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NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-8931**

August 15, 2003

NMED No. 030390

Global Nuclear Fuel - Americas, L.L.C.
ATTN: Mr. J. D. Fuller, Chief Executive Officer
and Facility Manager
Global Nuclear Fuel - Americas, L.L.C.
P. O. Box 780
Wilmington, NC 28402

SUBJECT: NRC INSPECTION REPORT NO. 70-1113/2003-04

Dear Mr. Fuller:

This report refers to the inspection conducted from July 14 -18, 2003, at your Wilmington facility. The purpose of the inspection was to determine whether activities authorized by your license were conducted safely and in accordance with United States Nuclear Regulatory Commission (NRC) requirements. At the conclusion of the inspection, the findings were discussed with the members of your staff who are identified in the enclosed report.

The areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress within the plant.

Based on the results of the inspection, no violations or deviations were identified.

In accordance with 10 CFR 2.790 of NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in NRC's Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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

Sincerely,

/RA BY DEBORAH A. SEYMOUR ACTING FOR/

David Ayres, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

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

Enclosure: (See Page 2)

Enclosure: NRC Inspection Report

cc w/encl:

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1113

License No.: SNM-1097

Report No.: 70-1113/2003-04

Licensee: Global Nuclear Fuel - Americas, L.L.C.

Location: Wilmington, NC 28402

Dates: July 14 - 18, 2003

Inspector: W. Gloersen, Sr. Fuel Facility Inspector

Accompanying
Personnel: C. Noelke, Student Engineer

Approved By: D. Ayres, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

Global Nuclear Fuel - Americas, L.L.C.
NRC Inspection Report 70-1113/2003-04

This routine, announced inspection involved observation and evaluation of the licensee's programs for management controls and maintenance and surveillance. The inspection identified the following aspects of the licensee's programs:

Management Controls

- The maintenance organization was changed to allow for better coordination among the various maintenance disciplines. In addition, the Maintenance Team Leader's experience was commensurate with his assigned responsibilities, functions, and authorities (Paragraph 2.a).
- Maintenance staff were trained on the recent changes made to the configuration management program procedure. The process for approving procedures complied with the license application requirements (Paragraph 2.b).

Maintenance and Surveillance

- The observed maintenance activities were properly performed and in accordance with maintenance authorizations, work control procedures, and radiation work permits. Planned work orders were properly authorized and signed. The change control process for maintenance work was implemented in accordance with practices and procedures. Appropriate functional testing instructions were established for various pieces of equipment (Paragraph 3.a).
- Maintenance personnel were experienced and demonstrated adequate knowledge of safety controls of the process equipment (Paragraph 3.b).
- Crane calibrations and maintenance inspections were performed safely and in accordance with approved procedures (Paragraph 3.c).
- Calibrations of selected hydrofluoric (HF) and hydrogen (H₂) monitors had been performed adequately and at the appropriate frequency (Paragraph 3.d).
- The licensee's emergency responses to a loss of criticality detector coverage were adequate for maintaining acceptable levels of safety. In addition, the licensee's corrective actions that were initiated or planned to be initiated as specified in the unusual incident report associated with the loss of criticality detector coverage provided reasonable assurance of acceptable levels of corrective maintenance and management measures.
- Proper clean-up and corrective actions were taken after a nitrogen puff event in the powder outlet area (Paragraph 3.f).

Attachment:

Persons Contacted

Inspection Procedures

List of Items Opened, Closed, and Discussed

List of Acronyms

REPORT DETAILS

1. Summary of Plant Status

This report covered a five-day period. During the inspection period, the licensee was in a planned maintenance outage.

2. Management Controls (IP88005) (O5)

a. Organizational Structure

(1) Inspection Scope

The inspectors reviewed changes in personnel responsibilities and functions that had occurred during the last 12 months and verified that requirements in the license concerning personnel qualifications were being met.

(2) Observations and Findings

The inspectors discussed with the licensee the organizational changes and changes in personnel responsibilities that occurred, specifically in the maintenance area during the past 12 months. Within that period, the licensee had created four Maintenance Coordinator positions (mechanical/electrical, ventilation, controls, and instruments) that reported to a Maintenance Team Leader. The inspectors verified that the Maintenance Team Leader's experience was commensurate with his assigned responsibilities, functions, and authorities. The maintenance organization was changed to allow for better coordination among the four maintenance disciplines.

