February 5, 2010

Mr. Robert Van Namen
Senior Vice President – Uranium Enrichment
United States Enrichment Corporation
6903 Rockledge Drive
Bethesda, MD 20817

SUBJECT: INSPECTION REPORT NO. 70-7002/2010-201

Dear Mr. Van Namen:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine, scheduled, and announced nuclear criticality safety (NCS) inspection from January 5-7, 2010, 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 on January 7, 2010, during which time inspection observations and findings were formally discussed with your management and staff.

The inspection, which is described in the enclosure, focused on the most hazardous activities and plant conditions; the most important controls relied on for safety and their analytical basis; and the principal management measures for ensuring controls are 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 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. Throughout this inspection, observations were discussed with your management and staff.

In accordance to the Title 10 of the *Code of Federal Regulations* 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 Dennis Morey, of my staff, at (301) 492-3112, or via e-mail to Dennis.Morey@nrc.gov.

Sincerely,

/RA/

Patricia A. Silva, Chief
Technical Support Branch
Special Projects and Technical
Support Directorate
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Enclosure: Inspection Report No. 70-7002/2010-201

Docket No.: 70-7002

cc: R. Starkey, Portsmouth General Manager
R. DeVault, Regulatory Oversight Manager, DOE
D. Fogel, Nuclear Regulatory Affairs Manager, Portsmouth
S. A. Toelle, Manager, Regulatory Affairs, USEC
C. O'Claire, State Liaison Officer, Ohio

If you have any questions concerning this report, please contact Dennis Morey, of my staff, at (301) 492-3112, or via e-mail to Dennis.Morey@nrc.gov.

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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.:	70-7002/2010-201
Certificate Holder:	United States Enrichment Corporation
Location:	Piketon, Ohio
Inspection Dates:	January 5-7, 2010
Inspector:	Dennis Morey, Criticality Safety Inspector
Approved by:	Patricia A. Silva, Chief Technical Support Branch Special Projects and Technical Support Directorate Division of Fuel Cycle Safety and Safeguards Office of Nuclear Material Safety and Safeguards

Enclosure

United States Enrichment Corporation
Portsmouth Gaseous Diffusion Plant

NRC Inspection Report 70-7002/2010-201

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 (GDP) in Piketon, Ohio, from January 5-7, 2010. The inspection included an on-site review of the certificate holder's programs dealing with plant operations, the nuclear criticality safety (NCS) program, NCS audits and inspections, NCS-related events, and the facility criticality alarm system. The inspection focused on risk-significant fissile material processing activities including those in Buildings X-326, X-333, and X-705.

Results

- A weakness was identified in the certificate holder response to a uranyl nitrate hexahydrate (UNH) block valve failure event. No immediate safety concerns were identified as a result of the weakness.

- No safety concerns were identified regarding the certificate holder NCS program.

- No safety concerns were identified regarding certificate holder NCS walkthroughs, assessments, and surveillance.

- No safety concerns were identified regarding certificate holder's criticality alarm coverage of fissile material operations.

- 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 GDP near Piketon, OH, in cold shutdown. During the inspection, the certificate holder was conducting cell deposit remediation, maintenance and equipment salvage, equipment decontamination, uranium recovery under contract for the U.S. Department of Energy (DOE), waste water treatment, and routine dry waste handling and processing operations. USEC has recently agreed with DOE to pursue a certificate amendment in support of de-leasing the cascade and autoclave buildings. Subsequent to NRC approval of de-leasing, remaining operational areas would include the 700 complex (i.e., X-705, X-710, X-720 etc.) along with parts of the utilities operations.

2.0 Nuclear Criticality Safety Program (IP 88015)

a. Inspection Scope

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

- POEF-SH-30, "Calculational Analysis for Small Diameter Containers," dated November 1995
- NCS-CALC-06-2002, "K and T Containers with 100% Enriched UO_2F_2 and H_2O not Bounded by GP Containers, dated October 10, 2006
- NCSA-PLANT025.A11 [nuclear criticality safety approval], "Use of Small Diameter Containers for Storing up to 10% Enriched Material," Revision 11, dated August 17, 2009
- NCSE-PLANT025.E07 [nuclear criticality safety evaluation], "Use of Small Diameter Containers for Storing up to 10% Enriched Material," Revision 7, dated August 17, 2009
- NCSA-PLANT006.A16, "Use of Small Diameter Containers for Storing High Enriched Material," Revision 16, dated August 17, 2009
- NCSE-PLANT006.E10, "Use of Small Diameter Containers for Storing High Enriched Material," Revision 10, dated August 17, 2009
- NCSA-0326_013.A16, "Cascade Operations in X-326," Revision 16, dated September 16, 2009
- NCSE-0326_013.E16, "Cascade Operations in X-326," Revision 16, dated September 16, 2009
- NCSA-PLANT049_A04, "Portable, Small UF_6 Release Gulpers," Revision 4, dated September 16, 2009
- NCSE-PLANT049_E04, "Portable, Small UF_6 Release Gulpers," Revision 4, dated September 16, 2009

