



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET SW SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

June 9, 2000

Global Nuclear Fuel - Americas, L.L.C.  
ATTN: Ms. C.A. Reda, Manager  
GNF-A Fuel Manufacturing  
P. O. Box 780  
Wilmington, NC 28402

SUBJECT: NRC INSPECTION REPORT NO. 70-1113/2000-003 AND NOTICE OF VIOLATION

Dear Ms. Reda:

This letter refers to the inspection conducted on May 8-12, 2000, at the Wilmington facility. The enclosed report presents the results of this inspection.

Based on the results of the inspection, certain of your activities appeared to be in violation of NRC requirements, as specified in the enclosed Notice of Violation (Notice). However, the NRC has concluded that information regarding the reason for the violations, the corrective actions taken and planned to correct the violation and prevent recurrence is already adequately addressed in this Inspection Report (70-1113/2000-03). Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

In accordance with 10 CFR 2.790, of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be made publically available.

Should you have any questions concerning this letter, please contact us.

Sincerely,

**/RA/**

Edward J. McAlpine, Chief  
Fuel Facilities Branch  
Division of Nuclear Materials Safety

Docket No. 70-1113  
License No. SNM-1097

Enclosures: (See Page 2)

Enclosures: 1. Notice of Violation  
2. NRC Inspection Report

cc w/encls:

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Facility Licensing  
Global Nuclear Fuel - Americas, L.L.C.  
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## NOTICE OF VIOLATION

Global Nuclear Fuel - Americas  
Wilmington Fuel Manufacturing Operation

Docket No. 70-1113  
License No. SNM-1097

During an NRC inspection conducted on May 8 through 12, 2000, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

Safety Condition No. S-1 of Special Nuclear Material License No. 1097, requires that material be used in accordance with statements, representations, and conditions in the License Application dated June 5, 1997, and supplements thereto.

Section 3.9 of the License Application requires that material processing or activities will be conducted in accordance with properly issued and approved operating procedures.

Operating procedure 1070.26 requires that the siletta vibratory feeder in the gad shop powder feed hood be removed from the press feed system for cleaning by disconnection of flange joints located below and above the joint.

Contrary to the above, on January 10, 2000, the licensee failed to properly remove the vibratory feeder for system cleaning, causing a misadjustment of the equipment, and loss of a criticality safety control.

This is a Severity Level IV violation (Supplement VI).

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence and the date when full compliance will be achieved is already adequately addressed on the docket in this Inspection Report. However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation," and send it to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Regional Administrator, Region II, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

If you choose to respond, your response will be made publically available. To the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made publically available without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld, and provide in detail the bases for your claim of withholding (e.g. explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the

Enclosure 1

information required by 10 CFR 2.790(b) to support a request for withholding confidential, commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated at Atlanta, Georgia  
this 9<sup>th</sup> day of June, 2000

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1113

License No.: SNM-1097

Report No.: 70-1113/2000-003

Licensee: Global Nuclear Fuel - Americas, L.L.C.  
Wilmington, NC 28402

Facility Name: Nuclear Energy Production

Dates: May 8 - 12, 2000

Inspectors: D. Ayres, Senior Fuel Facility Inspector

Approved by: E. J. McAlpine, Chief  
Fuel Facilities Branch  
Division of Nuclear Materials Safety

## EXECUTIVE SUMMARY

### Global Nuclear Fuel - Americas NRC Inspection Report 70-1113/2000-003

The primary focus of this routine unannounced inspection was the evaluation of the licensee's conduct of plant operations, maintenance/surveillance, and training. The report covered a one-week period and included the results of the inspection efforts of one regional fuel facility inspector.

#### **Plant Operations**

- The facility was operated safely and in accordance with regulatory and license requirements. Personnel complied with nuclear criticality and radiological safety requirements. Housekeeping was adequate to ensure routes of egress were clear in case of an emergency (Paragraph 2.a.3).
- The licensee's investigation of two recent events were very thorough with strong corrective actions. Due to the safety significance of the powder spill event combined with prior opportunity to implement corrective action, the event were identified as Violation (VIO) 00-03-01 (Paragraph 2.b.3).