(3) Conclusion

The maintenance organization was changed to allow for better coordination among the four maintenance disciplines. In addition, the Maintenance Team Leader's experience was commensurate with his assigned responsibilities, functions, and authorities.

b. Procedural Controls

(1) Inspection Scope

The inspectors reviewed the licensee's process for approving procedures, including a review of selected procedures pertaining to maintenance and configuration management.

(2) Observations and Findings

The inspectors reviewed the following maintenance and configuration management procedures:

- Practices and Procedures (P/P) 05-05, Functional Test Instructions, Revision 0, July 17, 2002

- P/P 10-10, Configuration Management Program - Fuel Manufacturing, Revision 6, May 9, 2003
- PRI 12-01, Scale and Balance Program, January 22, 2003
- PRI 12-03, Calibration Program for Instruments and Controls, Revision 1, October 10, 2001

The inspectors verified that these procedures complied with the licensee's process for approving procedures and with license application requirements. In addition, the procedure control process required review and approvals by the appropriate organizational unit for significant changes made to the procedures. The inspectors also verified that maintenance personnel were trained on the changes made to procedure P/P 10-10, Configuration Management Program - Fuel Manufacturing, in June 2003.

(3) Conclusion

Maintenance staff were trained on the recent changes made to the configuration management program procedure. The process for approving procedures complied with the license application requirements.

3. Maintenance and Surveillance (IP 88025) (F1)

a. Conduct of Maintenance
Work Control Procedures
Work Control Authorization

(1) Inspection Scope

The inspectors observed selected maintenance activities being performed in the Dry Conversion Process (DCP) process area to verify that maintenance authorizations, work control procedures, and radiation work permits (RWPs) were being followed.

(2) Observations and Findings

The inspectors observed selected aspects of the following maintenance activities during the facility's planned outage: (1) replacement of the Line 1 kiln two-section reactor with a one section reactor, and (2) installation of piping modifications on the Line 2 vaporization system. Additionally, the inspectors observed several of the twice daily plan-of-the-day maintenance meetings that provided the operations, maintenance, and safety staff the status of the maintenance work performed or scheduled. The daily meetings assured that the planned maintenance activities were conducted safely and on schedule.

The inspectors reviewed the change control process. It should be noted that the two maintenance activities selected by the inspectors involved examples of both a minor change control process (Line 1 reactor) and a major modification (Line 2 vaporization

pipings modifications). The inspectors reviewed the following: (1) P/P 10-10, Configuration Management Program - Fuel Manufacturing, Revision 6; (2) Change Initiation Requests (CIRs); (3) Change Request Reports (CRRs); and (4) Maintenance Work Orders. For the maintenance work noted above, the inspectors verified that the authorizations from the appropriate safety disciplines were provided on the CIRs. Since the Line 1 reactor replacement involved a "like kind" replacement, the inspectors noted that a revision to the operating procedure was not needed. For the Line 2 vaporization piping modification project, the inspectors verified that the affected operating procedure was in the process of being revised. The procedural revisions had not been completed since the piping modification work was on-going at the time of this inspection. The inspectors also verified that the equipment drawings and piping and instrumentation diagrams had been red-lined and in the revision process. The inspectors noted that the detailed equipment drawing of the Line 1 reactor system was considered proprietary by the equipment manufacturer. Hence, the licensee was experiencing technical challenges in obtaining a detailed drawing in order to make the necessary revisions.

The inspectors observed that maintenance personnel adhered to the applicable work control procedures and RWPs for the two maintenance activities noted above. The licensee relied on the skill of the craft and experience of the maintenance personnel. The inspectors verified that maintenance personnel were familiar with the work requests and procedural guidance for making either modifications to or replacement of the equipment. The inspectors also verified that the licensee had established functional testing instructions that were to be used to perform pre-start-up functional tests of the modified or replaced equipment.

(3) Conclusion

The observed maintenance activities were properly performed according to maintenance authorizations, work control procedures, and radiation work permits. Planned work orders were properly authorized and signed. The change control process for maintenance work was implemented in accordance with practices and procedures. Appropriate functional testing instructions were established for various pieces of equipment.

b. Qualifications of Maintenance Personnel

(1) Inspection Scope

The inspectors interviewed maintenance personnel and supervisors regarding work experience to verify their qualification for the jobs performed.

