



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION II  
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61 FORSYTH STREET, SW, SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

October 2, 2006

Mr. D. B. Ferguson, Jr.  
President & CEO  
Nuclear Fuel Services, Inc.  
P. O. Box 337, MS 123  
Erwin, TN 37650

SUBJECT: NRC INSPECTION REPORT NO. 70-143/2006-010

Dear Mr. Ferguson:

This refers to the inspection conducted from July 23, 2006, through September 2, 2006, at the Nuclear Fuel Services facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the enclosed report.

Areas examined during the inspection included: Operations, Management Organization and Controls, Transportation, Waste Generation Requirements, Operator Training/Retraining and Strike Contingency Plans. 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 scope of the inspection, violations or deviations were not identified.

This letter and the enclosed report contain sensitive unclassified information and will not be available for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS).

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

Sincerely,

*/RA/*

David A. Ayres, Chief  
Fuel Facility Inspection Branch 1  
Division of Fuel Facility Inspection

Docket No. 70-143  
License No. SNM-124

Enclosure: (See page 2)

D. B. Ferguson, Jr.



Enclosure: NRC Inspection Report

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-143

License No.: SNM-124

Report No.: 70-143/2006-010

Licensee: Nuclear Fuel Services, Inc.

Facility: Erwin Facility

Location: Erwin, TN 37650

Dates: July 23, 2006 - September 2, 2006

Inspectors: S. Burris, Senior Resident Inspector  
G. Smith, Resident Inspector  
W. Gloersen, Senior Fuel Facilities Inspector  
O. Lopez, Fuel Facilities Inspector

Approved by: D. Ayres, Chief  
Fuel Facility Inspection Branch 1  
Division of Fuel Facility Inspection

Enclosure

[REDACTED]

## EXECUTIVE SUMMARY

Nuclear Fuel Services, Inc.  
NRC Inspection Report 70-143/2006-010

This inspection included observations conducted by the Resident Inspectors during normal and off-normal shifts in the area of Plant Operations and Strike Contingency Plans. Specialized inspections and reviews of documentation were conducted by regional inspectors in the areas of Transportation, Waste Generation Requirements, Operator Training/Retraining and Management Organization and Controls.

### Plant Operations

- All of the operations activities observed were performed safely and in accordance with approved procedures. One issue was identified which related to the failure to identify and correct a potentially adverse condition associated with the operability of the Building 306 diesel generator.
- A spill occurred in Building 302 on August 31. At the conclusion of this inspection, the licensee had not completed the post cause investigation.
- Safety Related Equipment (SRE) changes in the Blended Low-enriched Uranium (BLEU) Complex were properly controlled and documented. Review of configuration control and SRE changes in the BLEU Preparation Facility (BPF) indicated that the licensee had obtained the proper authorizations and approvals for the changes in the solvent extraction area (Paragraph 2.b).

### Management Organization and Controls

- Personnel changes did not appear to impact the responsibilities and functions specified in the license. The licensee's system to review and issue procedures adequately ensured that safety procedures were properly controlled and approved (Paragraph 3.a).
- Reviewed audits were of sufficient depth and appropriately targeted, the results were documented and conveyed to management, and audit findings were resolved in a timely manner. The inspectors determined that the licensee adequately implemented requirements of the Safety & Safeguard Review Council (SSRC) (Paragraph 3.a).

### Transportation

- The designation of transportation authorities and responsibilities were adequate. Management approved procedures that were established to carry out the various transportation activities at the facility were acceptable (Paragraph 4.a).
- The LR-230 leak testing and maintenance activities were performed in accordance with standard operating procedure and Certificate of Compliance (CoC) requirements (Paragraph 4.b).

- Staff knowledge of the regulations and procedures for the receipt of radioactive material packages was adequate. No problem areas were noted with the radiation and contamination survey records of incoming radioactive material (Paragraph 4.c).
- The licensee's maintenance of NRC CoC documents for packages used to ship fissile material was adequate (Paragraph 4.d).

#### Waste Generation Requirements

- The licensee had adequate controls for waste classification and characterization and meeting disposal site waste acceptance criteria. Waste manifests were in compliance with the 10 CFR Parts 20 and 61 requirements (Paragraph 5.a).

#### Operator Training/Retraining

- The licensee provided adequate training to its employees in the required areas of radiation protection, criticality safety, emergency preparedness, procedure adherence, and general employee training. The training observed showed that the employees had a good understanding of the training acquired and the acquired training knowledge was implemented in the work area. (Paragraph 6.a).

#### Strike Contingency Plan

- The licensee strike contingency plan is in place and continued security operations for the on-going strike appeared to be adequate (Paragraph 7.a).

