

March 3, 2006

Mr. Russell B. Starkey, Jr.
Vice President, Production
United States Enrichment Corporation
Two Democracy Center
6903 Rockledge Drive
Bethesda, MD 20817

SUBJECT: INSPECTION REPORT NO. 70-7002/2006-201

Dear Mr. Starkey:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine, scheduled, and announced nuclear criticality safety (NCS) inspection from February 7 through 9, 2006, at the Portsmouth facility in Piketon, Ohio. The purpose of this inspection was to determine whether activities authorized by your certificate involving special nuclear material were conducted safely and in accordance with regulatory requirements. Throughout the inspection, observations were discussed with your staff. An exit meeting was held by telephone on February 10, 2006, during which time inspection observations and findings were discussed with your staff.

The inspection, which is described in the enclosure, focused on NCS analysis, risk-significant NCS controls and items relied on for safety, and principal management measures for ensuring that NCS controls are capable, available, and reliable. The inspection consisted of reviews of new, changed, and other risk-significant NCS analyses; selective examinations of relevant procedures and records; examinations of safety-related equipment; interviews with plant personnel; and facility walkdowns and observations of in-plant conditions and activities. Throughout this inspection, observations were discussed with your managers and staff. Based on the inspection, your activities involving nuclear criticality hazards were found to be conducted safely and in accordance with regulatory requirements.

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 Document Access and Management System (ADAMS). ADAMS is accessible from the NRC web site at <http://www.nrc.gov/reading-rm/adams.html>.

R. B. Starkey

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If you have any questions concerning this report, please contact Dennis Morey, of my staff, at (301) 415-6107.

Sincerely,

/RA/

Melanie A. Galloway, Chief
Technical Support Group
Division of Fuel Cycle Safety
and Safeguards

Docket No.: 70-7002

Enclosure: Inspection Report No. 70-7002/2006-201

cc: P. D. Musser, Portsmouth General Manager
R. DeVault, Regulatory Oversight Manager, DOE
G. Workman, Nuclear Regulatory Affairs Manager, Portsmouth
S. A. Toelle, Manager, Nuclear Regulatory Assurance and Policy, USEC
C. O'Claire, State Liaison Officer, Ohio

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

Docket No.: 70-7002

Certificate No.: GDP-02

Report No.: 70-7002/2006-201

Certificatee: United States Enrichment Corporation

Location: Piketon, Ohio

Inspection Dates: February 7 - 10, 2006

Inspector: Dennis Morey, Senior Criticality Safety Inspector

Approved by: Melanie A. Galloway, Chief
Technical Support Group
Division of Fuel Cycle Safety
and Safeguards

Enclosure

**United States Enrichment Corporation
Portsmouth Gaseous Diffusion Plant**

**NRC Inspection Report
70-7002/2006-201**

EXECUTIVE SUMMARY

Introduction

Staff of the U. S. Nuclear Regulatory Commission (NRC) performed a routine, scheduled, and announced criticality safety inspection of the Portsmouth Gaseous Diffusion Plant in Piketon, Ohio, facility from February 7 through 9, 2006. The inspection included an on-site review of the certificatee programs dealing with the nuclear criticality safety (NCS) program, NCS-related inspections, audits, and investigations, NCS-related training, and plant operations. The certificatee programs were acceptably directed toward the protection of public health and safety and in compliance with NRC regulatory requirements. The inspection focused on risk-significant fissile material processing activities including Buildings X-330, X-344, X-705, and X-847.

Results

- The NCS program as observed was adequate for maintaining acceptable levels of safety.
- The certificatee maintains adequate programs to perform inspections, audits, and investigations to assure criticality safety at the facility.
- The criticality monitoring system was capable of detecting and reporting inoperable equipment.
- With the exception of a floor storage issue the certificatee agreed to resolve, observed plant operations were conducted safely and in accordance with written procedures.

REPORT DETAILS

1.0 Summary of Plant Status

The United States Enrichment Corporation (USEC) operates the Portsmouth Gaseous Diffusion Plant near Piketon, Ohio in cold standby to maintain U.S. capacity to enrich uranium through diffusion of gaseous uranium hexafluoride (UF_6). During the inspection, the certificatee was conducting technetium clean-up, deposit remediation in Building X-330, equipment decontamination in Building X-705, and routine waste handling and processing operations. USEC is preparing to change the status of the facility to cold shutdown, which is not expected to affect NCS operations.