#### **Maintenance/Surveillance**

- Functional test instructions were well written and approved by safety management. Calibration instructions for in-line uranium monitors and moisture detectors were not fully formalized and approved by safety management. A weakness existed where the functionality of safety controls could be altered through the calibration process without being reviewed and approved by safety management (Paragraph 3.a.3).
- Annual calibrations of uranium monitors and pipe detectors in the uranium recovery area and moisture detectors for dry uranium powder were being performed adequately at the prescribed frequency (Paragraph 3.b.3).

#### **Training**

- Training for new pelleting area employees provided a good introduction to the safety aspects of specific work areas (Paragraph 4.a.3).

## REPORT DETAILS

### **1. Summary of Plant Status**

This report covered the efforts of one regional inspector during a one-week inspection. Pellet production, rod loading, bundle assembly, and uranium recovery continued operations at near normal levels. There were no unusual plant operational occurrences reported during the onsite inspection.

### **2. Plant Operations (O3) (IP 88020)**

#### a. Conduct of Operations (O3.01) and Housekeeping (O3.06)

##### (1) Inspection Scope

Plant operations were reviewed to verify adherence to safety requirements and that safety controls identified in operating procedures were available to perform their intended function. Housekeeping associated with the storage of equipment and materials throughout the facility was also reviewed to assure significant potential hazards did not exist.

##### (2) Observations and Findings

The inspector observed operations in the Uranium Recovery Unit (URU) area and conducted interviews with operators and engineering staff. The inspector observed that a water line break had occurred above the uranium recovery oxidation furnace, spilling water over the furnace control panel and onto a uranium storage area. The inspector found that cans of stored uranium had been properly protected or relocated to prevent water intrusion into the storage containers. The inspector also found that the area supervision had taken appropriate steps to protect furnace electrical components from damage and workers from an electrical hazard.

During tours of the facility, the inspectors noted radiological signs, postings, and procedures were properly posted or readily available. The inspector observed conditions and determined that equipment and devices used to confine and contain radioactive contamination and airborne radioactivity in fuel processing and other areas were in proper working condition, and that proper personal protective clothing and dosimetry were issued and properly worn.

During process area tours, the inspector noted that emergency egress routes were adequately clear of debris.

##### (3) Conclusions

The facility was operated safely and in accordance with regulatory and license requirements. Personnel complied with nuclear criticality and radiological safety requirements. Housekeeping was adequate to ensure routes of egress were clear in case of an emergency.

b. Review of Previous Events (O3.07)

(1) Inspection Scope

The licensee's responses to two previous events were reviewed to determine if adequate measures had been taken to prevent recurrence.

(2) Observations and Findings

Powder Spill in Gad Dump Station Lower Enclosure

The inspector reviewed event No. 36577 (nuclear material events database (NMED) No. 000028) concerning a spill of 75 kilograms of uranium oxide powder inside a feed hood in the gadolinium shop on January 10, 2000. The licensee's investigation revealed that the spill was due to an incorrectly installed vibratory feeder that was used to feed powder to a pellet press. The vibratory feeder was installed in the feed line with flexible hoses, hose clamps, and flanges. The feeder was supported by wire restraints that connected the feeder body to the upper flange. The procedure for removal of the vibratory feeder required disconnection at the flange joints to avoid disturbance of the hose clamps and wire restraints. The vibratory feeder had been disassembled for a routine enrichment change, but had been removed from the powder feed system by removal of hose clamps and wire restraints. After cleaning, the assembly was reinstalled without tightening of the wire restraints. Thus, the weight of the feeder was not supported and undue stress was placed on the flexible hose instead of the flange. This caused the flexible hose to become loose and powder spilled into the feed hood.

The licensee indicated that a similar incident had occurred in July 1999, spilling 12 kilograms of powder. At that time, the licensee had taken action to revise the disassembly procedure to the currently approved method to avoid disturbance of the hose clamps and wire restraints. However, the incident again occurred in September 1999, spilling 25 kilograms. At that time, operators were retrained on the proper method to be used for equipment disassembly. During the investigation of event No. 36577, the licensee found that three of the four operating shifts did not know the proper method for disassembling the vibratory feeder.

The inspector observed that the station where the spill occurred was maintained under moderation control, but that sources of moderation were available in nearby steam and water piping. The inspector also observed that the feed hood containing the spilled powder was not water-tight, and that doors accessing the spill area were only a few inches above floor level. The inspector determined that these factors made credible the possibility of moderator intrusion into the spilled material and increased the safety significance of the event.

