

May 1, 2008

Mr. Dwight B. Ferguson, President  
and Chief Executive Officer  
Nuclear Fuel Services, Inc.  
P.O. Box 337, MS 123  
Erwin, TN 37650

SUBJECT: INSPECTION REPORT NO. 70-143/2008-203

Dear Mr. Ferguson:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine announced criticality safety inspection at your facility in Erwin, Tennessee, from April 21-25, 2008. The purpose of the inspection was to determine whether activities involving licensed materials were conducted safely and in accordance with NRC requirements. Inspection observations were discussed with your management and staff throughout this inspection and at the exit meeting which was held on April 25, 2008.

The inspection, which is described in the enclosure, focused on: (1) the most hazardous activities and plant conditions; (2) the most important controls relied on for safety and their analytical basis; and (3) the principal management measures for ensuring controls are capable, available, and reliable to perform their functions relied on for safety. The inspection consisted of analytical basis review, selective review of related procedures and records, examinations of relevant nuclear criticality safety (NCS)-related equipment, interviews with NCS engineers and plant personnel, and facility walkdowns to observe plant conditions and activities related to safety basis assumptions and related NCS controls.

In accordance with 10 CFR 2.390 of NRC's "Rules of Practice," a copy of this letter and the enclosure will be available in the public electronic reading room of the NRC's Agency-Wide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC web site at <http://www.nrc.gov/reading-rm/adams.html>.

D. Ferguson

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

Enclosure: Inspection Report 70-143/2008-203

D. Ferguson

- 2 -

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**U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS**

Docket No.: 70-143

License No.: SNM-124

Report No.: 70-143/2008-203

Licensee: Nuclear Fuel Services, Inc.

Location: Erwin, TN

Inspection Dates: April 21-25, 2008

Inspector: Thomas Marenchin, Criticality Safety Inspector

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

**Enclosure**

## **EXECUTIVE SUMMARY**

### **Nuclear Fuel Services, Inc. NRC Inspection Report No. 70-143/2008-203**

#### **Introduction**

Staff of the U.S. Nuclear Regulatory Commission (NRC) performed a routine and announced nuclear criticality safety (NCS) inspection of the AREVA Erwin facility (licensed under Nuclear Fuel Services, Inc. (NFS) License Number SNM-124), in Erwin, Tennessee, facility from April 21-25, 2008. The inspection included an on-site review of the licensee programs involving the NCS program, inspections, audits, and investigations, plant operations, NCS event review and follow-up and open items. The inspection focused on risk-significant fissile material processing activities including the blended low-enriched uranium (BLEU) Oxide Conversion Building (OCB), the BLEU Uranyl Nitrate Building, and the BLEU Effluent Processing Building (EPB).

#### **Results**

- No safety concerns were noted regarding the NCS program.
- No safety concerns were noted regarding the licensee NCS inspections, audits, and investigations.
- No safety concerns were identified during a review of recent licensee investigation of internal events.
- No safety concerns were identified during walkdowns of fissile material operations.

## REPORT DETAILS

### 1.0 Plant Status

AREVA facility (licensed under NFS License Number SNM-124) produces uranium oxides from low-enriched uranium (LEU) liquid, conducts routine ammonia recovery process and liquid waste treatment at its Erwin, Tennessee site. During the inspection, AREVA was performing routine oxide production and maintenance operations.

### 2.0 Nuclear Criticality Safety Program (IP 88015, 88016)

#### a. Inspection Scope

The inspector reviewed Nuclear Criticality Safety Evaluations (NCSEs) to determine that criticality safety of risk-significant operations was assured through engineered and human controls with adequate safety margin and preparation and review by qualified staff. The inspector reviewed selected aspects of the following documents:

- NFS-GH-913, "Nuclear Criticality Safety Program," Revision 2, dated February 27, 2004
- NFS-HS-A-C-16, "Safety Audits and Inspections," Revision 10, dated July 31, 2007
- NFS-HS-CL-27, "Nuclear Criticality Safety Buildings 520/530 OCB/EPB," Revision 8, dated March 21, 2008
- NFS-HS-CL-27-01, "Nuclear Criticality Safety Building 520 OCB," Revision 5, dated November 18, 2005
- NFS-HS-CL-27-02, "Nuclear Criticality Safety Building 520 OCB/NUN [natural uranium nitrate] Area," Revision 2, dated November 18, 2005
- 54T-05-0004, "Nuclear Criticality Safety Evaluation for OCB Natural Uranium and Scrap Uranium Dissolution Systems," Revision 4, dated January 27, 2005
- 54T-05-0022, "Nuclear Criticality Safety Analysis OCB Equipment Interactions," Revision 2, dated July 29, 2005
- 54T-05-0025, "Nuclear Criticality Safety Analysis for the Oxide Conversion Building Process Ventilation System," Revision 2, dated July 22, 2005
- 54T-05-0065, "Nuclear Criticality Safety Analysis Non-Homogeneous Waster Distribution Effects in OCB Powder Blender," Revision 1, dated August 9, 2004
- 54T-07-0009, "Nuclear Criticality Safety Evaluation for the Effluent Process Building Ammonia Recovery and Liquid Waste Process," Revision 3, dated February 27, 2007

#### b. Observations and Findings

The inspector determined that NCSEs were performed by qualified NCS engineers, that independent reviews of the evaluations were completed by 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 NCS controls for equipment and processes assured the safety of the operations. NCS

analyses and supporting calculations demonstrated adequate identification and control of NCS hazards to assure operations within subcritical limits.

c. Conclusions

No safety concerns were noted regarding the NCS program.

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

a. Inspection Scope

The inspector reviewed results of the most recent NCS audits to assure that appropriate issues were identified and resolved. The inspector reviewed selected aspects of the following documents:

- NFS-HS-A-C-16, "Safety Audits and Inspections," Revision 10, dated July 31, 2007

b. Observations and Findings

The inspector reviewed the monthly NCS inspections for the previous six months. The inspector observed that the licensee NCS audits were conducted in accordance with written procedures. The inspector noted that the audits were performed by NCS engineers who reviewed open NCS issues from previous audits; reviewed the adequacy of control implementation; reviewed plant operations for compliance with license requirements, procedures, and postings; and examined equipment and operations to determine that past evaluations remained adequate. The inspector observed that the licensee procedure for monthly inspections, NFS-HS-A-C-16, did not accurately represent the process that the licensee staff was using to document monthly inspections. The licensee staff stated they would review NFS-HS-A-C-16 and determine if the procedure needed to be updated.

c. Conclusions

No safety concerns were noted regarding the licensee NCS inspections, audits, and investigations.

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

a. Inspection Scope

The inspector reviewed the licensee response to internally-reported events. The inspector reviewed the progress of investigations and interviewed licensee staff regarding immediate and long-term corrective actions. The inspector reviewed selected aspects of the following documents:

- Problem Identification, Resolution, and Corrections System (PIRCS) Problem ID 11838, dated November 14, 2007
- PIRCS Problem ID 12589, dated February 11, 2008

- PIRCS Problem ID 12706, dated February 21, 2008
- PIRCS Problem ID 12798, dated January 31, 2008
- PIRCS Problem ID 13361, dated April 21, 2008

b. Observations and Findings

The inspector reviewed selected licensee internally-reported events. The inspector observed that internal events were investigated in accordance with written procedures and appropriate corrective actions were assigned. The inspector had no safety concerns regarding licensee reporting, investigation, and correction of internal NCS related events.

c. Conclusions

No safety concerns were identified during a review of recent licensee investigation of internal events.

