October 19, 2005

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

SUBJECT: INSPECTION REPORT NO. 70-7001/2005-203

Dear Mr. Starkey:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine, scheduled, and announced criticality safety inspection from September 26 - 30, 2005, at the Paducah facility in Paducah, Kentucky. 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 on September 30, 2005, during which time inspection observations and findings were discussed with your staff.

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

If you have any questions concerning this report, please contact Lawrence Berg, of my staff, at (301) 415-6215.

Sincerely,

/RA/

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

Docket No.: 70-7001

Enclosure: Inspection Report No. 70-7001/2005-203

cc: S. Penrod, Paducah General Manager
S. R. Cowne, Paducah Regulatory Affairs Manager
P. D. Musser, Portsmouth General Manager
S. A. Toelle, Director, Nuclear Regulatory Affairs, USEC
R. M. DeVault, Regulatory Oversight Manager, DOE
G. A. Bazzell, Paducah Facility Representative, DOE
Janice H. Jasper, State Liaison Officer

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

Docket Number:	70-7001
Certificate Number:	GDP-01
Report Number:	70-7001/2005-203
Certificatee:	United States Enrichment Corporation
Location:	Paducah, Kentucky
Inspection Dates:	September 26 - 30, 2005
Inspectors:	Lawrence Berg, Criticality Safety Inspector Natreon Jordan, Criticality Safety Inspector
Approved by:	Melanie A. Galloway, Chief Technical Support Group Division of Fuel Cycle Safety and Safeguards

Enclosure

United States Enrichment Corporation
Paducah Gaseous Diffusion Plant

NRC Inspection Report
70-7001/2005-203

EXECUTIVE SUMMARY

Introduction

Staff of the U. S. Nuclear Regulatory Commission (NRC) performed a routine, scheduled, and announced criticality safety inspection of the Paducah Gaseous Diffusion Plant in Paducah, Kentucky, from September 26 - 30, 2005. The inspection included an on-site review of certificatee programs dealing with plant operations, the nuclear criticality safety (NCS) program, audits and inspections, and NCS-related corrective actions. The certificatee programs were acceptably directed toward the protection of public health and safety and were in compliance with NRC regulatory requirements. The inspection focused on risk-significant fissile material processing activities including Buildings C-310, C-335, C-337, C-360, C-400, C-746, C-746-Q1 and C-754.

Results

- No safety concerns were noted during the inspection.

- Nuclear criticality safety analyses and supporting calculations demonstrated adequate identification and control of NCS hazards to assure operations within subcritical limits. The NCS program as observed was adequate for maintaining acceptable levels of safety.

- Certificatee NCS walkthroughs and assessments were adequate for maintaining acceptable levels of safety.

- Observed plant operations were conducted safely and in accordance with regulatory requirements.

REPORT DETAILS

1.0 NCS Program (88015)

a. Scope

The inspectors reviewed NCS analyses to determine that criticality safety of risk-significant operations was assured through engineered and human performance (controls) with adequate safety margin/certainty and preparation and review by qualified staff. The inspectors reviewed selected aspects of the following documents:

- Nuclear Criticality Safety Evaluation (NCSE)-094, "Handling, Transportation, Storage, Disassembly and Decontamination of Small Vacuum Pumps and Datum Pumps," Revision 0, dated October 30, 2003
- NCSE-091, "Fissile/Potentially Fissile Waste and Handling," Revision 3, dated June 30, 2005
- NCSE-085, "Operation of the C-400 Cylinder Washing, Hydrostatic Tests," Revision 4, dated September 1, 2005
- NCSE-105, "Transportation, Storage, and Repair of Process Motors," Revision 0, dated August 25, 2005
- NCSE-032, "Product and Side Withdrawal in the C-310 Building," Revision 6, dated May 19, 2005
- NCSE-036, "Nuclear Criticality Safety Evaluation for Decontamination in the Alkali Tank of the C-400 Building at the Paducah Gaseous Diffusion Plant," Revision 2, dated April 3, 2003
- NCSE-041, "Normetex Pumps Used for UF_6 Product Withdrawal," Revision 7, dated May 26, 2005
- NCSE-KY/S-241, "In-Place High Efficiency Particulate Airborne Filter System," Revision 6, dated April 22, 2005
- DAC-832-ZA1280-0045, "GEN-012 Small Pump Calculations," Revision 1, dated October 28, 2003
- DAC-832-ZA1280-0042, "Calculations for 5.5 Gallon Drums, 2.1 Gallon Drums, and 21 Liter Carboy Containers," Revision 1, dated June 29, 2005
- DAC-832-ZA1280-0001, "Five Gallon Waste Drum Storage (Formerly NCSE-207, Revision 1)," Revision 0, dated May 14, 1999

b. Observations and Findings

Within the selected aspects reviewed, the inspectors determined that the analyses 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 inspectors determined that NCS controls for equipment and processes assured the safety of the operations.