The inspector reviewed the licensee's corrective actions associated with this event. Immediate actions included requiring shift supervision to be present during the removal and installation of the vibratory feeder to ensure the proper method was understood and being used by all operating shifts. Longer term corrective actions included additional training of workers on management expectations and the proper disassembly techniques, revision of the operating procedure to require additional equipment

inspection, additional station lighting, and the installation of photo sensors that would detect a powder spill before it became large enough to be a criticality safety concern. The inspector found that these corrective actions were adequate to prevent recurrence.

The inspector found that the licensee conducted a thorough incident investigation and had strong corrective actions. However, since the event had safety significance and could have reasonably been expected to be prevented by the corrective actions from a previous licensee finding, the failure to follow procedural requirements was identified as Violation (VIO) 00-03-01.

#### Heterogeneous Mass Limit Exceedance on Outdoor Storage Pad

The inspector reviewed event No. 36691 (NMED No. 000107) concerning the storage of gad scrap swarf material in excess of the posted mass limit. This swarf material generally was comprised of uranium dust removed from fuel pellets during the grinding process, but could also contain larger pieces of broken fuel pellets. Because of the possibility of containing these larger pieces, the swarf material was treated as heterogeneous material in the criticality safety analysis used to develop container mass limits. However, shop support personnel had been characterizing swarf material as homogenous material. Since heterogeneous material had a lower container mass limit, several containers of swarf material were being stored in excess of the heterogeneous mass limit of 16.5 kilogram net weight, but were within the homogeneous limit of 25 kilogram net weight. The design of the container storage pad kept all containers separated from all other containers such that geometry control was maintained during the event. The inspector found that a large margin of safety was built into the system's container mass limits and geometry controls such that the failure of identifying the material as heterogeneous constituted a violation of minor significance and not subject to formal enforcement action. The inspector also found that the licensee conducted a thorough incident investigation and had strong corrective actions.

#### (3) Conclusions

The licensee's investigations of two recent events were thorough with strong corrective actions. Due to the safety significance of the powder spill event combined with prior opportunity to implement corrective action, the event were identified as VIO 00-03-01.

### **3. Maintenance/Surveillance (F1) (IP 88025)**

#### a. Work Control Procedures (F1.02) and Work Control Authorizations (F1.03)

##### (1) Inspection Scope

Work control procedures and functional test instructions were reviewed for safety related controls in the uranium recovery and conversion process areas to verify that instructions were available and adequate to ensure that the safety controls could perform their intended function.

##### (2) Observations and Findings

The inspector reviewed the active engineered safety controls (AECs) identified in selected operating procedures for the uranium recovery area. The inspector reviewed the list of functional test instructions (FTIs) and found that each of the identified AECs had a corresponding FTI for testing the functionality of that control. The inspector reviewed selected FTIs and found that the instructions provided for adequately testing the controls' safety function. The inspector also found that FTIs were adequately reviewed and approved by safety management.

The inspector reviewed the work instructions for performing calibrations of certain equipment important to safety. The inspector discussed calibration of uranium monitors and pipe detectors with the licensee's calibration personnel. These instruments were used to determine the uranium content of liquids prior to and during transfer to unfavorable geometry vessels. The inspector found the calibration personnel very knowledgeable in the method(s) used for performing the calibrations of these detectors. The inspector also found that the instructions for properly preparing the system for calibration, performing the calibration, interpreting the calibration data, and making system adjustments were not well documented. Instructions for performing the calibrations were documented in a manual written by a licensee staff member. This manual appeared well-written but was not formally approved by safety management in the manner that FTIs were approved. The remainder of the calibration operation (equipment cleaning and preparation, data manipulation, etc.) appeared to be performed by "skill of the craft" since no formal procedure approved by safety management existed to complete these actions. In addition, the inspector found that only three of the licensee's staff were trained and permitted to perform these calibrations. The inspector determined that the combination of informal procedures and few knowledgeable staff was a weakness in the licensee's system for calibration of uranium monitors and pipe detectors.

