

March 5, 2008

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. 70-7002/2008-201

Dear Mr. Starkey:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine, scheduled, and announced criticality safety (NCS) inspection from February 11-14, 2008, at the Portsmouth facility in Piketon, Ohio. The purpose of the 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 February 14, 2008, during which inspection observations and findings were discussed with your management and 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 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. As a result of this inspection, no violations of NRC requirements were identified.

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>.

R. Starkey Jr.

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If you have any questions concerning this report, please contact Dennis Morey, of my staff, at (301) 492-3112.

Sincerely,

/RA/

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

Docket No.: 70-7002

Enclosure: Inspection Report No. 70-7002/2008-201

cc: S. Penrod, Paducah General Manager
V. Shanks, Paducah Regulatory Affairs Manager
W. Jordan, 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 No.: 70-7002

Certificate No.: GDP-02

Report No.: 70-7002/2008-201

Certificatee: United States Enrichment Corporation

Location: Piketon, Ohio

Inspection Dates: February 11-14, 2008

Inspectors: Dennis Morey, Criticality Safety Inspector

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

Enclosure

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

NRC Inspection Report 70-7002/2008-201

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, from February 11-14, 2008. The inspection included an on-site review of the certificatee's programs dealing with the nuclear criticality safety (NCS) program, NCS audits and inspections, NCS-related corrective actions, and NCS-related plant operations. The inspection focused on risk-significant fissile material processing activities including those in Buildings X-326, X-330, X-343, and X-705.

Results

- No safety concerns were identified regarding the certificatee's NCS program.
- No safety concerns were identified regarding the certificatee's NCS program administrative procedures.
- No safety concerns were noted regarding the certificatee's NCS evaluations.
- No safety concerns were identified regarding the certificatee's internal event reporting, investigation, and correction actions.
- No safety concerns were identified during walkdowns of the facility and operations.

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 shutdown. During the inspection, the certificatee was conducting cylinder re-feed, technetium clean-up, cell deposit remediation, equipment decontamination, uranium recovery, wastewater treatment and routine dry waste handling and processing operations.

2.0 Nuclear Criticality Safety Program (IP 88015, 88016)

a. Inspection Scope

The inspector reviewed the certificatee's NCS program. The inspector evaluated the adequacy of the program to assure the safety of fissile material operations. The inspector interviewed the certificatee's managers, NCS engineers, system engineers, and facility operators during document review and facility walkdowns. The inspector reviewed selected aspects of the following documents:

- XP2-EG-NS1031, "Nuclear Criticality Safety," Revision 8, dated November 5, 2008.
- XP2-EG-NS1032, "NCS Subcommittee to the PORC," Revision 2, dated March 24, 2000.

b. Observations and Findings

The inspector observed that the certificatee had an effective NCS program which was independent from production and was implemented through written procedures. During the inspection, the inspector observed NCS staff engaging in various program aspects such as audits, analysis and control implementation. The inspector reviewed separate program elements such as procedures, analysis and audits which is discussed in subsequent sections of this report.

c. Conclusions

No safety concerns were identified regarding the certificatee's NCS program.

3.0 Administrative and Operating Procedures (IP 88015)

a. Inspection Scope

The inspector reviewed the certificatee's NCS program administrative procedures to determine whether the authority and responsibilities of the NCS staff is defined in administrative instructions and whether administrative procedures adequately implement

the NCS program described in plant documents, including the certificate. The inspector reviewed selected aspects of the following documents:

- XP4-EG-NS1001, "NCS Evaluation and Approval," Revision 7, dated February 28, 2001.
- XP4-EG-NS1025, "NCS Response to Anomalous Conditions," Revision 1, dated February 28, 2001.
- XP4-EG-NS1035, "Peer Technical Review of NCSAs/Es," Revision 0, dated July 27, 1998.
- XP4-EG-NS1100, "NCS Calculations," Revision 1, dated November 30, 1999.
- XP4-EG-NS1101, "NCS Walk-Through and Review Program," Revision 3, dated July 7, 2005.

b. Observations and Findings

The inspector reviewed the certificatee's administrative procedures, a selection of changes affecting NCS analysis, and selected NCS controls. The inspector interviewed certificatee's managers, NCS engineers, and facility operators during document reviews and facility walkdowns. The inspector determined that the certificatee's NCS program was conducted in accordance with written administrative procedures that reflected the program described in the certificate.

c. Conclusions

No safety concerns were identified regarding the certificatee's NCS program administrative procedures.

4.0 Nuclear Criticality Safety Evaluations and Analyses (IP 88016)

a. Inspection Scope

The inspector reviewed NCS analyses to determine that criticality safety of risk-significant operations was ensured through engineered and administrative controls with adequate safety margin 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:

- NCSA-Plant066, "Mopping Contaminated Areas," Revision 9, dated June 20, 2006
- NCSE-Plant066, "Mopping Contaminated Areas," Revision 9, dated May 25, 2006
- NCSA-Plant031, "Portable Sampling/Testing Buggies and Carts," Revision 10, dated November 19, 2007
- NCSE-Plant031, "Portable Sampling/Testing Buggies and Carts," Revision 10, dated November 19, 2007
- NCSA-705-024, "X-705 B-Area Electric Calciners," Revision 9, dated June 20, 2006
- NCSE-705-024, "X-705 B-Area Electric Calciners," Revision 9, dated June 20, 2006

- NCSA-705-024, "Use of Inadvertent Containers in X-705," Revision 6, dated March 6, 2007
- NCSE-705-024, "Use of Inadvertent Containers in X-705," Revision 6, dated March 6, 2007
- NCSA-705-024, "Blending/Sampling Solution in the West Annex," Revision 6, dated August 6, 2007
- NCSE-705-024, "Blending/Sampling Solution in the West Annex," Revision 6, dated June 22, 2007

b. Observations and Findings

The inspector reviewed NCS Approvals, NCS Evaluations (NCSE), and supporting calculations for new, changed, and other selected operations. Within the selected aspects reviewed, the inspector 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 inspector determined that NCS controls for equipment and processes assured the safety of the operations. Nuclear criticality safety 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 certificatee NCS evaluations.