2.0 NCS Program (88015)

a. Scope

The inspector reviewed NCS evaluations (NCSE) to determine that criticality safety of risk-significant operations was assured through engineered and administrative controls with adequate safety margin and including preparation and review by qualified staff. The inspector accompanied NCS, and other technical staff, on walkdowns of NCS controls in selected plant areas. The inspector reviewed selected aspects of the following documents:

- NCSE-0705_137, "Small UF_6 Cylinder Cleaning in the West Annex," Revision 0, dated September 16, 2005
- NCSE-0705_105, "Cylinder Cleaning Gulper System," Revision 3, dated September 16, 2005
- NCSE-0705_122, "Blending/Sampling Solution in the West Annex," Revision 5, dated July 20, 2005
- XP4-EG-NS1100, "Nuclear Criticality Calculations," Revision 1, dated November 30, 1999
- XP4-EG-NS1001, "Nuclear Criticality Safety Evaluation and Approval," Revision 7, dated February 28, 2001
- XP4-EG-1101, "NCS Walk-through and Review Program," Revision 3, dated July 20, 2005

b. Observations and Findings

Within the selected aspects reviewed, the inspector determined that the analyses were performed by qualified NCS engineers, that independent reviews of evaluations were completed by other 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. The inspector noted that most NCSE changes were editorial and that the three technical changes made were of low risk significance had been made to resolve an NRC finding, to address corrective actions for an event, and to improve autoclave facility operations.

c. Conclusions

The NCS program as observed was adequate for maintaining acceptable levels of safety.

3.0 NCS Inspections, Audits and Investigations (88015)

a. Scope

The inspector reviewed the most recent licensee quality assurance audit and six anomalous condition reports related to NCS controls. The inspector reviewed selected aspects of the following documents:

- Memorandum, "Tri-Annual Audit of the Nuclear Criticality Safety Program," dated February 3, 2006
- Anomalous Condition Report NSI-05-02457, dated July 18, 2005
- Anomalous Condition Report NSI-05-03858, dated November 7, 2005
- Anomalous Condition Report NSI-05-03675, dated October 21, 2005
- Anomalous Condition Report NSI-05-03710, dated October 25, 2005
- Anomalous Condition Report NSI-05-00158, dated January 17, 2006
- Anomalous Condition Report NSI-05-00189, dated January 20, 2006

b. Observations and Findings

The inspector determined that certificatee programs to identify, evaluate, and correct NCS deficiencies are being adequately applied to shutdown cascade, autoclave, and other operations ongoing at the facility. The inspector determined that the certificatee maintained adequate numbers of suitably qualified staff to conduct inspections and audits, review identified findings, develop corrective actions, and evaluate completion of corrective actions. The inspector observed that the certificatee internal audit identified appropriate issues and that appropriate issues were being raised and resolved through the certificatee problem reporting system.

c. Conclusions

The certificatee maintains adequate programs to perform inspections, audits, and investigations to assure criticality safety at the facility.

4.0 Criticality Accident Alarm System (88015)

a. Scope

The inspector reviewed criticality alarm monitor system configuration. The inspector reviewed selected aspects of the following documents:

- Drawing 8465, "Neutron Criticality Monitor Outline," Revision B, dated April 4, 1984
- Drawing 8406, "Schematic Channel Electronics," Sheet 1, Revision D, dated April 21, 1984

- Drawing 8406, "Schematic Channel Electronics," Sheet 2, Revision D, dated April 20, 1984
- Drawing 8278, "Cluster Electronics Schematic," Revision C, dated December 12, 1984
- Drawing 8412, "Neutron Criticality Monitor Wiring Diagram," Sheet 1, Revision C, dated May 3, 1985
- Drawing 8412, "Neutron Criticality Monitor Wiring Diagram," Sheet 2, Revision C, dated March 4, 1985

b. Observations and Findings

The inspector interviewed the criticality monitoring system engineer and reviewed system technical drawings to understand how the criticality alarm monitors perform self-checks to identify inoperable equipment. The inspector determined that the system uses a light-emitting diode to generate pulses in the photomultiplier tube and is not vulnerable to a spurious current that could prevent the system from identifying inoperable detectors, circuits or other equipment problems. The inspector had no safety concerns regarding the criticality monitoring system equipment.

c. Conclusions

The criticality monitoring system was capable of detecting and reporting inoperable equipment.