- NCSA-PLANT022.A05, "Sample Cylinder Handling and Storage," Revision 5, dated September 1, 2009
- NCSA-PLANT085.A11, "X-340 Complex Autoclave Operation," Revision 11, dated September 1, 2009
- NCSE-PLANT085.E11, "X-340 Complex Autoclave Operation," Revision 11, dated September 1, 2009
- NCSA-PLANT096.A02, "Cold Standby and Cold Shutdown Cascade Equipment," Revision 2, dated September 1, 2009
- NCSE-PLANT096.E02, "Cold Standby and Cold Shutdown Cascade Equipment," Revision 2, dated September 1, 2009
- NCSA-PLANT043.A08, "Fissile Material Transport," Revision 8, dated November 10, 2009
- NCSE-PLANT043.E08, "Fissile Material Transport," Revision 8, dated November 10, 2009

b. Observations and Findings

The inspector observed that the certificate holder had an NCS program which was independent from production and was implemented through written procedures. 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. The inspector reviewed NCS approvals, NCS evaluations, 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. The inspector determined that NCS controls for equipment and processes assured the safety of the operations and that nuclear criticality safety analyses and supporting calculations assured operations within subcritical limits.

c. Conclusions

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

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

a. Inspection Scope

The inspector reviewed records of previously-completed certificate holder internal NCS walkthroughs of fissile operations and observed a certificate holder audit. The inspector reviewed selected aspects of the following documents:

- XP4-EG-NS1101, "NCS Walkthrough and Review program," Revision 3, dated March 14, 2006
- WTR-CS-2009-008, "X-343," dated October 16, 2009
- WTR-CS-2009-009, "X-344A," dated October 16, 2009
- WTR-CS-2009-010, "X-333," dated October 16, 2009
- WTR-CS-2009-011, "X-710," dated October 23, 2009
- WTR-CS-2009-012, "X-333," dated October 20, 2009

- WTR-CS-2009-013, "X-330," dated December 13, 2009
- WTR-CS-2009-014, "XT-847," dated December 13, 2009

b. Observations and Findings

The inspector accompanied a certificatee NCS engineer on a scheduled audit of the X-333 building and reviewed reports of audits conducted since the previous inspection. The inspector observed that the certificate holder NCS walkthroughs and assessments were conducted within the required time limit and were performed in accordance with written procedures. The inspector noted that the walkthroughs and assessments were performed by NCS engineers who: (1) reviewed NCS analysis and other requirements for the operations to be audited; (2) reviewed NCS issues from previous audits; (3) reviewed the adequacy of control implementation and compliance with certificate holder requirements, procedures, and postings; and (4) examined equipment and operations to determine that past evaluations remained adequate.

c. Conclusions

No safety concerns were identified regarding the certificate holder's NCS walkthroughs, assessments, and surveillance.

4.0 Nuclear Criticality Safety Event Review and Follow-up (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:

- Anomalous Conditions Incident Report, NSI-09-01869, "DOE versus USEC NCS Limits," Revision 0, dated August 17, 2009
- Anomalous Conditions Incident Report, 09-01901, "UNH Spill from failed block valve," Revision 0, dated August 21, 2009

b. Observations and Findings

The inspector noted that a recent event in the uranium recovery area of X-705 involved the abrupt failure of a block valve when exposed to UNH and which resulted in approximately 25 liters of 5% enriched UNH spilling to the floor of the facility. This event resulted from the incorrect replacement of a stainless steel plug in a stainless steel valve body with a Monel plug during maintenance. The block valve was below a UNH storage column that fed one of the calciners and the valve could not be isolated. During the leak event, operators determined that it was unsafe to enter the room and attempt to catch the spraying solution and the UNH was allowed to leak out to the floor. The certificate holder determined that the Monel plug had been in stores for at least ten years and was in a distributor package labeled stainless steel. The inspector noted that, although the quality level for the stainless steel valve was augmented quality-nuclear criticality safety (AQ-NCS), the quality level for the replacement plug was non-safety related (NS), a lower quality level. The AQ-NCS level of the valve was based on a criticality safety limit on the valve diameter. The lower NS level of the replacement valve stem was based on the valve stem not affecting the diameter of the valve body. Composition of the replacement valve stem was not considered important to the safety function of the valve.