c. Conclusions

Nuclear criticality safety analyses and supporting calculations demonstrated adequate identification and control of NCS hazards to assure operations within subcritical limits. The NCS program as observed was adequate for maintaining acceptable levels of safety.

2.0 NCS Inspections, Audits and Investigations (88015)

a. Scope

The inspectors reviewed records of previously completed walkthroughs of fissile operations in Buildings C-315, C-400, C-720C, C-728, C-745 UF_6 cylinder yards, and C-754. The inspectors also reviewed records of completed programmatic self-assessments. The inspectors reviewed selected aspects of the following documents:

- CP4-EG-NS-1107, "Nuclear Criticality Safety Oversight Program," Revision 3, dated April 6, 2005
- 05-WS-0003, "NCS Walking Spaces Summary for C-315 Tails Withdrawal Facility," dated June 27, 2005
- 05-WS-0004, "NCS Walking Spaces Summary for C-400," dated June 29, 2005
- 05-WS-0005, "NCS Walking Spaces Summary for C-720C," dated June 30, 2005
- 05-WS-0006, "NCS Walking Spaces Summary for C-728 Motor Wash Facility," dated September 15, 2005
- 05-WS-0007, "NCS Walking Spaces Summary for C-754, C-754-A, C-757, C-727, C-746-Q1," dated September 15, 2005
- 05-WS-0008, "NCS Walking Spaces Summary for C-745 UF6 Cylinder Storage Yards," dated September 15, 2005
- C31-NCS-SA-05-04, "Corrective Maintenance Program for AQ-NCS/SRIs," dated June 30, 2005
- C31-NCS-SA-05-09, "Review of NCSEs that Assure a Less than Optimal Bounding Condition," dated August 12, 2005

b. Observations and Findings

The inspectors determined that certificatee NCS engineers observed plant operations to determine adequacy of implementation of NCS requirements and ensured that implementation weaknesses were identified and entered into the corrective action system. The inspectors observed that the certificatee NCS walkthroughs and assessments were conducted in accordance with written procedures. The inspectors noted that the walkthroughs and assessments were performed by NCS engineers who: (1) reviewed open NCS issues from previous audits; (2) reviewed the adequacy of control implementation; (3) reviewed plant operations for compliance with certificate requirements, procedures, and postings; and (4) examined equipment and operations to determine that past evaluations remained adequate. No safety concerns were noted regarding certificatee walkthroughs and assessments.

c. Conclusions

Certificatee NCS walkthroughs and assessments were adequate for maintaining acceptable levels of safety.

3.0 Plant Operations (88015)

a. Scope

The inspectors 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 inspectors verified the adequacy of management measures for assuring the continued availability, reliability and capability of safety-significant controls relied upon by the certificatee for controlling criticality risks to acceptable levels. The inspectors performed walkdowns of Buildings C-310, C-335, C-337, C-360, C-400, C-746, C-746-Q1, and C-754.

The inspector reviewed selected aspects of the following documents prior to performing the walkdowns:

- NCSE-085, “Operation of the C-400 Cylinder Washing, Hydrostatic Tests,” Revision 4, dated September 1, 2005
- NCSE-091, “Fissile/Potentially Fissile Waste and Handling,” Revision 3, dated June 30, 2005
- NCSE-032, “Product and Side Withdrawal in the C-310 Building,” Revision 6, dated May 19, 2005
- NCSE-036, “Nuclear Criticality Safety Evaluation for Decontamination in the Alkali Tank of the C-400 Building at the Paducah Gaseous Diffusion Plant,” Revision 2, dated April 3, 2003
- NCSE-041, “Normetex Pumps Used for UF6 Product Withdrawal,” Revision 7, dated May 26, 2005
- NCSE-KY/S-241, “In-Place High Efficiency Particulate Airborne Filter System,” Revision 6, dated April 22, 2005

b. Observations and Findings

The inspector verified that controls identified in the NCS analyses reviewed 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.

c. Conclusions

Observed plant operations were conducted safely and in accordance with regulatory requirements.