#### Attachment:

Partial List of Persons Contacted

Inspection Procedures Used

List of Items Opened, Closed, and Discussed



## REPORT DETAILS

### 1. Summary of Plant Status

Fuel manufacturing, training activities, and scrap recovery processes were operated throughout the reporting period. Blended low-enriched uranium (BLEU) oxide conversion activities operated normally during the inspection period. BLEU Preparation Facility (BPF) operations were shut down following the March 6, 2006, spill event. NRC performed Phase 2 (Uranium-Metal, Uranium-Aluminum and Low Enriched Uranium) of an Operational Readiness Review for BPF during the week of July 24, 2006 (results documented in NRC Inspection Report 2006-012.) Decommissioning, including processing, packaging, and shipping contaminated soil and debris from burial grounds has been stopped due to staffing issues because of the union strike.

### 2. Plant Operations (Temporary Instruction (TI) 2600/006, Inspection Procedure (IP) 88020)

#### a. Routine Observations, Plant Activities (03.03); Operating Procedures (03.06); NCS Training (03.08)

#### (1) Inspection Scope and Observations

The inspectors performed numerous walkdowns of the fuel process areas, Building 333, the Oxide Conversion Building (OCB), and the BPF. The inspectors verified adequate staffing and evaluated attentiveness of operators in carrying out their assigned duties. Communications were monitored between supervision and line operators. Adequate oversight was provided by supervision. The inspectors verified procedural compliance within the operating areas.

The inspectors observed the Building 306 diesel generator and uninterruptible power supply (UPS) testing on August 4, 2006. This testing resulted in a failure of the diesel generator to assume the electrical load from the UPS following a loss of offsite power. Subsequent troubleshooting by the licensee and the UPS manufacturer revealed that the UPS was preventing the diesel from supplying the system loads. Removal of an electrical jumper from a control circuit board located within the UPS corrected the deficiency and the diesel generator was returned to service on August 9. The inspectors also evaluated the licensee's semi-annual testing of the UPS and diesel generator performed on August 26. Although the diesel generator had successfully passed all its associated weekly and monthly testing since the new Building 306 UPS had been placed in service on January 14, based on discussions with the licensee, some tests did indicate difficulty in the diesel generator loading sequence. This anomaly was never identified in the Problem Identification, Resolution, and Correction System (PIRCS). License Condition 6.3 requires emergency power for the criticality



alarm system. Further, the emergency generators shall be tested for operability on a weekly basis. Since the operability of the diesel generator could have been affected by the installed jumper for a period in excess of six months, this issue will be tracked as an unresolved item (URI) 70-143/2006-10-01, Failure of the Building 306 Diesel Generator.

The inspectors monitored the licensee's actions as a result of a spill in Building 302 on August 31. The inspectors monitored the cleanup efforts as well as the activities associated with the event response team. The licensee plans on completing a root cause report to address this issue and potential corrective actions. Pending further evaluation of this issue and assessment of the root cause, this issue will be tracked for further NRC review as Inspector Followup Item (IFI) 70-143/2005-10-02, Spill in Building 302.

(2) Conclusions

All of the operations activities observed were performed safely and in accordance with approved procedures. One issue was identified which related to the failure to identify and correct a potentially adverse condition associated with the operability of the Building 306 diesel generator.

b. Safety Function (03.02); Maintenance for Safety Controls (03.07), Configuration Control (03.04), and Change Control (03.05)

(1) Inspection Scope and Observations

The inspectors observed the resumption of BPF activities for inventory reconciliation after both Phases 1 and 2 authorization letters were issued. These activities included:

- observation of BPF personnel in the initial recovery actions for special nuclear material (SNM) inventory clean-out and accountability,
- safety related equipment (SRE) testing of all of the identified in the BPF Restart of Phases 1 and 2,
- verification of training activities (discussed in detail in paragraph 6),
- flush of U-Metal/U-Aluminum process lines for final BPF inventory resolution, and
- LEU Blend performed on August 31, 2006.

Numerous SRE tests were performed and verified by the inspectors to ensure items relied on for safety (IROFS) were capable of performing their intended function when the facility was restarted. Some of the items reviewed included: operability of the in-line monitors, waste off gas line, automatic isolation (shutoff) valve, level switch detectors and pressure switches, dissolver column thickness measurements, drain enclosures, mass limit safety programmable logic controller (PLC) flow switches, and other SRE.

After successfully completing all of the required SRE tests, the licensee commenced flushing lines and components which had been previously shutdown after the March 6, 2006 event. The flushing activities were performed to ensure that all SNM was properly inventoried for BPF. Flushing activities were completed in accordance with approved procedures by qualified BPF operations personnel.

