

February 22, 2008

EN 43897

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

SUBJECT: INSPECTION REPORT NO. 70-1113/2008-201

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 January 28 – February 1, 2008. 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 February 1, 2008.

The inspection, which is described in the enclosure, focused on NCS analysis, risk-significant NCS controls, items relied on for safety, and principal management measures for ensuring that NCS controls are capable, available, and reliable. The inspection consisted of NCS analytical basis review, selective examinations of relevant procedures and records, examinations of NCS-related equipment, interviews with plant personnel, and facility walkdowns to observe in-plant conditions and activities related to NCS assumptions and controls. Throughout this inspection, observations were discussed with your managers and staff. As a result of this inspection, no violations of NRC requirements were identified.

J.D. Fuller

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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/

Deborah A. Jackson, Chief
Technical Support Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

Docket No.: 70-1113

Enclosure: Inspection Report No. 70-1113/2008-201

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.: 70-1113/2008-201

Licensee: Global Nuclear Fuel - Americas, LLC

Location: Wilmington, North Carolina

Inspection Dates: January 28 – February 1, 2008

Inspector: Thomas Marenchin, Criticality Safety Inspector

Approved: Deborah A. Jackson, Chief
Technical Support Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

ENCLOSURE

**Global Nuclear Fuel - Americas, LLC Fuel Fabrication Facility
NRC Inspection Report 70-1113/2008-201**

EXECUTIVE SUMMARY

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 January 28 – February 1, 2008. The inspection 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, and pellet pressing operations.

Results

- No safety concerns were identified regarding the licensee NCS program.
- No safety concerns were identified during review of NCS audits.
- No safety concerns were identified regarding the licensee NCS event review and follow-up.
- No safety concerns were identified regarding the licensee NCS training program.
- No safety concerns were identified regarding the licensee criticality alarm system.
- No safety concerns were identified during walkdowns of plant operations.

REPORT DETAILS

1.0 Plant Status

Global Nuclear Fuels - America, LLC 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 to UO₂ with a DCP and performing normal powder, UO₂ 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 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:

- CSA [Criticality Safety Analysis], "General HEPA Floorstorage," Revision 1, dated November 27, 2007
- CSA, "Shipment of Loose Rods in RAJ-II," Revision 1, dated November 1, 2007
- CSA, "Gadolinia Slugger Lower Section," Revision 1, dated June 4, 2007
- NSR/R [Nuclear Safety Release/Requirements] 01.19.06, "Chemical PTLBLEND Conveyor," Revision 2, dated May 14, 2001
- NSR/R 03.03.18, "Fabricat Press Pellet-Hard," Revision 5, dated October 30, 2007
- NSR/R 03.05.03, "Fabricat Grind Grinder," Revision 13, dated April 4, 2006
- NSR/R 05.01.06, "Gadolinia Mezz Rotary-Slug," Revision 6, dated June 2, 2007
- NSR/R 06.01.14, "CHEMET-L Wet-Lab Standard-CAB," Revision 3, dated June 25, 1998
- FTI [Functional Test Instruction] F6, "42-KG Mass Control of Holdup in Integration Gad Slugger and Granulator," Revision 3, dated January 29, 2008
- TOP [Temporary Operating Procedure] #20073298, "Transport and Storage of GH Material in Station 130," Revision 0, dated September 27, 2007
- "Tap Root Investigation Report – Improper Storage of Chemet Lab Scrap Containing Wet ADU [ammonium diurate]," dated January 25, 2008

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, that subcriticality of the systems and operations was assured through appropriate limits on controlled parameters, and that double contingency was assured for each credible accident sequence leading to inadvertent criticality. The inspector

determined that appropriate NCS controls were identified in analysis and that the controls as identified for equipment and processes assured the safety of the operations.

c. Conclusions

No safety concerns were identified regarding the licensee NCS program.

