UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-8931

March 28, 2006

Mr. Kerry Schutt, President
Nuclear Fuel Services, Inc.
P. O. Box 337, MS 123
Erwin, TN 37650

SUBJECT: LICENSEE PERFORMANCE REVIEW (LPR) OF LICENSED ACTIVITIES FOR NUCLEAR FUEL SERVICES, INC., DOCKET NUMBER 70-143

Dear Mr. Schutt:

Managers and staff in our Region II office, the Office of Nuclear Material Safety and Safeguards, and the Office of Nuclear Security and Incident Response, completed a review of the Erwin facility's performance in conducting NRC-licensed activities. The review evaluated the facility's performance during the period beginning January 23, 2005, and ending February 4, 2006. This letter and the enclosure provide you with the results of our review, and will be used as a basis for establishing the NRC oversight program for your facility.

During the review period, NFS continued to maintain safety and security for its workers and the public. However, the numerous deficiencies noted within the attached report are of concern because of the potential for violations with relatively low safety significance to be precursors to or indicators of larger problems. A large number of these deficiencies are in the blended low enriched uranium (BLEU) processing operations, where your efforts to improve safety have either not been implemented or were not effective. Given the number of these violations, the safety margin normally provided through a robust safety program is not evident, indicating that actions are necessary to provide additional assurance that facility operations will be conducted safely. In addition, BLEU operations continued to experience problems after the LPR period ended such that a Confirmatory Action Letter was issued on March 18, 2006. These continuing problems appear to confirm the findings of this LPR.

Based on the performance information reviewed, the NRC found areas needing improvement in four of the five performance areas, including problems identified in the previous LPR period associated with implementing the criticality safety analytical process, implementing the safeguards program, and management oversight of operations. The NRC is concerned that these areas continue to be problematic and that corrective actions taken by you, as of the date of this report, have not yet been fully implemented. To date, your efforts have not resulted in consistent conduct of licensed activities in accordance with regulatory requirements. Other areas identified in the report as needing improvement include consistency in the implementation of the radiological protection program; the quality assurance of transportation packages; the use of the corrective action program; facility configuration control; the reliability of the criticality

alarm system; and control of strategic special nuclear material. Although NFS has previously indicated that the attributes of formality and discipline are part of the NFS core values, the NRC believes that such core values are not being demonstrated in the implementation of these program areas. In addition, the number and repetitive nature of elements of this LPR are indications that further action to improve your safety culture is warranted.

The results of our review will be discussed with you at your facility on April 26, 2006. The meeting will be closed to the public and will discuss the material in the enclosure, which pertains to sensitive unclassified information. During the meeting, we expect you to discuss your view of your performance in the same major areas that the NRC evaluated. We ask you to specifically address what actions you have taken, or are planning to take, to improve these program areas and the overall safety performance of the facility. In addition, we expect you to describe how your management will monitor the implementation and effectiveness of the actions to improve areas needing improvement identified in this letter.

As a result of our review of your performance, the NRC will continue heightened oversight of your licensed operations through inspections beyond those specified by the NRC's core inspection program. These supplemental inspections will be primarily in the areas of criticality safety and facility modifications. Also, the deterioration of the overall safety performance of the facility has warranted the next LPR to be conducted in six months. In addition, we propose meeting with you periodically to monitor the status of actions you are taking to improve performance.

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).

Questions and comments about NRC's review of NFS' performance should be referred to Mr. David Ayres, who can be reached by telephone at 404-562-4711.

Sincerely,

***/RA/***

William D. Travers
Regional Administrator

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

Enclosure: Licensee Performance Review
- Summary Outline

cc w/encl: (See page 3)

[redacted]

[redacted]



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| DATE | 03/24/2006 | 03/24/2006 | 03/24/2006 | | 03/24/2006 | 03/28/2006 | 03/28/2006 | |
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**LICENSEE PERFORMANCE REVIEW**
**NUCLEAR FUEL SERVICES, INC.**
ASSESSMENT PERIOD: January 23, 2005 to February 4, 2006

The following is a summary of the performance of Nuclear Fuel Services, Inc., in the conduct of NRC licensed activities.

**PERFORMANCE AREA: SAFETY OPERATIONS**

This area is comprised of chemical safety, nuclear criticality safety (NCS), plant operations, and fire safety.

**Program Areas Needing Improvement**

- NCS analyses that adequately reflect license requirements and identify appropriate scenarios and controls

  - Failure to prohibit use of a positive bias in calculating upper safety limits (USLs); the method approved in the license assumes any positive values of bias to be equated to zero (Violation (VIO) 2005-205-05).