(2) Conclusions

All of the BPF testing and operational activities observed were performed safely and in accordance with approved procedures.

3. **Management Organization and Controls (IP 88005)**

a. Organizational Structure (05.01), Procedure Controls (05.02)

(1) Inspection Scope and Observations

The inspectors reviewed changes in personnel responsibilities and functions that occurred since the last inspection in order to verify that personnel qualification requirements were met. The inspectors determined that experience and education requirements, as specified in the license, were satisfied.

The inspectors reviewed several procedures for operations and safety management systems to verify that they were reviewed in the appropriate time frame and approved by the appropriate management. Through discussions with the licensee, the inspectors determined that procedures would be reviewed and updated should a modification of the floor layout occur or new equipment be installed. The inspectors also found that management and operational procedures were reviewed at the required frequency. The inspectors observed that the appropriate safety management was included in the review and approval of procedure changes. The inspectors found no examples of outdated procedures during the inspection.

(2) Conclusions

Personnel changes did not appear to impact the responsibilities and functions specified in the license. The licensee's system to review and issue procedures adequately ensured that safety procedures were properly controlled and approved.



b. Internal Reviews and Audits (05.03), Safety Committees (05.04), Quality Assurance Programs (05.05)

(1) Inspection Scope and Observations

The inspectors reviewed quality assurance audits for the Integrated Safety Analysis (ISA) and the training programs; and for the implementation of the Safety & Safeguard Review Council (SSRC). The review was conducted as required by the license. The audits addressed a wide range of concerns, for which adequate recommendations were proposed. The corrective action program tracked the management approved recommendations. The inspectors reviewed a sample of the resolutions and found them to adequately address the concerns detailed in the audit. No findings of significance were identified with the licensee's audit program.

The inspectors reviewed a selection of the most recent minutes from the SSRC meetings. The inspectors found that the reviewed minutes from the calendar year 2006 meetings included a review of new or revised facilities and equipment, NRC inspection findings, safety-related audit and inspection findings, and licensing deficiency reports. The inspectors found that all the required disciplines (e.g. Safety, Security, Material Control and Accounting Management, Production, etc.) were represented in the meetings conducted. The inspectors found that the items reviewed were given appropriate consideration and management attention. No findings of significance were identified.

The inspectors also reviewed the effectiveness of the corrective action program. The inspectors noted that the PIRCS allowed the licensee to track issues and trend potential safety problems. The inspectors attended a PIRCS screening committee and an oversight committee meeting. The inspectors noted that overdue items, investigations, negative trends, and ways to improve the system were discussed. No findings of significance were identified.

(2) Conclusions

Reviewed audits were of sufficient depth and appropriately targeted, the results were documented and conveyed to management, and audit findings were resolved in a timely manner. The inspectors determined that the licensee adequately implemented the SSRC.

**4. Transportation (IP 86740)**

a. Management Controls

(1) Inspection Scope and Observations

The inspectors discussed with staff involved in the transportation of radioactive materials the changes that occurred in the organization since the last inspection. The inspectors also verified that written management approved procedures were established

to carry out the various transportation activities at the facility, including package preparation, delivery of completed packages to carriers, and receipt of packages. The inspectors verified that changes to procedures were approved by licensee management.

(2) Conclusions

The designation of transportation authorities and responsibilities was adequate. Management approved procedures that were established to carry out the various transportation activities at the facility were acceptable.

b. Package Maintenance

(1) Inspection Scope and Observations

The inspectors reviewed the annual leak testing and maintenance of the Liqui-Rad (LR)-230 shipping package. The LR-230 leak testing and maintenance was performed in accordance with Standard Operating Procedure (SOP)-500, Section 16, Leak Testing and Annual Maintenance. The inspectors verified that the annual maintenance and inspection requirements specified in SOP-500, Section 16 were in accordance with the requirements specified in CoC 9291 and Safety Analysis Report (SAR) Section 8 (Acceptance Tests and Maintenance Program). The inspectors reviewed selected test results records for several LR-230 packages performed in September and October 2005. The inspectors noted that Attachment 1, LR-230 Container Inspection Form, did not indicate the date of the inspection.

The inspectors also reviewed the shipping paperwork for fissile shipments using the OPTU shipping containers for selected shipments made from June - August 2006. The licensee prepared the required shipping paper documentation and accurately included the applicable required elements of information. The inspectors noted that the OPTU package labels had been recently re-stenciled with USA/9288/B(U) F-96. The outer package was previously labeled USA/9288/B(U) F-85. The inspectors observed that the licensee had not changed the template for the OPTU shipping paperwork to indicate the new package label. The licensee indicated that the shipping paper template would be changed before any shipments are made using the re-stenciled OPTUs.

