



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931**

November 21, 2003

Mr. J. Morris Brown
Vice President - Operations
United States Enrichment Corporation
Two Democracy Center
6903 Rockledge Drive
Bethesda, MD 20817

SUBJECT: NRC INSPECTION REPORT 07007001/2003-010(DFFI) - PADUCAH

Dear Mr. Brown:

On November 12, 2003, the NRC completed a routine resident inspection at the Paducah Gaseous Diffusion Plant. The purpose of the inspection was to determine whether activities authorized by the certificate were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection on November 12, 2003, the NRC inspectors discussed the findings with members of your staff.

This inspection consisted of an examination of activities conducted under your certificate as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your certificate. Areas examined during the routine resident inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities in progress, and interviews with personnel.

Based on the results of this inspection, the NRC did not identify any violations.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

/RA/

Jay Henson, Chief
Fuel Facility Inspection Branch 2
Division of Fuel Facility Inspection

Docket No. 07007001
Certificate No. GDP-1

Enclosure: (See page 2)

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2

Enclosure: Inspection Report 07007001/2003-010 (DFFI)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No. 07007001

Certificate No. GDP-1

Report No. 07007001/2003-010

Facility Operator: United States Enrichment Corporation

Facility Name: Paducah Gaseous Diffusion Plant

Location: 5600 Hobbs Road
P.O. Box 1410
Paducah, KY 42001

Dates: October 1, 2003 through November 12, 2003

Inspectors: Bruce L. Bartlett, Senior Resident Inspector
Mary L. Thomas, Resident Inspector

Approved by: Jay Henson, Chief
Fuel Facility Inspection Branch 2
Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

United States Enrichment Corporation
Paducah Gaseous Diffusion Plant
NRC Inspection Report 07007001/2003-010

This inspection included aspects of certificatee operations, maintenance, and engineering. The report covered a six-week period of resident inspection activities, including follow-up to issues identified during previous inspections.

Operations

Routine operations activities were conducted in accordance with written procedures. Routine communications among operators were adequate. Nuclear criticality safety requirements were adequately addressed during routine operations activities. However, certificatee staff identified inattentive operators in the Feed Vaporization Facility, C-333A, and took appropriate action to address the issue (Paragraph 1.a).

Maintenance

Maintenance and surveillance activities were conducted appropriately and in accordance with approved procedures. Acceptance criteria contained in surveillance procedures were adequate and, when required, assessment and tracking reports were initiated (Paragraph 2.a).

During routine observations, the inspectors determined that the certificatee had not entered all truck trailers used to move uranium hexafluoride (UF₆) cylinders on site into the preventive maintenance program. In addition, the inspectors identified discrepancies concerning the labeling of these trailers. Material condition deficiencies identified by both the inspectors and the certificatee were corrected (Paragraph 2.b).

One unresolved item related to the certificatee's root cause and corrective actions in response to deficiencies found on the structural supports for the cranes which handled liquid UF₆ cylinders was identified (Paragraph 2.c).

Engineering

Following questioning by the inspectors of a proposed cylinder-to-cylinder transfer project regarding compliance with 10 CFR 76.68, the activity was placed on hold. Certificatee personnel failed to identify that, as the proposed experiment was not described in the Safety Analysis Report, prior NRC approval was required (Paragraph 3.a).

REPORT DETAILS

1. Conduct of Operations

a. Routine Operations Activities

(1) Inspection Scope (88100)

The inspectors observed routine operations activities and discussed routine operations with staff and management. In addition, the inspectors reviewed the applicable area control room (ACR) log books and routine surveillance forms. The inspectors observed operators respond to various alarms and reviewed the following documents:

- ATRC-03-3652, Inattentive operators in Feed Facility C-333A;
- CP2-CO-CO1030, "Maintaining Narrative Logbooks," Revision 2;
- CP2-CO-ON3031, "Abnormal Criticality Accident Alarm System Conditions," Revision 9;
- CP4-CO-CN2028, "Cascade Valve and Leak Rating Operations," Revision 15;
- CP4-CO-CN2075, "Operation of Cascade RCW Systems," Revision 15;
- CP4-CO-CN2076, "Control of Cascade Assay," Revision 3; and
- CP4-CO-CN6069, "Periodic Regulatory Checks," Revision 27.

(2) Observations and Findings

The inspectors observed routine operations in the cascade buildings and area control rooms, the feed vaporization facility, product and tails withdrawal facilities, and the central control facility. The appropriate nuclear criticality safety requirements were implemented for the routine activities observed. The operations staff were alert and generally knowledgeable of the current status of equipment associated with their assigned facilities, with one exception.