(2) Observations and Findings

The inspectors noted that the maintenance personnel that were interviewed were knowledgeable of safety controls of the systems. The inspectors also verified that the maintenance personnel knew that any work they performed had to be approved prior to starting. The inspector noted that the licensee's maintenance staff was experienced with approximately 15 years of experience at the facility and that the licensee relied on the skill of the maintenance craft to perform various maintenance activities.

(3) Conclusion

Maintenance personnel were experienced and demonstrated adequate knowledge of safety controls of the process equipment.

c. Surveillance Testing

(1) Inspection Scope

The inspectors observed selected crane calibration and maintenance testing that was performed in various areas of the DCP facility.

(2) Observations and Findings

The inspectors observed crane calibration and maintenance testing to verify that maintenance was being performed adequately and in accordance with procedures. The inspectors verified that the required maintenance inspections on selected cranes were performed safely and in accordance with management approved procedures.

(3) Conclusion

Crane calibrations and maintenance inspections were performed safely and in accordance with approved procedures.

d. Calibrations of Equipment

(1) Inspection Scope

The inspectors reviewed selected 2003 calibration records for the hydrogen (H₂) and hydrofluoric (HF) acid detectors throughout the facility to verify that they were performed in accordance with approved procedures and at the frequency specified by the procedures.

(2) Observations and Findings

The inspectors reviewed records for selected calibrations performed in 2003 of both the H₂ and HF monitors located in various areas of the plant, including the heating, air conditioning, and ventilation room; conversion room; kiln area; and the HF Building. The inspectors verified that the HF and H₂ detectors were calibrated at the appropriate frequency.

(3) Conclusion

The licensee adequately performed the calibrations for the HF and H₂ monitors.

e. Follow-up on Events: Criticality Warning System

(1) Inspection Scope

The inspectors reviewed the circumstances associated with Event Number 39833 which was reported to the NRC Operations Center on May 8, 2003. This event involved the temporary loss of two Data Acquisition Modules (DAMs) and the Criticality Warning System (CWS) coverage for the Dry Conversion Process (DCP) following a severe thunderstorm. The inspectors reviewed the licensee's follow-up actions, including the implementation of compensatory measures to restore coverage using portable monitoring equipment. The inspectors also reviewed the corrective maintenance and management measures associated with the CWS.

(2) Observations and Findings

On May 8, 2003, criticality detector coverage of the DCP was lost when two DAMs, which provided redundant criticality detector coverage, were simultaneously rendered inoperable following severe thunderstorm conditions. Although additional DAMs failures occurred in other plant areas, criticality detector coverage for those areas was maintained. The inspectors determined that upon discovery of the failed DAMs, the licensee secured fuel operations, halted all fuel movements, and mobilized portable monitoring equipment to restore criticality detector coverage while the failed DAMs were troubleshooted, replaced, tested, and returned to service.

The inspectors reviewed the event with the Radiological Engineering Program Manager. The testing frequency and procedures of the CWS components were discussed, including a review of the pertinent nuclear safety instrumentation procedure. All detectors were checked monthly with an internal strontium-yttrium check source. In addition, all detectors were calibrated annually with a cesium-137 source.

The inspectors noted that when a DAM is offline as a result of severe weather conditions, it can be reset and then, as a precautionary measure, the licensee performs a source check on all detectors before the system is returned to service. Even without a DAM failure, the licensee performs a source check on all detectors after a lightning strike. The inspectors verified that the results of the tests were documented. In addition, if any maintenance is performed on a detector or the system, the licensee performs a calibration and source check on all detectors in the system before they are returned to service.

The licensee installed photocouples in the outdoor lines that run to the DAMs so that if lightning does strike the ground around these monitors, it cannot pass through the photocouple. The inspectors noted that GNF-A did not use analog monitors or A6B logic chips. Finally, the inspectors verified that the GNF-A system components were installed in accordance with the CWS manufacturer's (Eberline) specifications.

The inspectors reviewed the Unusual Incident Report (UIR) that was associated with this event and the following corrective actions that were taken or planned to be taken: (1) initiate a checklist or proceduralize actions to be taken by the members of the

emergency organization in the Emergency Control Center (ECC) in the event of loss of CWS coverage in Fuel Manufacturing Operations (FMO), Fuel Manufacturing Operations Expansion (FMOX), or outside pads, (2) evaluate detector coverage for bundle assembly and the shipping area to determine if there is a need for additional DAMs and detectors; (3) evaluate the current lightning suppression system in DCP, FMO, and the outside pad area to determine if more lightning protection is needed or if a suppression system is needed. The inspectors concluded that the licensee has taken appropriate corrective actions.