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

a. Inspection Scope

The inspector reviewed recent internally- and externally-reported NCS-related events. The inspector reviewed selected aspects of the following documents:

- NSI-07-03222, "Anomalous Condition Report - NCS Spacing Violation," Revision 0, dated October 30, 2007
- NSI-07-03664, "Anomalous Condition Report - NCS Spacing Violation," Revision 0, dated December 13, 2007
- NSI-07-03724, "Anomalous Condition Report - NCS Floor Storage," Revision 0, dated December 12, 2007
- WTR-CS-2007-009, Cylinder Storage Yards, dated July 7, 2007
- WTR-CS-2007-010, X-343, dated October 17, 2007
- WTR-CS-2007-010, X-343, Revision 1, dated July 7, 2007
- WTR-CS-2007-011, X-333, dated October 23, 2007
- WTR-CS-2007-012, X-710, dated October 23, 2007

- WTR-CS-2007-013, X-333, dated October 25, 2007
- WTR-CS-2007-014, X-344A, dated October 29 and 30, 2007
- WTR-CS-2007-015, X-760, dated October 29, 2007
- WTR-CS-2007-016, XT-847, dated December 28, 2007
- WTR-CS-2007-017, X-330, dated December 28, 2007
- WTR-CS-2008-001, X-700, dated January 29, 2007
- WTR-CS-2008-002, X-330, dated January 30, 2007
- WTR-CS-2008-003, X-333, dated January 31, 2007

b. Observations and Findings

The inspector determined that NCSE-related events were adequately investigated in accordance with written procedures and appropriate corrective actions were assigned and tracked to closure.

c. Conclusions

No safety concerns were identified regarding the certificatee internal event reporting, investigation, and correction actions.

6.0 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 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 inspector performed walkdowns of Buildings X-326, X-330, X-343, and X-705. The inspector reviewed selected aspects of the following document prior to performing the walkdowns:

- Procedure XP2-CU-DC2307, "Mopping Contaminated Areas," Revision 4, dated November 21, 2003

b. Observations and Findings

The inspector verified that controls identified in the NCS analyses reviewed were adequate to assure safety. The inspector observed that the cognizant NCS engineers were knowledgeable and able to explain the basis for changes in operations and controls. An example of a change in operations and controls that the inspector noted was a change to inadvertent container requirements in X-705. An inadvertent container is a container that is deemed to have dimensions or volume suitable to support inadvertent criticality if it were to collect fissile solution normally present in a specified process area. The certificatee assumes that fissile solution present in X-705 contains

uranium that is less than 5% enriched and had identified inadvertent container size limits for specified areas where enrichment may be 5% or greater. The certificatee implemented a change in order to identify new inadvertent container size limits for area that may contain fissile solution that is up to 10% enriched. The inspector noted that the change causes the facility to have three sets of inadvertent container sizes. The inspector reviewed the certificatee's implementation of inadvertent container control areas. The inspector observed that the certificate had identified and addressed analytical and implementation issues related to the change.

c. Conclusions

No safety concerns were identified during walkdowns of the facility and operations.

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 an exit meeting on February 14, 2008. Portsmouth Gaseous Diffusion Plant management and staff acknowledged and understood the findings as presented.

SUPPLEMENTARY INFORMATION

1.0 Items Opened, Closed, and Discussed

Items Opened

None

Items Closed

None

Items Discussed

None

2.0 Inspection Procedures Used

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

3.0 Partial List of Persons Contacted

USEC

E. Wagner*	Manager, Nuclear Criticality Safety
T. Brooks*	Director, Infrastructure Operations
D. Fogel	Engineer, Nuclear Regulatory Affairs
A. Stone*	Engineer, Nuclear Regulatory Affairs
L. Sendek*	Engineer, Nuclear Regulatory Affairs
M. Conkel*	Manager, Chemical Utilities
L. Cutlip*	Director, Project Management & Strategic Planning
D. D'Aquila*	Lead, Nuclear Criticality Safety
R. Lemming*	Engineer, Nuclear Criticality Safety
D. Davidson	Operations Manager X-342/X-343
J. Anzelmo*	Director, Technical Services
C. Rausch	Engineer, Nuclear Regulatory Affairs
R. Woods	Training
D. Whittle*	Technician Feed Manager

NRC

D. Morey	Criticality Safety Inspector, NRC Headquarters
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*Attended the exit meeting on February 14, 2008.

4.0 List of Acronyms and Abbreviations

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
IP	inspection procedure
NCS	nuclear criticality safety
NCSA	nuclear criticality safety analysis
NCSE	nuclear criticality safety evaluation
NMSS	NRC Office of Nuclear Material Safety and Safeguards
PORC	Certificatee plant operations review committee
USEC	U.S. Enrichment Corporation (certificatee)