**5.0 Plant Activities (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 operations staff and NCS engineers both before and during walkdowns. The inspector reviewed selected aspects of the following documents prior to performing the walkdowns:

- NFS-HS-CL-27, "Nuclear Criticality Safety Buildings 520/530 OCB/EPB," Revision 8, dated March 21, 2008

b. Observations and Findings

The inspector verified that controls identified in NCS analyses were installed or implemented and were adequate to ensure safety. The inspector also verified that safety was maintained for observed facility operations. The cognizant NCS engineers were knowledgeable and interacted regularly with operators on the process floors. The inspector verified the adequacy of management measures for assuring the continued availability, reliability, and capability of safety-significant controls relied upon by the licensee for controlling criticality risks.

c. Conclusions

No safety concerns were identified during walkdowns of fissile material operations.

## **6.0 Open Item Follow-up**

### **VIO 70-143/2007-208-01**

This item concerned the failure to have NCS approval in a Standard Operating Procedure (SOP), Letter of Authorization (LOA), or other formal method for flexible lines that were located in the OCB as required by procedure. During a previous inspection, the inspector observed flexible piping stored in four locations inside the process area. NFS-HS-CL-27 requires that any flexible lines and temporary piping in process areas must be approved by NCS (e.g., SOP, LOA, etc.). While interviewing operations staff and NCS engineers, the inspector determined that no formal approval was in place that stated which of the flexible line were authorized for use in the OCB. During this inspection, the inspector determined that all flexible piping in the OCB had been labeled as approved by NCS and NFS-HS-CL-27 had been updated. This item is closed.

## **7.0 Exit Meeting**

The inspector presented the inspection results to members of the licensee's management and staff during an exit meeting on April 25, 2008. The licensee acknowledged and understood the findings as presented.

## SUPPLEMENTARY INFORMATION

### 1.0 List of Items Opened, Closed, and Discussed

#### Items Opened

None

#### Items Closed

VIO 70-143/2007-208-01

Failure to have NCS approval in an SOP, LOA, or other formal method for flexible lines that were located in the OCB as required by procedure.

#### Items Discussed

None

### 2.0 Inspection Procedures Used

IP 88015                      Nuclear Criticality Safety Program  
IP 88016                      Nuclear Criticality Safety Evaluations and Analyses

### 3.0 Key Points of Contact

#### Nuclear Fuel Services, Inc.

\*G. Athon                      Vice President Applied Technology  
\*N. Brown                      Engineer, NCS  
\*R. Droke                      Director, Licensing  
\*J. Dunn                      Manager, Technical Security  
\*D. Ferguson                      Chief Executive Officer  
\*D. Gardner                      Licensing  
\*S. Gizzie                      Engineer, NCS  
\*D. Hopson                      BLUE Safety Manager  
\*N. Kenner                      Director, Human Performance and Learning  
\*N. Kerns                      Manager, Security Compliance  
\*J. Lee                      Manager, Security Operations  
\*B. Moore                      Vice President, Safety and Regulatory  
\*J. Nagy                      Chief Nuclear Safety Officer  
\*S. Sanders                      Training Manager  
\*R. Shackelford                      Manager, NCS  
\*M. Shope                      Manager, Quality Assurance  
\*M. Tester                      Manager, Radiological Control  
\*A. Ward                      General Counsel  
\*J. Wheeler                      Manager, Licensing and Integrated Safety Analysis

**Attachment**

**NRC**

\*S. Burris                      Senior Resident Inspector, NRC Region II  
\*G. Smith                      Resident Inspector, NRC Region II  
\*T. Marenchin                Criticality Safety Inspector, NRC Headquarters

\*Attended the exit meeting on April 25, 2008.

**4.0      List of Acronyms and Abbreviations**

BLEU	blended low-enriched uranium
EPB	Effluent Processing Building
IP	inspection procedure
LEU	low-enriched uranium
LOA	Letter of Authorization
NCS	nuclear criticality safety
NCSE	nuclear criticality safety evaluation
NFS	Nuclear Fuel Services, Inc. (licensee)
NUN	natural uranium nitrate
OCB	Oxide Conversion Building
PIRCS	Problem Identification, Resolution, and Corrective System
SOP	Standard Operating Procedure