May 23, 2011

Ms. Nicole Holmes
COO & Facility Manager
Global Nuclear Fuel - Americas, LLC
P.O. Box 780
Wilmington, NC 28402

SUBJECT: INSPECTION REPORT NO. 70-1113/2011-201

Dear Ms. Holmes:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine announced nuclear criticality safety (NCS) inspection of your facility in Wilmington, North Carolina, from April 25-28, 2011. 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 April 28, 2011.

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 Title 10 of the *Code of Federal Regulations* 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/

Margie Kotzalas, Acting 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. 70-1113/2011-201

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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NAME	TMarenchin	CFisher	MKotzalas	
DATE	5/19/11	5/17/11	05/23/2011	

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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.:	70-1113/2011-201
Licensee:	Global Nuclear Fuel - Americas, LLC
Location:	Wilmington, North Carolina
Inspection Dates:	April 25-28, 2011
Inspectors:	Thomas Marenchin, Criticality Safety Inspector Christian Fisher, Criticality Safety Inspector
Approved:	Margie Kotzalas, Acting Chief /RA/ 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 70-1113/2011-201

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 April 25-28, 2011 which included an on-site review of the licensee's 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 (DSR), 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 licensee's NCS program and NCS analyses.
- No safety concerns were identified during review of NCS administrative and operating procedures.
- No safety concerns were identified during review of NCS audits.
- No safety concerns were identified during review of the NCS event review and follow-up.
- No safety concerns were identified during a review of the licensee's criticality warning system (CWS).
- No safety concerns were identified during walkdowns of plant operations.

REPORT DETAILS

1.0 Plant Status

GNF, LLC 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 to UO_2 in 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:

- Criticality Safety Engineer Training and Qualification Manual, Revision 3, dated October 2007
- CSA [Criticality Safety Analysis], "DCP-Moderation Restricted Area," Revision 8, dated April 18, 2011
- CSA, "DSR Furnace Feed Hood," Revision 0, dated June 4, 2010
- CSA, "Gadolinium Ministacker at 5% Enrichment," Revision 3, dated October 15, 2007
- CSA, "Safe Mass Limits for Uranium Systems," Revision 1, dated September, 2007
- CSA, "UO_2 Powder Receipt," Revision 3, dated September 16, 2010
- CSA, "Vacuum Cleaner Unit Analysis," Revision 0, dated February 18, 2008
- CR [Change Request] Package 1833, completed June 18, 2010
- CR Package 4089, completed September 14, 2010
- CR Package 6330, completed September 21, 2010
- CR Package 6379, completed June 21, 2010
- CR Package 6943, completed December 17, 2010
- CR Package 6954, completed November 23, 2010
- CR Package 6955, completed November 9, 2010
- NSR/R [Nuclear Safety Release/Requirements] 02.15.02, "DSR," Revision 4, dated June 4, 2010
- NSR/R 04.09.06 "Support – General – N2 Plant," Revision 4, dated September 11, 2006
- NSR/R 04.14.05, "Support," Revision 2, dated January 5, 2010
- NSR/R 15.05.01 "DCP – Powder Transfer – General," Revision 0, dated September 17, 1997
- NSR/R 15.05.02 "DCP – Powder Transfer – Powder Pack," Revision 16, dated October 12, 2009
- NSR/R 15.05.03 "DCP – Powder Transfer – Powder Cont," Revision 6, dated December 19, 2000