On October 26, 2003, at 4:40 am, a Quality Assurance (QA) auditor performing routine deep back shift coverage found both operators at C-333A, Feed Vaporization Facility, inattentive to duty with their feet up on their desks. One operator had his chin on his chest with his eyes closed. The other operator was leaning back in his chair with his eyes closed. The QA auditor stood between the two operators for several minutes and then spoke loudly enough that they became aware of his presence. When questioned by management as to why he did not follow the recommended guidance to get a member of plant management to observe, the QA auditor stated that he was concerned about safe facility operations while leaving the operators in their inattentive positions. The certificatee entered this finding into their corrective action program as ATRC-03-3652 and took immediate action to counsel the operators regarding the requirements for attentiveness while on duty.

(3) Conclusions

Routine operations activities were conducted in accordance with written procedures. Routine communications among operators were adequate. Nuclear criticality safety requirements were adequately addressed during routine operations activities. However, certificatee staff identified inattentive operators in the Feed Vaporization Facility, C-333A, and took appropriate action to address the issue.

b. Miscellaneous Operations Issues(1) Miscellaneous Open Item Closures (92701)

(Closed) VIO 07007001/2001-02-03: Failure to revise work package. The inspectors verified that maintenance workers and Front Line Managers (FLM) had been re-instructed on the criteria for revising work packages and the criteria for engineering test approvals. This item is closed.

(Closed) IFI 07007001/2001-02-04: Development of an acceptable Nuclear Criticality Safety Approval (NSCA) for disassembly of centrifugal compressors. The inspectors reviewed NCSA GPS-19, "Centrifugal Pump Disassembly at Building C-400," Revision 0, and Nuclear Criticality Safety Evaluation (NCSE) GPS-19, "Centrifugal Pump Disassembly at Building C-400," Revision 0, and determined that appropriate limits were established on controlled parameters and that double contingency was assured for each credible accident sequence leading to inadvertent criticality. This item is closed.

(Closed) IFI 07007001/2001-02-05: Development of an acceptable NCSA/E to bound cylinder washing above two percent assay in the C-409 Stabilization Building. The certificatee developed the NCSA/E but had no current plans to implement it. The inspectors reviewed NCSA 409-002, "Disassembly of Fissile Compressors in C-400 and C-720," Revision 0, and its associated NCSE 057, Revision 0, and determined that appropriate limits were established on controlled parameters and that double contingency was assured for each credible accident sequence leading to inadvertent criticality. This item is closed.

(Closed) IFI 07007001/2001-02-06: Revision of the C-710 Technical Services Building laboratory NCSAs to support operational upgrades such as processing laboratory solution in the C-409 Stabilization Building without assay dilution. The inspectors reviewed the changes and determined that appropriate limits were established on controlled parameters and that double contingency was assured for each credible accident sequence leading to inadvertent criticality. This item is closed.

(Closed) IFI 07007001/2001-02-07: Upgrade of C-400 Cleaning Building General Maintenance NCSA requirements to include the C-409 Stabilization Building. The inspectors reviewed the applicable NCSA and maintenance procedure and determined that the C-409 Stabilization Building had been included. This item is closed.

(Closed) IFI 07007001/2001-02-08: Revision of the UF₆/R-114 separation unit NCSA to support an increase in the assay limit to three percent. The inspectors reviewed the

revised NCSA/E, performed walkdowns of the old separation system removal and the planned new system installation, and determined that appropriate limits were established on controlled parameters and that double contingency was assured for each credible accident sequence leading to inadvertent criticality. This item is closed.

2. Conduct of Maintenance and Surveillance

a. Maintenance and Surveillance Activity Reviews

(1) Inspection Scope (88102 and 88103)

For the maintenance and surveillance activities listed below, the inspectors verified one or more of the following: activities observed were performed in a safe manner; testing was performed in accordance with procedures; measuring and test equipment was within calibration; Technical Safety Requirement Limiting Conditions for Operations were entered, when appropriate; removal and restoration of the affected components were properly accomplished; test acceptance criteria were clear and conformed with the Technical Safety Requirements and the Safety Analysis Report; and any deficiencies or out-of-tolerance values identified during the testing were documented, reviewed, and resolved by appropriate management personnel.

- Work Order 0305184, Annual Surveillance of Toll, Transfer, and Sampling Building C-360 East Crane;
- Work Order 0307374, Quarterly Criticality Accident Alarm System (CAAS) Surveillance of "P" Cluster;
- Work Order 0307850, Replacement of the Unit 5, Cell 10, Stage 5B Seal in Process Building C-333;
- Work Order 0308484, Replacement of the Unit 3, Cell 9 , Stage 4 Converter in Process Building C-331;
- Work Order 0308837, Install CAAS UPS 05-999-9910 and perform Cluster "AE" Functional Test Operability Support for C-409 in accordance with Procedure CP4-GP-IM6516;
- Work Order 0309382, Quarterly Functional Test of Feed Vaporization Facility C-337A Autoclave 3 East;
- Work Order 0310034, Monthly Surveillance of Feed Vaporization Facility C-333A East Crane Lifting Fixture and Sling Legs;
- Work Order 0311937, Inspect collector shoes and replace as necessary. Notify System Engineer of findings on the Toll, Transfer, and Sampling Building C-360 West Crane;

- Work Order 0312347, Check nitrogen pressure at C-315 emergency valve closure system;
- Work Order 0312921, Replace the seats on XV-249 of Toll, Transfer, and Sampling Building C-360 Autoclave 2; and
- Work Order 0313943, Scale outside of tolerance at C-310 position number 3.