(2) Conclusions

The LR-230 leak testing and maintenance activities were performed in accordance with standard operating procedure and CoC requirements.

c. Receipt of Packages

(1) Inspection Scope and Observations

The inspectors discussed with licensee staff involved in transportation the requirements for the receipt of radioactive material packages and noted they were knowledgeable of requirements and procedures for unloading vehicles and receiving radioactive material packages. The inspectors interviewed several licensee personnel to verify their knowledge of radioactive material receipt requirements.

The inspectors also reviewed selected radiation and contamination survey records of incoming radioactive material shipments to verify that the surveys were performed in accordance with the requirements specified in 10 CFR 20.1906. The receipt records reviewed included LEU received by the BLEU facility and high enriched uranium (HEU) received by the NFS facility. No problem areas were noted with the surveys. The inspectors reviewed SOP-500, Section 1, Uranyl Nitrate Trailer Receiving, Revision 6, May 19, 2005, which was the radioactive material receipt procedure for the Eco-Pak LR transport Package (Model No. LR-230). The inspectors also reviewed the SAR, Section 7.1 for the LR-230 and compared the package receipt requirements to the appropriate section in SOP-500. No problem areas were noted.

(2) Conclusions

Staff knowledge of the regulations and procedures for the receipt of radioactive material packages was adequate. No problem areas were noted with the radiation and contamination survey records of incoming radioactive material shipments that were reviewed.

d. Certificates of Compliance

(1) Inspection Scope and Observations

The inspectors verified that the licensee maintained current the following NRC CoC for packaging currently used at the facility:

- CoC 9291, USA/9291/B(U) F-96, Eco-Pak Liqui-Rad (LR 230) Transport Unit Package

The inspectors also verified that the licensee had registered with NRC as a user of the NRC-certified package and had a quality assurance program approval issued by NRC .

(2) Conclusions

The licensee's maintenance of NRC CoC for packages used to ship fissile material was adequate.

e. Follow-up on Previously Identified Issues

(Closed) URI 70-143/2005-11-04: Investigate overweight thorium shipment and implement corrective actions. Ten kilograms (approximately 22 pounds) of natural thorium was shipped to LR International, Inc. on November 11, 2005, under the provisions of 10 CFR 40.22. 10 CFR 40.22 (a) limits domestic shipments of source material to a maximum of 15 pounds at a time (and up to 150 pounds in a year). However, the package should have been offered under the provisions of 10 CFR 110.22 since it was an international shipment to Holland. 10 CFR 110.22 authorizes international shipments of up to 10 kilograms of source material. The licensee determined that shipping personnel were in a hurry and interchanged the appropriate regulating reference, the correlating weight, and the proper weight units. The licensee re-instructed shipping personnel on 10 CFR 40.22 and 10 CFR 110.22 requirements and occasions for use. This item is considered closed.

5. **Waste Generation Requirements (IP 84850)**

a. Inspection Scope and Observations

The inspectors verified that waste classification and characterization, and documentation in waste manifests, met the requirements of 10 CFR Parts 20 and 61. The review included management controls, quality assurance, and waste shipment tracking.

The inspectors reviewed several waste manifests for waste shipments made in 2006 year-to-date at the NFS facilities and the BLEU complex to verify compliance with regulations. No discrepancies were identified.

b. Conclusions

The licensee had adequate controls for waste classification and characterization and meeting disposal site waste acceptance criteria. Waste manifests were in compliance with the 10 CFR Parts 20 and 61 requirements.

6. **Operator Training/Retraining (IP 88010)**

a. Adequacy of Training/Retraining

(1) Inspection Scope and Observations

The inspectors reviewed the lesson plans and training materials for the licensee's radiological worker training and general employee training (GET). GET discussed the following topics: criticality safety, radiological safety, emergency response, industrial safety, chemical safety, and fire protection. The inspectors noted that the training emphasized the different ways that the employees have to notify management of any event or violation of regulatory requirements. The radiological worker training adequately described the radiological safety controls throughout the facility. The inspectors also observed a session of the radiological worker training practical test. As

part of the test, a radiological control area was simulated and the employees had to follow all the required procedures to enter and exit the area. No findings of significance were identified.

The inspectors reviewed the lesson plans for Building 333 common training. Some of the topics covered by the training were general criticality safety requirements and postings, review of radioactive materials processed, emergency alarm and evacuation, abnormal operations and items relied on for safety. In addition, previous safety significant events were discussed during the training. The inspectors also observed a practical session of routine activities for Building 333. No findings of significance were identified.