  - Failure to discuss the actual safety limit based on a neutron multiplication factor of 0.98, where the license limited the neutron multiplication factor in such cases to 0.95 (VIO 2005-208-01).

  - Failure to implement/establish a criticality safety control identified in the safety analysis for the uranium-aluminum (U-Al) hydrogen dilution ventilation system (VIO 2005-203-01).

  - Failure to establish an appropriate concentration safety limit for a non-uniform aqueous solution in the waste water treatment facility (WWTF) (VIO 2005-208-03).

  - NRC identified a poorly controlled modification of a process enclosure drain. These enclosure drains may have been identified as credited safety features in the process analysis (Inspection Report (IR) 2005-008).

  - NRC identified various inconsistencies and deficiencies found in validation reports and analyses involving verification of normality of benchmarks, definition of the area of applicability, and calculation of the upper safety limits (USLs) (IR 2005-205).



[redacted]

- Management oversight of operations and operational changes

  - Failure to conduct downblending operations in accordance with an approved temporary procedure due to the lack of awareness of disabled safety system (VIO 2005-001-01).

  - Failure to remove danger isolation tags prior to system operation for testing on the high enriched uranium (HEU) storage columns in the 333 building (VIO 2005-002-01).

  - Failure to store special nuclear material (SNM) in its authorized location due to confusion over identical storage racks (Non-Cited Violation (NCV) 2005-003-01).

  - Failure to rework U-Al process caustic waste solution according to procedure led to a transfer to the ventilation system (Event Number (EN) 41651, NCV 2005-003-02).

  - Licensee employee transferred raffinate solvent extraction waste into a solvent extraction boil-down condensate storage area using a temporary hose, which was not covered by approved, written procedures (Unresolved Item (URI) 2005-004-01).

  - Failure to place the lock and tag on the single energy isolation point, prior to performing work on the equipment was a violation of procedures (VIO 2005-008-02).

  - Failure to have personnel present in the building during the operation of the Uranium-Metal (U-M) dissolvers for approximately one hour, contrary to procedural requirements (NCV 2005-010-03).

  - Failure to comply with criticality safety postings which restricted the number of drums stored in the QC vault (NCV 2005-010-04).

  - Failure to leak-test the Area 800 components when required by the operating procedure (NCV 2005-011-01).

  - Failure to close an open container when it was left unattended (NCV 2005-011-03).

  - Failure to comply with criticality safety instructions (NCV 2006-001-01).

## PERFORMANCE AREA: RADIOLOGICAL CONTROLS

This area is comprised of radiation protection (RP), environmental protection, waste management, and transportation.

**Program Areas Needing Improvement**

- Formality and discipline in implementing the RP program
  - Failure to control work in contaminated areas within the Blended Low Enriched Uranium (BLEU) Preparation Facility (BPF) with written procedures (VIO 2005-002-04).
  - Two examples of failure to properly control and release radiation work permit (RWP) areas, involving missing boundary tape in controlling an area and no final surveys before releasing an area (VIO 2005-007-01).
  - Failure to ensure an employee's urine sample was collected within the required time frame and, accordingly, to deny that employee access to the BLEU protected area (VIO 2005-007-02).
  - Failure of plant staff to don full face respirators or evacuate according to procedure (VIO 2005-007-03).
  - Four examples of failure to comply with RWP instructions involving inadequate RWPs, incorrect personal protective equipment (PPE), improper posting of an area, and poor final close out surveys (VIO 2005-010-06).
  - Failure to post the RWP at the job site (NCV 2005-011-02).
  - Four examples of failure to follow RWP requirements involving the failing to wear PPE (VIO 70-143/2006-001-03).
  - No radiation controls were established for excavation work adjacent to the WWTF, which had been controlled as a Radiologically Controlled Area when previously excavated and filled with fresh gravel. The area was subsequently released under NFS-GH-15, Covering Plant Surfaces (IR 2006-001).

- Quality assurance (QA) of packaging components important to safety; specifically, the conduct of quality assurance audits and the control and effectiveness of the procurement control program.

  - Failure to perform audits of the Transportation QA program during the last three years addressing all applicable criteria of Subpart H of 10 CFR Part 71, using appropriately trained personnel not having direct responsibilities in the areas audited (IR 71-0249/2005-201 (VIO Severity Level (SL)-IV)).

  - NFS issued PO0412052298 on 12/6/04 without prior QA approval of the requisition and without including the mandatory quality requirement for nonconformance disposition (IR 71-0249/2005-201 (VIO SL-IV)).

  - PO0412052298 issued by NFS on 12/6/04, failed to specify that the provisions of Part 21 applied to the procurement (IR 71-0249/2005-201 (VIO SL-IV)).

