

December 23, 2009

Sean M. Fuller
Facility Manager, M/C A20
Global Nuclear Fuel - Americas, LLC
P.O. Box 780
Wilmington, NC 28402

SUBJECT: INSPECTION REPORT NO. 70-1113/2009-207

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 November 30 – December 4, 2009. The purpose of the inspection was to determine whether operations involving special nuclear material were conducted safely and in accordance with regulatory requirements. An exit meeting was conducted at the conclusion of the inspection on December 4, 2009.

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 Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC web site at <http://www.nrc.gov/reading-rm/ADAMS.html>.

S.M. Fuller

- 2 -

If you have any questions concerning this report, please contact Dennis Morey, of my staff, at (301) 492-3112.

Sincerely,

/RA/

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

Docket No.: 70-1113

Enclosures: Inspection Report No. 70-1113/2009-207

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

S.M. Fuller

- 2 -

If you have any questions concerning this report, please contact Dennis Morey, of my staff, at (301) 492-3112.

Sincerely,

/RA/

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

Docket No.: 70-1113

Enclosure: Inspection Report No. 70-1113/2009-207

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

DISTRIBUTION:

FCSS r/f MAdams, FMB KMcCallie,RII DRich, RII RGibson, RII

ML093490976

| INDICATE IN BOX: "E"=COPY W/ATT/ENCL; "C"=COPY W/O ATT/ENCL; "N"=NO COPY | | | | | | |
|--|----------|---|----------|---|----------|--|
| OFFICE | TSB/FCSS | E | TSB/FCSS | E | TSB/FCSS | |
| NAME | DMorey | | PJenifer | | PSilva | |
| DATE | 12/15/09 | | 12/16/09 | | 12/23/09 | |

OFFICIAL RECORD COPY

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

Docket No.: 70-1113

License No.: SNM-1097

Report No.: 70-1113/2009-207

Licensee: Global Nuclear Fuel - Americas, LLC

Location: Wilmington, North Carolina

Inspection Dates: November 30 - December 4, 2009

Inspector: Dennis C. Morey, 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 70-1113/2009-207

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 November 30 - December 4, 2009. The inspection 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 scrap pack facility, outside storage pads, bundle assembly areas, sintering furnaces, and equipment removal areas.

Results

- A weakness was identified regarding documentation of items relied on for safety (IROFS)-related findings during licensee internal audits.
- A weakness was identified regarding configuration management of an in-process change to a sintering furnace.
- No safety concerns were identified during review of the licensee NCS program or NCS analysis.
- No safety concerns other than the previously described weakness in documentation of findings were identified during review of NCS audits.
- No safety concerns were noted regarding licensee identified NCS-related events.
- No safety concerns other than the previously described weakness related to the sintering furnace change were identified during facility walkdowns.

REPORT DETAILS

1.0 Plant Status

GNF manufactures uranium dioxide (UO₂) powder, pellets, and light water reactor fuel bundles at its Wilmington, NC, facility. During the inspection, the facility was converting uranium hexafluoride (UF₆) to UO₂ powder in the Dry Conversion Process facility and performing normal powder, pellet, and fuel fabrication operations. Waste operations at the facility consisted primarily of packaging and storage of dry waste and processing of wet sanitary waste.

2.0 Nuclear Criticality Safety Program (88015, 88016)

a. Inspection Scope

The inspector 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 inspector accompanied NCS and other technical staff on walkdowns of NCS controls in selected plant areas. The inspector reviewed selected aspects of the following documents:

- "GEMER Monte Carlo Code Validation Report," Revision 5, dated May 2009
- CSA [Criticality Safety Analysis]-2100.00, "Scrap Pack Facility," Revision 6, dated October 9, 2009
- CSA, "Rod Loader with Spring Insertion," Revision 2, dated August 4, 2009
- Criticality Safety Summary, "Mobile HEPA," dated October 2009

b. Observations and Findings

The inspector determined that analyses were performed by qualified NCS engineers and that independent reviews were completed for the evaluations by other qualified NCS engineers. The inspector 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 Audits and Investigations (88015)

a. Inspection Scope

The inspector reviewed the records of previously completed audits of fissile material operations. The inspector observed a licensee audit team conduct an audit in the bundle assembly shop. The inspector reviewed selected aspects of the following documents:

- NSI [Nuclear Safety Instruction] E-2.0, "Internal Nuclear Safety Audits," Revision 44, dated June 26, 2009
- P&P [Practices and Procedures] 40-06, "EHS Regulatory Compliance Audits," Revision 23, dated July 27, 2009
- Audit, "Gadolinia Shop MRA/Slug/Granulate/Sinter/Grind/Rod," dated November 18, 2009
- Audit, "UO₂ Shop Press/Feed/Sintering," dated November 24, 2009

b. Observations and Findings

The inspector found that NCS audits were conducted in accordance with written procedures. During the bundle assembly shop audit, the inspector observed that the licensee's auditors carried a copy of the applicable NCS requirements, examined NCS postings, labels, and other controls and identified appropriate NCS-related deficiencies. The inspector observed licensee auditors reviewing previous deficiencies and items for correction.

The inspector reviewed records of previous audits. During review of a previous audit of the Gadolinia Shop, the inspectors noted that one of the findings identified by the licensee auditor concerned the function of an IROFS but was not identified as an IROFS-related finding 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. Licensee staff committed to revise the audit form to include a section or check-off for IROFS-related findings so that personnel involved in completing corrective actions would immediately recognize that an IROFS was affected. Revision of the licensee audit form to identify IROFS-related findings will be tracked as **Inspection Follow-up Item (IFI) 70-1113/2009-207-01**.

c. Conclusions

A weakness was identified regarding documentation of IROFS-related findings during licensee internal audits. Other than the weakness described above, no safety concerns were identified during review of NCS audits.

4.0 **Nuclear Critically Safety Event Review (88015)**

a. Inspection Scope

The inspector reviewed the licensee's response to internally reported events. The inspector reviewed the progress of investigations and interviewed licensee staff regarding immediate and long-term corrective actions. The inspector reviewed selected aspects of the following documents:

- UIR [Unusual Incident Report] FAB-083, "Water in Gadolinia Vibro-mill knockout bottle," dated September 17, 2008
- UIR FAB-0908, "Water in Gadolinia Vibro-mill Addition Port Cap," dated June 23, 2009

b. Observations and Findings

The inspector reviewed selected licensee internal events. The inspector 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 noted regarding licensee identified NCS-related events.

5.0 Plant Operations (88015)

a. Inspection Scope

The inspector 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 inspector interviewed operators, NCS engineers, and process engineers both before and during walkdowns. The inspector reviewed selected aspects of the following documents:

- Procedure P&P 10-10, "Configuration Management – Fuel Manufacturing," Revision 14, dated April 24, 2009
- Criticality Safety Analysis, "UO₂ Sintering Furnace," Revision 3, dated September 1, 2009
- Change request CR-2962, "Additive Fuel," dated May 22, 2008
- Technical report TR-1030.10, "UO₂ Furnaces," Revision 1, dated January 9, 2009

b. Observations and Findings

The inspector performed walkdowns of the scrap pack facility, outside storage pads, bundle assembly areas, sintering furnaces, and equipment removal areas. During review of the sintering furnace CSA, the inspector noted that a scrubber was being installed on one of the sintering furnaces for use in a new production operation. During the CSA review, the inspector asked how the temperature of the furnace off-gases was reduced sufficiently to enter the scrubber and was informed that cooling was by convection with room air. The inspector determined that the description of furnace off-gas cooling provided by licensee NCS staff reflected the change request for the scrubber installation. During the walkdown of the sintering furnaces, the inspector asked a licensee process engineer to describe the temperature profile of the off-gas duct between the sintering furnace and the scrubber. This engineer identified a water cooling system on the final portion of the off-gas duct. 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. The inspector noted that the furnace was not in operation and that there was no immediate safety concern.