The inspector reviewed the calibration instructions for the moisture detectors used in various uranium powder hoppers to monitor moderating materials for criticality safety purposes. All of the instructions for performing this calibration were included in a calibration work order and appeared to be detailed enough to adequately complete the calibration. However, as with the calibration of uranium monitors and pipe detectors, these instructions were not reviewed and approved by safety management. The inspector found that this was another example of a weakness in the management of the functionality of safety controls.

The inspector discussed this apparent inconsistency between FTIs and calibration instructions, where both can significantly affect the functionality of safety controls, but only FTIs were reviewed and approved by safety management. Licensee management agreed to review and address the issue as needed.

(3) Conclusions

Functional test instructions were well written and approved by safety management. Calibration instructions for in-line uranium monitors and moisture detectors were not fully formalized and approved by safety management. A weakness existed where the functionality of safety controls could be altered through the calibration process without being reviewed and approved by safety management.

b. Calibrations of Equipment (F1.07)

(1) Inspection Scope

Equipment calibrations of certain safety controls identified in procedures or safety analyses were reviewed to verify they were being performed at the prescribed frequency to assure continued operability.

(2) Observations and Findings

The inspector reviewed the calibration records of the uranium monitors and pipe detectors in the uranium recovery area. Calibration of this equipment was required annually (no longer than 13 months). The inspector found no instances where calibrations were performed beyond the 13 month time span. The inspector also reviewed the calibration records for uranium powder moisture detectors used in the dry conversion and dry scrap recycle processes. Testing of this equipment was required monthly and calibration was required annually. The inspector found a few incidents where the monthly equipment tests were performed nearly two months apart, but the impact on functionality of the equipment was minimal. The inspector also found that the annual calibrations were completed on time and often performed a few months early to avoid scheduling conflicts.

(3) Conclusions

Annual calibrations of uranium monitors and pipe detectors in the uranium recovery area and moisture detectors for dry uranium powder were being performed adequately at the prescribed frequency.

**4. Training (F2) (IP 88010)**

a. Operating Procedure Training (F2.05)

(1) Inspection Scope

Operator training for new employees was reviewed to verify that it adequately addressed and emphasized safety controls in their specific work areas.

(2) Observations and Findings

The inspector attended training sessions for new employees being assigned in the pelleting areas. The inspector observed that the training emphasized the safety of the operations as top priority, and gave examples of safety significant controls. The training also focused on proper radiation protection requirements and techniques for that work area, configuration management of equipment and controls, and lessons learned from the 1999 Tokai-mura criticality accident and other recent incidents. The inspector found these training sessions to be a good introduction into the safety aspects specific to the pelleting work areas.

(3) Conclusions

Training for new pelleting area employees provided a good introduction to the safety aspects of specific work areas.

**5. Exit Meeting**

On May 12, 2000, the inspection scope and results were summarized with licensee representatives. The inspector discussed, in detail, the routine program areas inspected, and the findings, including any apparent violation(s). No dissenting comments were expressed by the licensee. Although the licensee identified materials provided during the inspection as proprietary, that information is not contained in this report.

## ATTACHMENT

### **PARTIAL LIST OF PERSONS CONTACTED**

#### Licensee Personnel

- \*R. Crate, Manager, Fuel Fabrication
- \*J. Earnhart, Manager, GNF Nuclear Measurements
- \*M. Enger, Manufacturing Engineer
- \*D. Hassler, Maintenance Team Leader
- \*C. Monetta, Manager, GNF Environment, Health and Safety
- \*L. Paulson, Manager, Nuclear Safety
- J. Pickett, GNF Nuclear Measurements
- \*C. Reda, Manager, GNF Production

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

\* Denotes those present at the exit meeting on May 12, 2000.

### **INSPECTION PROCEDURES USED**

IP 88010	Operator Training/Retraining
IP 88020	Regional Nuclear Criticality Safety Inspection Program
IP 88025	Maintenance and Surveillance
TI 2600/003	Plant Operations

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### Opened

70-1113/00-03-01    VIO    Failure to follow procedure for disassembly of vibratory feeder.

### **ABBREVIATIONS AND ACRONYMS**

AECs	Active Engineered Controls
FTIs	Functional Test Instructions
GNF	Global Nuclear Fuels
IP	Inspection Procedure
NMED	Nuclear Material Events Database
TI	Temporary Instruction
URU	Uranium Recovery Unit
VIO	Violation