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

a. Inspection Scope

The inspector reviewed licensee internal audit procedures, records of previously completed audits of fissile material operations, and records of NCS infractions. The inspector observed a licensee audit team conduct an audit in the DCP homogenization lines and blend/press/granulate lines. The inspector reviewed selected aspects of the following documents:

- NSI E-2.0, "Internal Nuclear Safety Audits," Revision 40, dated October 2, 2006
- #3982, "WTF [Waste Treatment Facility], Pads, Residue Scan, Warehouse #2," dated December 11, 2007
- #3964, "Residue/Scan Area, Scrap Pack, NFS Shipping Area," dated December 18, 2007
- #3963, "Shipping Warehouse, Box Factory" dated December 18, 2007
- #3946, "QA Labs," dated December 4, 2007
- #3805, "Residue Scan, SPF [Scrap Pack Facility], NFS Shipping Area," dated September 25, 2007

b. Observations and Findings

The inspector found that NCS audits were conducted according to procedural requirements. The inspector noted that NCS audits were focused on determining that plant operational requirements conform to those listed in the applicable NCS specification documents. In review of the findings/observations found during the audits the inspector noted that the licensee's was tracking the corrective actions for the findings/observations until they were completed.

c. Conclusions

No safety concerns were identified during review of NCS audits.

4.0 Nuclear Criticality Safety Event Review and Follow-up (IP 88015, 88016)

a. Inspection Scope

The inspector reviewed three recent NCS-related events that the licensee had reported to NRC. The inspector reviewed licensee investigation reports, interviewed NCS engineers and operators, and performed walkdowns of selected work areas.

b. Observations and Findings

The inspector observed that the selected licensee reportable events were investigated in accordance with written procedures and that appropriate corrective actions were assigned and tracked. The licensee reported a loss of spacing control in event notice (EN) 43897 involving Chemet Lab Scrap containing wet ADU. The licensee has since placed the cans containing the Chemet Lab Scrap on skids on the correct conveyor. The inspector noted that during the Tap Root Investigation the licensee had identified corrective actions to ensure that this condition will not reoccur. This event is closed.

c. Conclusions

No safety concerns were identified regarding the licensee NCS event review and follow-up.

5.0 Nuclear Criticality Safety Training and Qualification (IP 88015)

a. Inspection Scope

The inspector reviewed the content of the Criticality Safety Engineer (CSE) training for new employees. The inspectors evaluated the effectiveness of the licensee training through interviews with NCS. The inspector reviewed selected aspects of the following document:

- CSE Training and Qualification Manual, Revision 3, dated October 2007

b. Observations and Findings

The inspector reviewed the CSE training and qualification manual, which was comprised of various items that a new employee would have to review and/or complete before earning a CSE qualification. The inspector determined that the training effectively identified items that a new NCS engineer would need to complete to become qualified as a NCS engineer.

c. Conclusions

No safety concerns were identified regarding the licensee NCS training program.

6.0 Criticality Alarm Systems (IP 88017)

a. Inspection Scope

The inspector reviewed documentation of criticality accident alarm detector coverage, interviewed engineering staff, and performed facility walkdowns to determine the adequacy of the licensee criticality alarm system and the proposed new licensee criticality warning system (CWS).

b. Observations and Findings

The inspector discussed with the licensee's staff, the placement of the new CWS detectors to ensure that the detectors are placed in accordance with the criteria described in 10 CFR 70.24.

c. Conclusions

No safety concerns were identified regarding the licensee criticality alarm system.

7.0 Plant Operations (IP 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.

b. Observations and Findings

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

c. Conclusions

No safety concerns were identified during walkdowns of plant operations.

8.0 Open Item Follow-up

VIO 70-1113/2007-203-02

This violation concerned the failure to verify the composition or periodically verify the integrity of polyvinylchloride (PVC) pipe in the gadolinia slugger press. Specifically, the PVC piping that was installed in the gadolinia slugger press was necessary to meet the license-required subcritical limit. The PVC piping used as fixed neutron absorber and required by the license prior to first use have the composition of the absorber measured and document and in addition periodic verification of the integrity of the neutron absorber subsequent to installation. The inspector determined that the licensee has established periodic verification of the integrity of the neutron absorber after maintenance on the gadolinia slugger. This item is closed.