4.0 Open Item Follow-up

IFI 70-7001/2005-201-01

This item tracked the certificatee's revision of NCSE 085 to clarify the double contingency argument for backflow. During inspection 70-7001/2005-201, the inspectors had determined that the double contingency basis had not been clearly described for scenario 7 of the cylinder wash NCSE. During this inspection, the inspectors reviewed the revisions to the scenario 7 double contingency basis, and determined that the double contingency basis clearly identified both the potential accident sequence and the credited controls. This item is closed.

IFI 70-7001/2005-201-02

This item tracked the certificatee's initiation of suspect drum recharacterization. During inspection 70-7001/2005-201, the inspectors noted that suspect drum recharacterization was scheduled to begin in October of 2005 and would involve approximately 12,000 drums. During this inspection, the inspectors reviewed certificatee procedure, CP-4-EW-WM9002, "Remediation Requirements for C-335 Generator Staging Area (C335-10)," Revision 0, which was implemented on September 30, 2005. The inspectors determined that the procedure adequately incorporated the NCS controls identified in the safety basis documentation, NCSE 091. The inspectors concluded, therefore, that the certificatee's recharacterization of suspect drums in accordance with procedure CP-4-EW-WM9002 complied with the double contingency principle and assured subcriticality in the event a suspect drum was found to have a U^{235} in excess of the NCS limit. This item is closed.

VIO 70-7001/2004-203-02

This violation concerned the failure to establish or maintain double contingency for the accident scenario of recirculating cooling water in-leakage to the enrichment cascade through the purge and evacuation coolers. During inspection 70-7001/2005-201, the inspectors had determined that the certificatee had completed all corrective actions identified in the November 15, 2004, reply to Notice of Violation 70-7001/2004-203-02. The issue was inadvertently left open in inspection report 70-7001/2005-201 because an additional corrective action, which was not a commitment identified in the reply to the Notice of Violation, had not been completed. During this inspection, the inspectors noted that this additional corrective action was still ongoing as part of the certificatee's corrective action process to revise the quality of older NCS evaluations. The inspectors re-verified that all commitments identified in the November 15, 2004, reply were completed. This item is closed.

5.0 Exit Meetings

The inspectors communicated the inspection scope and results to members of Paducah Gaseous Diffusion Plant management and staff throughout the inspection and during an exit meeting on September 30, 2005. Paducah Gaseous Diffusion Plant management and staff acknowledged and understood the findings as presented.

Supplementary Information

1.0 List of Items Opened, Closed, and Discussed

Opened

None.

Discussed

None.

Closed

IFI 70-7001/2005-201-01	Tracked the certificatee's revision of NCSE 085 to clarify the double contingency argument for backflow
IFI 70-7001/2005-201-02	Tracked the certificatee's initiation of suspect drum recharacterization
VIO 70-7001/2004-203-02	Failure to establish or maintain double contingency for the accident scenario of recirculating cooling water in-leakage to the enrichment cascade through the purge and evacuation coolers

2.0 Inspection Procedures Used

IP 88015	Headquarters Nuclear Criticality Safety Program

3.0 Partial List of Persons Contacted

USEC

J. Martin	Manager, Nuclear Criticality Safety
S. Cowne	Manager, Nuclear Regulatory Affairs
D. Stadler	Engineer, Nuclear Regulatory Affairs
T. Hofer	Engineer, Nuclear Criticality Safety
T. Henson	Engineer, Nuclear Criticality Safety
J. Lewis	Manager, Maintenance
D. Baltimore	Engineer, Nuclear Criticality Safety
B. Chenier	Nuclear Criticality Safety
M. Boren	Nuclear Regulatory Affairs
S. Penrod	General Manager
E. Paine	Manager, Chemical Operations
L. Jackson	Manager, Operations

Attachment

NRC
N. Jordan, Criticality Safety Inspector, Headquarters
L. Berg, Criticality Safety Inspector, Headquarters
M. Thomas, Resident Inspector, RII

All attended the exit meeting on September 30, 2005.

4.0 List of Acronyms and Abbreviations

IFI	inspector follow-up item
NCS	nuclear criticality safety
NCSE	nuclear criticality safety evaluation
NRC	U. S. Nuclear Regulatory Commission
USEC	U.S. Enrichment Corporation
VIO	violation