- NSR/R 15.05.04 “DCP – Powder Transfer – Utility Hood,” Revision 3, dated May 5, 1999
- NSR/R 15.05.05 “DCP – Powder Transfer – Cont Storage,” Revision 5, dated December 5, 2003
- NSR/R 15.06.01 “DCP – MRA [moderator restricted area] – General,” Revision 6, dated May 3, 2010
- NSR/R 15.06.02 “DCP – MRA – Facility,” Revision 0, dated December 19, 1997
- NSR/R 15.06.03 “DCP – MRA – Process Equipment,” Revision 0, dated December 19, 1997
- NSR/R 15.06.04 “DCP – MRA – Posting,” Revision 0, dated December 19, 1997
- NSR/R 15.06.05 “DCP – MRA – HVAC,” Revision 2, dated September 26, 2006
- NSR/R 15.06.07 “DCP – MRA – Cleaning,” Revision 6, dated July 18, 2010
- NSR/R 15.06.08 “DCP – MRA – Fire,” Revision 2, dated September 11, 2006
- QRA [Qualitative Risk Assessment]-202, “DCP – Conversion,” Revision 0, dated March 2011
- QRA 35.9, “DSR Oxidation Furnace,” Revision 21
- GNF-A IROFS[item relied on for safety] Management Assurances Master List for Revision 13.9, dated June 4, 2010

b. Observations and Findings

The inspectors determined that NCS analyses were performed by qualified NCS engineers and 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 and NCS analyses.

3.0 Administrative and Operating Procedures (IP 88015)

a. Inspection Scope

The inspectors reviewed licensee NCS administrative and operating procedures to determine if the NCS program is adequately controlled through adherence to approved written procedures. The inspectors reviewed selected aspects of the following documents:

- NSI [Nuclear Safety Instruction] E-3.0, “Nuclear Safety Review,” Revision 36, dated October 15, 2009
- NSI E-4.0, “Criticality Safety Analysis Methods and Verification,” Revision 41, dated February 10, 2011
- NSI E-2.0, “Internal Nuclear Safety Audits,” Revision 47, dated August 4, 2010
- NSI E-3.0, “Nuclear Safety Reviews,” Revision 36, dated October 15, 2010
- Practices and Procedures 10-20-A, “Integrated Safety Analysis,” Revision 3, dated June 4, 2010
- OP [Operating Procedure] 1210.00, “Dry Recycle Oxidation Furnace,” Revision 21

- OP 2200.00, “Powder Receipt Facility,” Revision 16

b. Observations and Findings

The inspectors evaluated licensee administrative procedures controlling NCS reviews, NCS internal audits, and NCS records. The inspectors interviewed licensee managers, NCS engineers, system engineers, and facility operators regarding NCS program implementation during document reviews and facility walkdowns. The inspectors noted that nuclear safety operating procedures have been updated to reflect recent organizational changes, to clarify the validation process and to clarify CSA documentation requirements. The inspectors determined that the licensee’s NCS program is adequately controlled through compliance with approved administrative and operating procedures.

c. Conclusions

No safety concerns were identified during review of NCS administrative and operating procedures.

4.0 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 a licensee audit team conduct an audit of the DCP vaporization, conversion and powder outlet. The inspectors reviewed selected aspects of the following documents:

- Audit, “DCP, Homogenizer, Blend, Pre Compact, Granulate, Tumble, and Powder Pack,” dated December 15, 2010
- Audit, “DSR, Chemical, Radwaste, FDL,” dated October 26, 2010
- Audit, “Gadolinium Ceramics,” dated February 23, 2011
- Audit, “DCP, Homogenizer, Blend, Pre Compact, Granulate, Tumble, and Powder Pack,” dated March 28, 2011
- Audit, “Shipping, Box Factory, Pod 12 Warehouse, Refurbish, UF_6 Cylinder Pad,” dated March 29, 2011
- External Audit, “Triennial Criticality Safety Audit of the Global Nuclear Fuel-America, LLC Fuel Fabrication Facility, Wilmington, NC,” dated November – December 2010,
- GenSuite Finding ID 2405, closed March 3, 2011
- GenSuite Finding ID 2406, closed March 3, 2011
- GenSuite Finding ID 2408, closed March 3, 2011
- GenSuite Finding ID 2409, closed March 3, 2011
- GenSuite Finding ID 2619, opened April 27, 2011
- GenSuite Finding ID 2628, opened April 27, 2011
- GenSuite Finding ID 2629, opened April 27, 2011

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. The inspectors observed that licensee staff carried a copy of the applicable NCS requirements; examined NCS postings, labels, and other controls; and identified appropriate NCS-related deficiencies. The inspectors observed the licensee enter findings from the audit into their corrective actions program (GenSuite), after being identified during the audit.

c. Conclusions

No safety concerns were identified during review of NCS audits.