Licensee procedure P&P 10-10, "Configuration Management – Fuel Manufacturing," Section 2.2 requires the area engineer responsible for a proposed change to provide nuclear safety with draft changes to technical reports for CSA prior to installation. The inspector determined that the original nuclear safety approval for the scrubber was to proceed "at risk" which means that final installation may not be approved by the licensee safety department. Licensee staff associated with the project stated that the water cooling system installation fell within the envelope of "at risk." The inspector determined and licensee management confirmed that the cooling system actually required nuclear safety review and approval prior to installation. The inspector determined that the licensee's failure to perform a nuclear safety review of the sintering furnace off-gas cooling system was a minor procedure violation because it did not change the risk of accident sequences associated with the equipment, a final nuclear safety audit of the change request would likely have identified the design change, and the furnace was not approved by the licensee safety department for operation with licensed material. Although this issue should be corrected, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the Enforcement Policy.

Licensee staff took immediate action to bring the scrubber project into compliance with procedure P&P 10-10 by assigning an NCS engineer to review the change. The licensee also initiated an unusual incident report and an extent of condition review. Corrective actions associated with bringing the scrubber project into compliance with procedure P&P 10-10 and corrective actions associated with the extent of condition review will be tracked as **IFI 70-1113/2009-207-02**.

c. Conclusions

A weakness was identified regarding configuration management of an in-process change to a sintering furnace. Other than the weakness described above, no safety concerns were identified during facility walkdowns.

6.0 Open Item Review

IFI 70-1113/2009-202-02

During a previous inspection, the inspector observed that when the licensee staff identified a deficiency during an audit, the deficiency was noted and later determined to be a potential non-compliance, finding, or observation. Procedure P&P 40-06 and NSI E-2.0 defines potential non-compliance but does not define finding and observation. Licensee staff agreed to update both procedures to define what an observation and finding are to ensure consistency between auditors regarding what is a finding or an observation. During the current inspection the inspector determined that the licensee had added adequate definitions of finding and observation to Procedure P&P 40-06 and NSI E-2.0. This item is closed.

7.0 Exit Meeting

The inspector communicated observations and findings to the licensee's management and staff throughout the week of the inspection and presented the final results to the licensee's management during an exit meeting held on December 4, 2009. The licensee's management acknowledged the results of the inspection and understood the findings presented.

SUPPLEMENTARY INFORMATION

1.0 Items Opened, Closed, and Discussed

Items Opened

- 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&P 10-10 and corrective actions associated with the extent of condition review.

Items Closed

- IFI 70-1113/2009-202-02** Tracks the licensee's corrective actions associated with updating NSI E-2.0 and P&P 40-06 to incorporate definitions of finding and observation.

2.0 Inspection Procedures (IP) Used

- IP 88015 Nuclear Criticality Safety Program
IP 88016 Nuclear Criticality Safety Evaluations and Analyses

3.0 Key Points of Contact

Global Nuclear Fuel

- Q. Ao Criticality Safety Engineer
C. Bough Logistics
J. DeGolyer Criticality Safety Engineer
G. Dickman Dry Conversion
M. Dodds Senior Criticality Safety Engineer
S. Fuller GNF Chief Operating Officer
A. Kennedy GLE-Licensing
A. Mabry Radiation Safety Program Manager
A. Mulligan Manager, GNF-A Quality
S. Murray Manager, Licensing
L. Paulson Manager, Nuclear Safety
J. Reeves Manager, Integrated Safety Analysis
J. Reynolds Manager, Fuels EHS
J. Rohner Criticality Safety Engineer
A. Thomas Criticality Safety Engineer
A. Vexler FMO Operations Leader
J. Zino Manager, Criticality Safety

NRC

D. Morey Senior Criticality Safety Inspector

All attended the exit meeting on December 4, 2009

4.0 List of Acronyms and Abbreviations

| | |
|-----------------|--|
| ADAMS | Agency-wide Documents Access and Management System |
| CSA | criticality safety analysis |
| CFR | code of federal regulations |
| GNF | Global Nuclear Fuels - America (licensee) |
| IP | inspection procedure |
| IFI | Inspection Follow-up Item |
| IROFS | item relied on for safety |
| NCS | nuclear criticality safety |
| NSI | Nuclear Safety Instruction |
| P&P | Practices and Procedures |
| UO ₂ | uranium dioxide |
| UIR | Unusual Incident Report |