers," Revision 0, January 28, 2010
- "Grind Rod-Load," Revision 14, May 5, 2010
- "HEPA Knock Down Hood," Revision 0, January 18, 2010
- Nuclear Safety Instruction [NSI] E-1.0, "Nuclear Safety Review Records," Revision 26, dated November 19, 2009
- NSI E-3.0, "Nuclear Safety Reviews [NSR]," Revision 35, dated October 6, 2009
- NSR/R #15.01.07, "DCP General Sinks," Revision 13, dated March 14, 2005
- NSR/R #15.03.04, "DCP BPG Granulate," Revision 6, dated May 27, 1999
- NSR/R #15.04.04, "DCP HF Floor – Sump," Revision 1, dated August 5, 1997
- NSR/R #15.04.05, "DCP HF HF–Policeman," Revision 4, dated June 25, 2004
- NSR/R #15.05.01, "DCP PWDR - General," Revision 0, dated September 17, 1997
- NSR/R #15.05.04, "DCP PWDR - XFR," Revision 3, dated May 5, 1999
- NSR/R #15.06.01, "DCP MRA General," Revision 6, dated May 3, 2010
- Operational Procedure [OP] 1333.00, "DCP Powder Outlet," Revision 66, dated May 3, 2010
- OP 1334.00, "DCP Homogenization," Revision 68, dated May 3, 2010
- OP 1335.00, "DCP Pre-Compact Granulate," Revision 90, dated May 3, 2010
- OP 1336.00, "DCP HF Recovery," Revision 39, dated February 24, 2010
- OP 1338.00, "DCP Material Handling and Movement," Revision 36, dated May 3, 2010
- Practices & Procedures (P & P) 10-10, "Configuration Management Program – Nuclear Manufacturing Operations," Revision 15, dated February 22, 2010

b. Observations and Findings

The inspectors determined that analyses were performed by qualified NCS engineers and that independent reviews were completed for the evaluations by other qualified NCS engineers. The inspectors determined that appropriate NCS controls were identified in NCS analyses and that the controls assured the safety of the operations.

c. Conclusions

No safety concerns were identified during review of the licensee's NCS program or NCS analysis.

3.0 Nuclear Criticality Safety Inspections, Audits, and Investigations (IP 88015)

a. Inspection Scope

The inspectors reviewed licensee internal audit procedures, records of previously completed audits of fissile material operations, and records of NCS infractions. The inspectors observed the licensee's audit team conduct an audit of the DCP vaporization, conversion and powder outlet. The inspectors reviewed selected aspects of the following documents:

- Audit, "Dry Conversion Process: Vaporization, Conversion, and Powder Outlet," dated February 11, 2010
- Audit, "Dry Conversion Process: Vaporization, Conversion, and Powder Outlet," dated November 10, 2009
- Audit, "Dry Conversion Process: Vaporization, Conversion, and Powder Outlet," dated August 19, 2009
- NSI E-2.0, "Internal Nuclear Safety Audits," Revision 46, March 1, 2010

b. Observations and Findings

The inspectors found that NCS audits were conducted according to procedural requirements. The inspectors noted that NCS audits were focused on determining that plant operational requirements conform to those listed in the applicable NCS specification documents. During the audit of the of the DCP vaporization, conversion and powder outlet, the inspectors observed that the licensee's NCS auditor carried a copy of the applicable NCS requirements, examined NCS postings, labels, and other controls and identified appropriate NCS-related deficiencies.

c. Conclusions

No safety concerns were identified during review of NCS audits.

4.0 Nuclear Critically Safety Event Review and Follow-up (IP 88015)

a. Inspection Scope

The inspectors reviewed a recent NCS-related event that the licensee had reported to NRC. Also, the inspectors reviewed the licensee's response to internally reported events. The inspectors reviewed the progress of investigations and interviewed licensee staff regarding immediate and long-term corrective actions. The inspectors reviewed selected aspects of the following documents:

- "30-day Report of Event – Loss of a Safety Control," dated April 22, 2010
- CSA 2310.00, "Primary HEPA Filter System," Revision 2, August 21, 2006
- GenSuite 1502, April 1, 2010
- Nuclear Safety Instruction, "HVAC Systems Audits & Inspections," Revision 32, August 22, 2009
- P&P 40-32, "Safety Event Communication & Notification," Revision 13, April 22, 2010
- P&P 40-12, "Incident Classification & Investigation," Revision 18, March 29, 2010
- Quality Notice 00225, "Scout-II Qualification for Hold-up Measurements in FMO [fuel manufacturing operation]," Revision 1, November 19, 2004
- TapRoot Investigation Report, "Bulk Uranium Placed in Trash Receptacle," dated April 5, 2010

b. Observations and Findings

The inspectors observed that the selected licensee internal reportable events were investigated in accordance with written procedures and that appropriate corrective actions were assigned and tracked. The inspectors also reviewed the root cause investigation and corrective actions associated with Event Notification (EN) 45785. The inspectors determined that the licensee staff had correctly determined the root cause of the event and had taken adequate corrective actions to prevent reoccurrence of the event. This closes EN 45785. The inspectors observed that licensee internally reportable events were investigated in accordance with written procedures and that appropriate corrective actions were assigned and tracked.

c. Conclusions

No safety concerns were identified during review of the NCS event review and follow-up.

5.0 Plant Operations (IP 88015)

a. Inspection Scope

The inspectors performed plant walkdowns to review activities in progress and to determine whether risk-significant fissile material operations were being conducted safely and in accordance with regulatory requirements. The inspectors interviewed operators, NCS engineers, and process engineers both before and during walkdowns.

b. Observations and Findings

The inspectors performed walkdowns of the DCP, dry scrap recovery, gadolinium scrap recovery, and pellet pressing operations. The inspectors did not identify any safety concerns during facility walkdowns.

c. Conclusions

No safety concerns were identified during walkdowns of plant operations.

6.0 Criticality Accident Alarm Systems (IP 88017)

a. Inspection Scope

The inspectors reviewed documentation of criticality accident alarm detector coverage, interviewed engineering and maintenance staff, and performed facility walkdowns to determine the adequacy of the licensee criticality alarm system. The inspectors reviewed selected aspects of the following document:

- 8001C03S1, "Criticality Warning System Site Detector Coverage, Numbers & Locations" Revision 2, June 24, 2003
- Nuclear Safety Instruction, "Criticality Warning System," Revision 7, September 25, 2009
- 8001C03S2, "Criticality Warning System FMO/FMOX Ground Floor Detector Numbers & Locations" Revision 5, July 8, 2008
- 8001C03S3, "Criticality Warning System FMO/FMOX Mezzanine Floor Detector Numbers & Locations" Revision 4, July 8, 2008
- 8001C03S4, "Criticality Warning System FMOX Warehouse Expansion Detector Numbers & Locations" Revision 2, June 24, 2003
- 8001C03S5, "Criticality Warning System Dry Conversion Process (1st Floor) Detector Numbers & Locations, " Revision 2, June 24, 2003
- 8001C03S6, "Criticality Warning System Dry Conversion Process (2nd Floor) Detector Numbers & Locations," Revision 2, June 24, 2003
- 8001C03S7, "Criticality Warning System Dry Conversion Process (3rd Floor) Detector Numbers & Locations," Revision 2, June 24, 2003
- Technical Report, "GNF-A Criticality Warning System," Revision 7, March 2008

b. Observations and Findings

The inspectors verified that each area had two-detector coverage. The inspectors reviewed the station that contains the output for each of the detectors and the controls for silencing them in order to do an audible and visual test of the alarms. The licensee found an error in the procedure for silencing the alarms, which caused the alarm to sound once. The licensee was able to identify the error and correct it.

c. Conclusions

No safety concerns were identified during a review of the licensee's criticality accident alarm system.

7.0 Open Items

IFI 70-1113/2009-207-01

This item tracks the revision of the licensee's internal audit form to identify items relied on for safety (IROFS)-related findings. During a pervious inspection the inspectors noted that findings identified by the licensee auditors that concern IROFS are not identified as an IROFS-related findings in the audit form or corrective action documentation. The licensee confirmed that the audit procedure did not require auditors to make any distinction between IROFS and non-IROFS related findings.

During this inspection the inspectors reviewed the licensee's procedure for conducting audits (NSI E-2.0). The inspectors determined that the licensee had revised the procedure so that when licensee staff was performing audits they would indicate in the findings that the finding was related to an IROFS. This item is closed.