The inspector determined that the certificate holder investigation results were entered incorrectly (response block not checked) into the facility corrective action Business Prioritization System (BPS) database such that the responsible manager was unaware that a response was required. Because of the incorrect entry, the responsible manager did not determine or assign long-term corrective actions. Since long-term corrective actions had not been assigned at the time of this inspection, the certificate holder could not say what the long term corrective actions would be. For example, the certificate holder could not say whether the quality level of replacement plugs for UNH service would be increased. The inspector determined that the certificate holder had performed an investigation of the event including a critique and an extent of condition review resulting in identification of an addition Monel plug installed incorrectly in a UNH line and seven Monel plugs is storage misidentified as stainless steel. Because the certificate holder's immediate corrective actions included testing all related valve plugs to assure that stainless steel valve plugs were not misidentified as Monel and new maintenance requirements were implemented to test for misidentified Monel parts during maintenance activities involving piping, valves and pumps in X-705, there was no immediate safety concern from the failure to assign long-term corrective actions. Certificate holder assignment of long term corrective actions for the UNH block valve failure event will be tracked as **Inspector Follow-up Item (IFI) 70-7002/2010-201-01**.

c. Conclusions

A weakness was identified in the certificate holder response to a UNH block valve failure event. No immediate safety concerns were identified as a result of the weakness.

5.0 Criticality Alarm System (IP 88017)

a. Inspection Scope

The inspector reviewed documentation of criticality accident alarm detector coverage and interviewed engineering and maintenance staff regarding planned changes to the alarm system hardware.

b. Observations and Findings

The inspector determined that the certificate holder had installed and maintained a system of criticality detectors that were capable of monitoring fissile material operations at the facility and reliably detecting the minimum accident of concern. The inspector reviewed a planned upgrade of the alarm system controller boards and discussed the installation of alarm cluster heaters.

c. Conclusions

No safety concerns were identified regarding the certificate holder's criticality alarm coverage of fissile material operations.

6.0 Plant Activities (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 reviewed selected aspects of the following documents prior to performing the walkdowns:

- NCSA-0705-012, "Operation of the X-705 Small Parts hand-Tables in A-Area," Revision 7, dated June 14, 2005
- NCSA-0705-024, "X-705 B-Area Electric Calciners," Revision 7, dated May 6, 2009
- NCSE-0705-012, "Operation of the X-705 Small Parts hand-Tables in A-Area," Revision 6, dated June 14, 2005
- NCSE-0705-024, "X-705 B-Area Electric Calciners," Revision 7, dated May 6, 2009

b. Observations and Findings

The inspector performed walkdowns of buildings X-326, C-333, and X-705. The inspector verified that controls identified in the NCS analyses reviewed were adequate to assure safety. The inspector determined that cognizant NCS engineers were knowledgeable and able to explain the basis for changes in operations and controls.

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 GDP management and staff throughout the inspection and during an exit meeting on January 7, 2010. Portsmouth GDP management and staff acknowledged and understood the findings as presented.

SUPPLEMENTARY INFORMATION

1.0 Items Opened, Closed, and Discussed

Items Opened

IFI 70-7002/2010-201-01	Tracks assignment of corrective actions for the UNH block valve failure event.

Items Closed

None

2.0 Inspection Procedures Used

IP 88015	Nuclear Criticality Safety Program
IP 88016	Nuclear Criticality Safety Evaluations and Analyses
IP 88017	Criticality Alarm Systems

3.0 Partial List of Persons Contacted

USEC

J. Albright	Project Maintenance Manager
J. Anzelmo	Manager, Technical Services
T. Brooks	Director, Infrastructure Operations
B. Corbin	Waste Management
D. D'Aquila	Engineer, Nuclear Criticality Safety
D. Davidson	X-340 Operations Manager
D. Fogel	Manager, Nuclear Regulatory Affairs
K. James	Engineer, Nuclear Criticality Safety
M. Keef	Business and Program Manager
P. Potter	Director, Infrastructure and utilities
J. Rapp	Engineer, Nuclear Criticality Safety
J. Snyder	Group Manager, X-330
R. Starkey	General Manager
A. Stone	Nuclear Regulatory Affairs
J. Tully	Manager, X-326 Operations
E. Wagner	Manager, Nuclear Criticality Safety

NRC

D. Morey	Criticality Safety Inspector, Headquarters

All attended the exit meeting on January 7, 2010.

Attachment

4.0 List of Acronyms and Abbreviations

ADAMS	Agency-Wide Document Access and Management System
DOE	U.S. Department of Energy
GDP	Gaseous Diffusion Plant
IFI	Inspector follow-up item
IP	inspection procedure
NCS	nuclear criticality safety
NCSA	nuclear criticality safety approval
NCSE	nuclear criticality safety evaluation
UNH	uranyl nitrate hexahydrate
USEC	U. S. Enrichment Corporation (certificate holder)