The inspectors discussed with supervisors the process used to ensure that only trained personnel perform work. The supervisors stated that the training information was entered into a software database that allowed supervisors to verify an employee's qualification prior to being granted access to the work process areas. The inspectors reviewed with the supervisor the qualification for several operators noting no issues.

The inspectors observed on the job training (OJT) for the 100/200 process areas and the solvent extraction process to review the adequacy of the licensee's OJT and the operating procedures training. During interviews, the employees pointed out the safety precautions and upset conditions related to the process areas. The inspectors were able to verify that the employees were aware of the radiological and criticality safety concerns, and safety controls of the designated work area. The inspectors were also able to see the trainer interact with trainees and verify the adequacy of the training. No findings of significance were identified.

## 2 Conclusions

The licensee provided adequate training to its employees in the required areas of radiation protection, criticality safety, emergency preparedness, procedure adherence, and general employee training. The training observed indicated that the employees had a good understanding of the training acquired and how it is implemented in the work area.

### b. Followup on Previously Identified Issues

(Closed) NOV 70-143/2006-02-01: Failure to comply with configuration control requirements. The inspectors reviewed the corrective actions stated by the licensee in their response to the violation, which involved modifications to the SRE Control Program and Programmable Controller Configuration Control procedures. The inspectors reviewed the modifications to the procedures and found them to be adequate to prevent reoccurrence. As part of the modifications, the IROFS and/or SRE function have to be part of the SRE test presentation when seeking test approval from the SSRC. Also the Functional Requirement Definitions (FRDs) will be developed for any electrical logic design impacting SRE items. The inspectors verified that an FDR was developed for the combustible gas detection system. No safety issues were noted. Therefore, the item is considered closed.

## 7. **Strike Contingency Plan (IP 92709)**

### Adequacy of Strike Contingency Plan

#### a. Inspection Scope and Observations

The inspectors continued to followup on the licensee's implementation of their strike contingency and response plan, including security preparations and response involvement for the strike.

The inspectors reviewed the licensee's ongoing actions in response to the continuing strike. Observation of vehicle access and personnel egress from the site did not identify any problems between NFS staff and the picket line. The inspectors interviewed managers and supervisors in critical areas of the facility to ensure that they were currently completing those tasks assigned to them as identified in the Strike Contingency Plan. The licensee had implemented their process for replacement workers and shifts necessary to carry out operations in the current shutdown mode and upcoming resumption of operations. In addition, the managers have completed a large majority of the previously identified operator training for the Navy Fuel Operations.

The inspectors observed numerous activities and determined that personnel assignments have been properly and adequately performed.

The inspectors discussed the licensee's continuing security preparations during the strike, and has found that, so far, preparations have been effective in providing site control and security.

#### b. Conclusions

The inspectors determined that the licensee had developed an adequate strike contingency plan and had made the necessary security preparations for the strike.

## 8. **Exit Meeting**

The inspection scope and results were presented to members of the licensee management at various meetings throughout the inspection period and were summarized on August 18 and August 24, 2006. No dissenting comments were received from the licensee.

**ATTACHMENT**

**1. PERSONS CONTACTED**

Partial List of Licensee's Persons Contacted

R. Bond, Sr. Project Director, BPF  
R. Droke, Licensing & Compliance Director/Acting Safety Director  
D. Ferguson, President & CEO  
G. Hazelwood, Engineering Director  
N. Kenner, Training Manager  
M. Moore, V.P., Safety & Regulatory  
J. Pugh, Director, Site Services  
K. Schutt, Senior Vice President  
A. Vaughn, Director, Fuel Production  
J. Wheeler, ISA Manager  
D. Wise, V.P., Fuel Production  
S. Barron, Emergency Preparedness Manager  
J. Nagy, Senior Licensing & Regulatory Compliance Officer  
T. Sheehan, HEU Operations Director  
J. Smallwood, Process Engineer  
M. Tester, Sr. Manager, Radiation Control

**2. INSPECTION PROCEDURES USED**

IP 88005      Management Organization and Controls  
IP 88020      Plant Operations  
IP 92709      Strike Contingency Plan  
IP 84850      Waste Generator Requirements  
IP 86740      Transportation  
IP 88010      Operator Training/Retraining

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

70-143/2006-02-01	Closed	VIO	Failure to comply with configuration control requirements.
70-143/2005-11-04	Closed	URI	Investigate overweight thorium shipment and implement corrective actions.
70-143/2006-10-01	Open	URI	Failure of the Building 306 diesel generator
70-143/2006-10-02	Open	IFI	Spill in Building 302