5.0 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:

- GenSuite Finding ID 2081, dated November 19, 2010
- GenSuite Finding ID 2083, dated November 19, 2010
- GenSuite Finding ID 2152, dated December 15, 2010
- GenSuite Finding ID 2153, dated December 15, 2010
- GenSuite Finding ID 2154, dated December 15, 2010
- GenSuite Finding ID 2156, dated December 15, 2010
- GenSuite Finding ID 2157, dated December 15, 2010
- GenSuite Finding ID 2403, dated February 23, 2011
- GenSuite Finding ID 2410, dated February 23, 2011
- GenSuite Finding ID 2411, dated February 23, 2011
- GenSuite Finding ID 2413, dated February 23, 2011
- GenSuite Finding ID 2532, dated March 28, 2011
- GenSuite Finding ID 2554, dated March 28, 2011
- GenSuite Finding ID 2555, dated March 28, 2011
- GenSuite Finding ID 2560, dated March 29, 2011
- GenSuite Finding ID 2561, dated March 29, 2011

b. Observations and Findings

The inspectors discussed findings with a licensee NCS engineer. Specifically the inspectors walked down areas where findings had been identified with the NCS engineer and discussed how items were closed or found.

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.

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 documents:

- CR Package 6769, completed September 22, 2010
- Drawing 8001C0351, "Criticality Warning System Site – Detector Coverage, Numbers, and Locations," Revision 2, dated May 23, 2003

b. Observations and Findings

The inspector reviewed the licensee's criticality alarm detector placement to determine that the system remained in accordance with license requirements. The inspector observed the locations of selected criticality alarm detectors during plant walkdowns.

c. Conclusions

No safety concerns were identified during a review of the licensee's CWS.

7.0 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 accompanied a licensee NCS engineer during in-plant IROFS verifications. The inspectors observed that the licensee is in the process of posting IROFS identification stickers on equipment in the facility. The inspectors did not identify any safety concerns during facility walkdowns.

c. Conclusions

No safety concerns were identified during walkdowns of plant operations.

8.0 Exit Meeting

The inspector communicated observations and findings to the licensee management and staff throughout the week of the inspection and presented the final results to the licensee management during an exit meeting held on April 28, 2011. 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

None.

Items Discussed

None.

2.0 Event Reports Reviewed

None.

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	Industrial Safety
F. Beaty	Manager, DCP
J. DeGolyer	Manger, Criticality Safety Engineer
M. Dodds	Criticality Safety Engineer
A. Hilton	Manager, FAB
A. Kennedy	Manager, ISA
R. Martyn	Manager, Material control and Accountability
A. Mabry	Manager, Radiation Safety Program
A. Mulligan	Manager, Quality
S. Murray	Manager, Licensing
L. Paulson	GEH Manager, Nuclear Safety Programs
M Venters	Manager, Emergency Preparedness and Site Security

Attachment

NRC

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

All attended the exit meeting on April 28, 2011.

5.0 List of Acronyms and Abbreviations

ADAMS	Agency-wide Documents Access and Management System
CSA	criticality safety analysis
CWS	criticality warning system
DCP	dry conversion process
DSR	dry scrap recovery
GNF	Global Nuclear Fuels - America (licensee)
IP	inspection procedure
IROFS	item relied on for safety
MRA	moderator restricted area
NCS	nuclear criticality safety
NMSS	Office of Nuclear Material Safety and Safeguards
NSR/R	Nuclear Safety Release/Requirements
NSI	Nuclear Safety Instruction
OP	Operational Procedure
QRA	Qualitative Risk Assessment
UO_2	uranium dioxide
WFSC	Wilmington Field Service Center