  - Failure to adequately evaluate and qualify Century Industries for design, testing, and fabrication activities performed under PO0303038655 (IR 71-0249/2005-201 (VIO SL-IV)).

**PERFORMANCE AREA: FACILITY SUPPORT**

This area is comprised of maintenance and surveillance, training, emergency preparedness, and management controls.

**Program Areas Needing Improvement**

- Utilization of the problem identification and corrective action program

  - Ineffective corrective actions, highlighted by a shallow root cause investigation, and failure to follow through on recommended evaluations and corrective actions (part of Apparent Violation (AV) 2005-009-02, Enforcement Action (EA) 2005-180, Severity Level (SL)-III, Civil Penalty (CP)).

  - Operational experience from similar past events not utilized:

    a. No verification that the discard block and bleed valve were locked shut prior to performing a transfer operation between banks. (Associated with VIO 2005-002-02), (Similar to events documented in IRs 2002-205 and 2004-001).

b. No signature verification that the discard valve was shut and locked as required, and no verification that the valve lineup was correct prior to initiating recirculation of the system. (Associated with VIO 2005-010-05).

- NRC- and licensee- identified issues were not entered into the corrective action program until requested by inspectors. The inspectors noted several issues which had been identified by NRC inspectors and discussed with licensee management which were not entered into PIRCS until inspectors made repeated inquiries. On each separate issue, inspectors had to either make repeated requests for information or point out to senior management that no entry was yet made in PIRCS (IR 2005-007).

- Two corrective action program entries related to radiation protection issues were not made until requested by the inspectors. One entry resolved a RP violation by incorrectly documenting that no violation occurred - corrected after the inspectors reviewed the item (IR 2006-001).

- Engineering design, verification, and configuration control, predominantly in BPF

  - The design basis of the U-Al enclosure drain safety system was inadequate, in that enclosure vacuum was not considered (AV 2005-010-02, EA 2006-018).

  - Failure of the safety related equipment program logic controller to be capable of performing the criticality safety purpose for which it was specified (VIO 2005-001-03).

  - Failure to analyze required environmental effluent samples in the BLEU complex sewer (NCV 2005-002-03).

  - Failure to maintain configuration control due to lack of use of engineering change notices (VIO 2005-008-01).

  - Failure to correctly set the 333 Building solvent extraction condensate in-line monitor to a non-conservative value (NCV 2006-001-02).

  - The licensee discovered a criticality safety concern, in that the wet off gas line for the raffinate column in the uranium recovery area was not adequately sized to prevent pressurization of the system (IR 2005-008, EN 41197).

- A weakness was identified in that only out-of-date configuration drawings were available in the BPF (IR 2005-010).

- The licensee identified a failure mode for an IROFS that was not recognized in the design process when the in-line monitor failed but the process continued to run (IR 2005-011).

- The NRC identified a failure to recognize a potential NCS precursor during review of an internal event (IR 2005-207).

- An investigation identified potential NCS control failures resulting in fissile solution accumulation in the BLEU U-Al dissolution process off-gas system (IR 2005-207).

- Reliability of the Criticality Alarm System

  - The large number of trouble alarms and false high radiation alarms due to electrical problems (IR 2005-003).

  - New radiation monitors reset themselves to factory defaults and rendered one detector pair inoperable with no indication of system trouble or fault (IFI 2005-010-07).

  - Criticality alarm system inoperable in the NDA/Loading dock area due to detector failure (Retracted EN 42047).

  - NRC EN 42226 involved a relay failure for a criticality detector in the Oxide Conversion Building, which rendered the detector pair inoperable. A 10 CFR Part 21 report was submitted (IR 2006-001).

**PERFORMANCE AREA: SPECIAL TOPICS (LICENSING ACTIVITIES)**

This area is comprised of safety licensing.

**Program Areas Needing Improvement**

- No specific areas needing improvement were identified for safety licensing.

**PERFORMANCE AREA: SAFEGUARDS**

This area is comprised of material control and accounting (MC&A), physical protection, and classified material/information security.

**Program Areas Needing Improvement**

- Control of Strategic Special Nuclear Material (SSNM) through procedural adherence
  - Failure to properly control an SSNM item [redacted] (AV 2005-202-01, EA 2005-093, SL-III/CP).
  - Failure to properly control SSNM (VIO 2005-012-03).
  - Failure to properly control SSNM (VIO 2005-009-01).
  - Failure to properly control SSNM (AV 2005-009-02, EA 2005-180).
  - Two examples in which the licensee failed to properly control SSNM (URI 2005-013-04).