IFI 70-1113/2009-207-02

This item tracks the corrective actions associated with bringing the sintering furnace scrubber project into compliance with procedure P&P10-10 and corrective actions associated with the extent of condition review. During a previous inspection the inspectors observed that a water cooling system on the final portion of the off-gas duct of the off-gas duct between the sintering furnace and the scrubber had been installed. The inspector determined that this water cooling system had been installed subsequent to NCS review of the change request and had not been reviewed or approved by the licensee nuclear safety organization. Licensee staff took immediate action to bring the scrubber project into compliance.

During this inspection the inspectors reviewed the licensee staff's corrective actions to bring the scrubber into compliance and the extent of condition review. The licensee updated the change request for the scrubber project to include the water cooling system and had the appropriate reviews of the change request completed. The licensee staff also provided training to the staff that was responsible for the system to ensure they understood the requirements in procedure P&P 10-10. The licensee staff conducted an extent of condition review of all currently open facility change requests to ensure that all of the changes were in compliance with procedure P&P 10-10. Change requests that were completed did not require a review because it was determined that during the normal process that this issue would have been caught during inspections. The inspectors determined that the licensee had taken adequate corrective actions to prevent reoccurrence and had completed an adequate extent of condition review of the event. This item is closed.

8.0 Exit Meeting

The inspector communicated observations and findings to licensee management and staff throughout the week of the inspection and presented the final results to licensee management during an exit meeting held on May 13, 2010. The licensee management acknowledged the results of the inspection and understood the findings presented.

SUPPLEMENTARY INFORMATION

1.0 Items Opened, Closed, and Discussed

Items Opened

None

Items Closed

IFI 70-1113/2009-207-01	Tracks revision of the Licensee internal audit form to identify IROFS-related findings.
IFI 70-1113/2009-207-02	Tracks corrective actions associated with bringing the sintering furnace scrubber project into compliance with procedure P&P10-10 and corrective actions associated with the extent of condition review.

Items Discussed

None.

2.0 Event Reports Reviewed

EN 45785

3.0 Inspection Procedures Used

IP 88015	Nuclear Criticality Safety Program
IP 88016	Nuclear Criticality Safety Evaluations and Analyses
IP 88017	Criticality Alarm Systems

4.0 Key Points of Contact

Global Nuclear Fuel

E. Anderson	Manger, Emergency Preparedness and Site Security
M. Baker	Area Engineer
B. Beard	FMO Maintence
C. Bough	Logistics
M. Campbell	Manager, Industrial Safety
J. DeGolyer	Criticality Safety Engineer
G. Dickman	Dry Conversion
B. Keenan	Radiation Protection
D. Livengood	Gad Ceramics Process Engineer
A. Mabry	Radiation Safety Program Manager

Attachment

R. Martyn	Manager Material control and Accountability
P. Mathur	Environmental Engineer EHS
A. Mulligan	Manager, GNF-A Quality
S. Murray	Manager, Licensing
P. Ollis	Licensing Engineer
L. Paulson	Manager, Nuclear Safety
J. Reynolds	Manager, Fuels EHS
J. Rohner	Criticality Safety Engineer
M. Shipman	MC&A Specialist
D. Snopek	Principal Criticality Safety Engineer
E. Dunn	Criticality Safety

NRC

T. Marenchin	Criticality Safety Inspector
C. Fisher	Criticality Safety Inspector

All attended the exit meeting on May 13, 2010.

5.0 List of Acronyms and Abbreviations

ADAMS	Agency-wide Documents Access and Management System
CSA	criticality safety analysis
CFR	code of federal regulations
CWS	criticality warning system
DCP	dry conversion process
EN	event notice
FMO	fuel manufacturing operation
GNF	Global Nuclear Fuels - America (licensee)
IP	inspection procedure
IROFS	item relied on for safety
NCS	nuclear criticality safety
NMSS	Office of Nuclear Material Safety and Safeguards
NSI	Nuclear Safety Instruction
NSR	Nuclear Safety Review
OP	Operational Procedure
P&P	Practices & Procedures
UF_6	uranium hexafluoride
UO_2	uranium dioxide