(3) Conclusion

The licensee's emergency responses to a loss of criticality detector coverage were adequate for maintaining acceptable levels of safety. In addition, the licensee's corrective actions that were initiated or planned to be initiated as specified in the UIR associated with the loss of criticality detector coverage provided reasonable assurance of acceptable levels of corrective maintenance and management measures.

f. Follow-up on Events: Nitrogen Puff in Powder Outlet Area

(1) Inspection Scope

The inspectors reviewed an event involving a high airborne condition that occurred on a powder outlet on the dry conversion process line on June 21, 2003.

(2) Observations and Findings

The inspectors reviewed this event with operations and maintenance personnel. On June 21, 2003, a technician was replacing the filters on the outlet of a hopper and a puff of nitrogen entered the hopper. This was a result of the technician removing the filters on the hopper before the pressure in the residual sampling probe system was low enough so as not to cause the nitrogen puff. A maintenance technician and operator were both present in the area at the time of occurrence, and both were wearing respirators. Nasal swabs were collected on the technician that was removing the filter and no detectable radioactivity was measured. Also, the nitrogen was properly isolated and vented after the occurrence. The licensee previously accounted for the separate nitrogen system by bleeding the sample probing system before repairs or filter equipment replacement. The licensee had initiated a UIR, along with corrective actions. As part of the corrective actions, the licensee was planning on developing a separate measurement of the pressure in the sample probing system before removing the hopper filters or making system repairs. The inspectors determined that the corrective actions taken or planned by the licensee were appropriate.

(3) Conclusion

Proper clean-up and corrective actions were taken after a nitrogen puff event in the powder outlet area.

4. Exit Meeting

The inspection's results were summarized on July 18, 2003 with the licensee's management representatives. Although proprietary documents and processes were occasionally reviewed during this inspection, the proprietary nature of these documents or processes has been deleted from this report. No dissenting comments were received from the licensee.

ATTACHMENT

1. **PARTIAL LIST OF PERSONS CONTACTED**

Licensee

- *M. Allen, Program Manager, Emergency Preparedness and Site Security
- *Q. AO, Principal Criticality Safety Engineer
- J. Ball, Manager, Global Supply Chain
- *D. Barbour, Leader, Radiation Protection
- F. Beaty, Principle Engineer
- *K. Clark, DCP Engineer
- *S. Coleman, Material Control and Accounting Engineer
- *R. Crate, Manager, Fuel Manufacturing Operations
- R. Foleck, Program Manager, Facility Licensing
- *B. Hines, Leader, Fuel Manufacturing Operations Technical Resources
- *A. Mabry, Program Manager, Radiological Engineering
- *R. Martyn, Manager, Material Control and Accounting
- M. May, Black Belt/Fuel Manufacturing Operations (FMO)
- *L. Paulson, Manager, Nuclear Safety
- *R. Roessler, Manager, Facilities and Maintenance
- H. Strickler, Manager, Site Environment, Health, and Safety
- *R. Stevens, Leader, FMO Maintenance Support Team
- B. Stokes, Maintenance Coordinator

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

*Attended exit meeting on July 18, 2003

2. **INSPECTION PROCEDURES (IP) USED**

IP 88005 Management and Organization Controls
IP 88025 Maintenance and Surveillance Testing

3. **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Item	Status	Description
Event 39883	Discussed	UIR: CWS coverage lost due to severe weather
June 21, 2003 Event	Discussed	UIR: Nitrogen puff in powder outlet area

4. **LIST OF ACRONYMS USED**

CIRs	Change Initiation Requests
CRRs	Change Request Reports
CWS	Criticality Warning System
DAMs	Data Acquisition Modules
DCP	Dry Conversion Process

FMO	Fuel Manufacturing Operations
FMOX	Fuel Manufacturing Operations Expansion
GNF-A	Global Nuclear Fuel - Americas
H ₂	Hydrogen
HF	Hydrofluoric
IP	Inspection Procedure
IR	Inspection Report
NRC	Nuclear Regulatory Commission
P/P	Practices and Procedures
RWPs	Radiation Work Permits
UIR	Unusual Incident Report