5.0 Plant Operations (88015)

a. 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 operators, NCS engineers, and process engineers both before and during walkdowns.

b. Observations and Findings

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 to acceptable levels. The inspector performed walkdowns of Buildings X-330, X-344, X-705, and X-847. The inspector observed several ongoing operations including technetium cleanup, cascade sampling during deposit remediation, and waste operations. The inspector had reviewed selected NCS analyses and verified that controls identified in those analyses were installed or implemented and were adequate to assure safety. The cognizant NCS engineers were knowledgeable and able to explain the basis for changes in operations and controls.

During a walkdown in cascade building X-330, the inspector noted about a dozen small sampling buggy alumina traps stored on the floor in two arrays with an approximate 2-foot pitch. The inspector questioned why the arrays did not have any posted NCS controls similar to other storage areas for numerous or similar fissile items. Certificatee NCS staff indicated that the traps were stored in open storage under NCS analysis (NCSA) PLANT-062, "Cascade Maintenance," as removed cascade equipment. Certificatee NCS staff noted that procedure XP4-EG-NS1001, "Nuclear Criticality Safety Evaluation and Approval," requires posting of NCS controls except for areas or equipment which are not well defined and that floor storage under NCSE PLANT-062 was not a well-defined area because the items could be stored any place on the cascade floor.

Certificatee staff investigated further and established that only three of the traps were contaminated with fissile material, and the remainder had been cleaned and were awaiting reuse. The inspector agreed that three traps stored near each other nominally met the requirements of NCSA PLANT-062 for floor storage of removed cascade equipment. The inspector determined that taking all used alumina traps to the same area for storage potentially created a well-defined area that should be addressed by NCS analysis for posting requirements. The certificatee committed to develop a method to cause operations staff to recognize when activities were creating a storage area and take appropriate actions to address NCS review. Actions to assure that non-compliant fissile material storage areas are not inadvertently created will be tracked as **Inspection Follow-up Item (IFI) 70-7002/2006-201-01**.

c. Conclusions

With the exception of a floor storage issue the certificatee agreed to resolve, observed plant operations were conducted safely and in accordance with written procedures.

6.0 Open Item Follow-up

IFI 70-7002/2005-201-01

This item tracked revision of certificatee procedure XP4-EG-NS1101 to address walk-through procedure weaknesses. Procedure XP4-EG-NS1101 had defined "walk-through" as a verification that conditions had not been altered to adversely affect NCS. During a previous inspection, the inspector observed that Step 6.2.2 of XP4-EG-NS1101 emphasized compliance with NCSAs, but did not require consideration as to whether plant configurations and processes conformed to the applicable NCSEs. During the current inspection, the inspector noted that Procedure XP4-EG-NS1101 had been revised to adequately address the walk-through issue. This item is closed.

7.0 Exit Meeting

The inspector communicated the inspection scope and results to members of Portsmouth Gaseous Diffusion Plant management and staff throughout the inspection and during a telephone exit meeting on February 10, 2006. Facility management and staff acknowledged and understood the findings as presented.

Supplementary Information

1.0 List of Items Opened, Closed, and Discussed

Opened

IFI 70-7002/2006-201-01 Tracks the certificatee's actions to assure that non-compliant fissile material storage areas are not inadvertently created. (Section 5.0)

Closed

IFI 70-7002/2005-201-01 Tracks the certificatee's revision of procedure XP4-EG-NS1101. (Section 6.0)

Discussed

None

2.0 Inspection Procedures Used

IP 88015 Headquarters Nuclear Criticality Safety Program

3.0 Partial List of Persons Contacted

United States Enrichment Corporation

*J. Bolling	Manager, Nuclear Criticality Safety Group
T. Brooks	Manager, Infrastructure Operations
D. Fosson	Operations Manager
*D. Fogel	Engineer, Nuclear Regulatory Affairs
*G. Workman	Manager, Nuclear Regulatory Affairs
R. Bouts	Manager, Training
J. Anzelmo	Technical Services
R. Lawton	Manager, Nuclear Safety and Quality
C. Rausch	Nuclear Regulatory Affairs

NRC

D. Morey Senior Criticality Safety Inspector, Headquarters

*Indicates attendance at the telephonic exit meeting on February 10, 2006.

4.0 Acronym List

CFR	Code of Federal Regulations
IFI	inspector follow-up item
IP	inspection procedure
NCS	nuclear criticality safety
NCSA	nuclear criticality safety analysis
NCSE	nuclear criticality safety evaluation
NRC	U.S. Nuclear Regulatory Commission
UF ₆	uranium hexafluoride
USEC	U.S. Enrichment Corporation