VIO 70-1113/2007-203-03

This violation concerned the failure to ensure that criticality controls in the new revision of the integrated safety analysis (ISA) were current and properly documented. Specifically, numerous examples of criticality controls that were not described as item relied on for

safety (IROFS) in the new ISA revision but were required to be in place according to criticality analysis. The inspector determined that the licensee had updated the ISA to include 12 new IROFS and that additional reviews are being conducted and are expected to be completed by April 2008. This item is closed.

9.0 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 February 1, 2008. 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

VIO 70-1113/2007-203-02

Failure to verify the composition or periodically verify the integrity of PVC pipe in the gadolinia slugger press.

VIO 70-1113/2007-203-03

Failure to ensure that criticality controls in the new revision of the ISA were current and properly documented.

Items Discussed

None

2.0 Event Reports Reviewed

EN 43897 Closed

Loss of spacing control of Chemet Lab Scrap containing wet ADU.

3.0 Inspection Procedures Used

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

ATTACHMENT

4.0 Key Points of Contact

Global Nuclear Fuel

A. Allen	Material Control and Accountability Specialist
E. Anderson	Manager, Emergency Preparedness and Site Security CEO
Q. Ao	Principal Criticality Safety Engineer
C. Bough	Logistics
C. Buddin	Manager, Chemet Lab
J. DeGolyer	Criticality Safety Engineer
G. Dickman	FMO Process Engineer
M. Dodds	Senior Criticality Safety Engineer
P. Fitzgerald	Material Control and Accountability Specialist
G. Gardner	Facilities
A. Heppner	GNF-A Logistics Team Leader
A. Hilton	Engineer, Dry Conversion
N. Holmes	Manager, Global Supply Chain
H. Knight	Manager, Fuels Environmental Health and Safety (EHS)
T. Leik	COE, Environmental
T. Leister	Manager, Manufacturing
G. Luft	Program Manager, Growth
A. Mabry	Manager, Radiation Safety Program
K. Maloy	COE, Radiological Protection
R. Martin	Manager, Material control and Accountability
P. Mathur	Environmental Engineer EHS
K. McGowan	Engineer, Dry Conversion
C. Moneta	Manager, EHS
S. Murray	Manager, Licensing & Liabilities
S. O'Connor	Environmental Engineer
P. Ollis	Licensing Engineer
L. Paulson	Manager, Nuclear Safety
L. Quintana	EHS Licensing
J. Reeves	Manager, Integrated Safety Analysis
C. Roche	Manager, Services EHS
C. Savage	Engineer, Dry Conversion
D. Wilson	Senior Administrative Specialist Licensing & Liabilities
J. Zino	Program Manager, Criticality Safety

NRC

C. Cramer	Fuel Facility Inspector, NRC Region II
D. Jackson	Chief, Technical Support Branch, NRC Headquarters
J. Jimenez	MC&A Inspector, NRC Region II
G. Kuzo,	Acting Branch Chief, NRC Region II DFFI
O. Lopez	Fuel Facility Inspector, NRC Region II
T. Marenchin	Criticality Safety Inspector, NRC Headquarters

All attended the exit meeting on February 1, 2008.

5.0 List of Acronyms and Abbreviations

ADAMS	Agency-wide Documents Access and Management System
ADU	ammonium diurate
CSA	criticality safety analysis
CSE	Criticality Safety Engineer
CWS	criticality warning system
DCP	dry conversion process
EN	event notice
FTI	Functional Test Instruction
GNF	Global Nuclear Fuels - America (licensee)
IP	inspection procedure
IROFS	item relied on for safety
ISA	integrated safety analysis
NCS	nuclear criticality safety
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	Nuclear Regulatory Commission
PVC	polyvinylchloride
SPF	Scrap Pack Facility
TOP	Temporary Operating Procedure
UO ₂	uranium dioxide
VIO	violation
WTF	Waste Treatment Facility