(2) Observations and Findings

The inspectors observed that the certificatee staff effectively implemented work control practices and associated radiological controls during the above listed maintenance activities. No significant issues or concerns were identified.

(3) Conclusions

Maintenance and surveillance activities were conducted appropriately and in accordance with approved procedures. Acceptance criteria contained in surveillance procedures were adequate and, when required, assessment and tracking reports (ATRs) were initiated.

b. Failure to control Cylinder Trailers in Preventive Maintenance Program

(1) Inspection Scope (88100 and 88103)

During routine observations on site, the inspectors identified several discrepancies on the truck trailers used to move uranium hexafluoride (UF₆) cylinders. The inspectors reviewed the following documents:

- ATRC-03-1972, Cylinder moved on trailer;
- ATRC-03-3436, Support leg on Cylinder Trailer C-52337 bent inward to a degree unknown to be deemed safe for continued service;
- ATRC-03-3575, All three 30B Cylinder Trailers found to have cracked welds across their superstructures;
- ATRC-03-3577, Preventive Maintenance (PM) tasks for all three 30B Cylinder Trailers were not entered into the PM program;
- ATRC-03-3582, Cylinder Trailers labeling does not match asset identification number;
- CP4-QA-QI6082, "Inspection of Type "A" Overpacks (Railcars-Trailers)," Revision 2;
- SAR Section 3.7.3, UF₆ Cylinder Handling Equipment;

- SAR Chapter 3.13, Maintenance;
- Task Performance History for Cylinder Trailer Asset Number C-52337;
- Work Order 0210602, Annual QC Inspection of UF₆ cylinder trailer; and
- Work Order 0313139, Annual Inspection of 30B Cylinder Trailers.

(2) Observations and Findings

The inspectors determined that the trailers used to move 30B cylinders on site had not been entered into the preventive maintenance program. The inspectors also noted discrepancies concerning the numbering and identification of the trailers. The certificatee had become a stand alone facility for uranium enrichment in May 2001. At that time several changes were implemented, including the addition of trailers to transport 30B cylinders over intra-plant roadways and cylinder storage yards. Section 3.7.3 of the Safety Analysis Report (SAR) listed truck trailers as an item used to transport solid or empty UF₆ cylinders over intra-plant roadways and cylinder storage yards. Chapter 3.13 of the SAR stated that facility maintenance ensured upkeep of UF₆ cylinder handling equipment. However, these trailers had not been entered into either the asset system or the preventive maintenance system.

The inspectors assessed the material condition of the trailers and noted that one trailer had a bent support leg. Procedure CP4-QA-QI6082 provided instructions for inspection of trailers used for transport of UF₆ cylinders. However, the procedure did not specifically instruct the certificatee to examine the support legs of the trailer.

The inspectors discussed these findings with the certificatee, who entered them into their corrective action program. As followup, during the certificatee's inspection of these trailers, several other minor material condition issues were identified including steel showing on tires, thin tread, and bent metal. None of the items were safety significant. At the close of the inspection period, all trailers used to move 30B cylinders had been entered into the preventive maintenance program, had been inspected, and were undergoing repairs. The certificatee was also evaluating enhancements to Procedure CP4-QA-QI6082 to provide more specific inspection criteria.

(3) Conclusions

During routine observations, the inspectors determined that the certificatee had not entered all truck trailers used to move UF₆ cylinders on site into the preventive maintenance program. In addition, the inspectors identified discrepancies concerning the labeling of these trailers. Material condition deficiencies identified by both the inspectors and the certificatee were corrected.

c. Deficiencies Found on Structural Supports of Cranes Used to Move Liquid UF₆ Cylinders

(1) Inspection Scope (88100 and 88102)

The inspectors reviewed the corrective actions taken in response to deficiencies found on the supporting structures for the cranes which handled liquid UF₆ cylinders. The inspectors reviewed the following documents:

- Operability Evaluation, OE-C-821-03-004, "Operability of the C-315 Overhead Crane," Revision 0;
- American Society of Mechanical Engineers B30.2, Overhead and Gantry Cranes, 1990;
- ATRC-03-3647, Deficiencies found on C-310 Crane Structural Supports;
- ATRC-03-3842, NRC Resident Inspector finds loose bolt on C-360 south rail support brace;
- Crane Manufacturers Association of American, Inc. 70, "Specifications for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes;"
- 29 CFR 1910.179, "Overhead and Gantry Cranes;"
- 29 CFR 1910.184, "Slings;"
- CP4-CO-CA2035, "Pre-Use Inspection of UF₆ Handling Cranes," Revision 4;
- CP2-EG-EG1048, "Inspections of AQ Structures and Other Plant Operational Infrastructure Elements," Revision 1;
- CP4-QA-QI6081, "Overhead and Semigantry Crane Inspections," Revision 2;
- CP4-QA-QI6085, "Inspection of UF₆ Cylinder Handling Cranes," Revision 8;
- Safety Analysis Report Section 3.7.3.2, UF₆ Cylinder Handling Cranes;
- Safety Analysis Report Section 3.15.6.3, Liquid UF₆ Cylinder Handling Equipment;
- Work Order 0313210, Inspect the west bridge girder structural bolts to identify any which are loose, broken or missing;
- Work Order 0313337, Inspect crane rails and supports in accordance with Engineering direction and repair as necessary; and
- Work Order 0313338, Inspect crane rails and supports in accordance with Engineering direction and repair as necessary.

(2) Observations and Findings

The inspectors observed that the certificatee was finding a number of deficiencies on the crane structure and structural supports for the cranes used to move liquid UF₆ cylinders. These deficiencies included loose knee brace bolts, bad welds, loose bolts on support braces, bent support braces and uprights, missing bolts, and welds where bolts were required by drawing. The certificatee determined that these deficiencies were minor and did not impact the safe operation of the cranes. Due to the large number of deficiencies, the certificatee formed a significant condition adverse to quality (SCAQ) investigation team to determine the root cause of these deficiencies. The inspectors will continue to follow the certificatee's SCAQ investigation. Pending the inspector's review, this item will be tracked as an unresolved item (URI 07007001/2003-010-01).

(3) Conclusions

One unresolved item related to inspector follow up of the certificatee's root cause and corrective actions to deficiencies found on the structural supports for the cranes that handled liquid UF₆ cylinders was identified.

3. Engineering Procedures and Documentationa. Cylinder-to-Cylinder Transfer Experiment Not Described in the Safety Analysis Report(1) Inspection Scope (88101)

During routine attendance at plant meetings, the inspectors determined that the certificatee was preparing an engineering design package for a proposed cylinder-to-cylinder transfer project. The inspectors performed routine follow up on the proposed activity. The inspectors reviewed the following documents:

- Engineering Services Data Sheet IS-0628-Z, "Flexible Hose Assembly for X-344 Building Autoclave 14-Ton Cylinder Drain and Monitor Flexible Pigtail," Revision 1;
- Unreviewed Safety Question Determination 03-051, "Test Operations Evaluating Cylinder-To-Cylinder Transfer of Gaseous UF₆ at C-333A," Revision 0;
- Plant Change Review PCR-TC000003-V08213, "Test Operations Evaluating Cylinder-To-Cylinder Transfer of Gaseous UF₆ at C-333A," Revision 0;
- CP2-EG-EG4007.TMP, "Cylinder-To-Cylinder Transfer Hot Weather Test," Revision 0; and
- ATR-03-3910, Cylinder to Cylinder transfer requires NRC approval.

(2) Observations and Findings

The certificatee had been evaluating a cylinder-to-cylinder transfer project to move UF₆ feed material contaminated with technetium from damaged cylinders that could not be heated in autoclaves. The inspectors noted that the certificatee's engineering design package concluded that the activity was not described in the Safety Analysis Report (SAR), yet the certificatee was proceeding with the project. Some equipment had already been set up including the daughter cylinder, electrical panel, scale, and transfer lines outside of the east end of the C-333A Feed Vaporization Facility Cylinder Yard. In addition, the procedure for performing the experiment had been reviewed and approved by the Plant Operations Review Committee.

The inspectors discussed this activity with certificatee staff. Certificatee personnel stated that, even though the proposed experiment was not described in the SAR, they had concluded that it was similar to existing activities, and the consequences of any accidents were also similar to existing postulated accidents. The inspectors stated that 10 CFR 76.68 allowed the certificatee to make changes to the plant or to the plant's operations as described in the SAR without prior NRC approval, but that 10 CFR 76.68 did not allow tests or experiments not described in the SAR without prior NRC approval.

After further internal discussions, certificatee personnel informed the inspectors that the proposed activity would be placed on hold.

(3) Conclusions

Following questioning by the inspectors of a proposed cylinder-to-cylinder transfer project regarding compliance with 10 CFR 76.68, the activity was placed on hold. Certificatee personnel failed to identify that, as the proposed experiment was not described in the SAR, prior NRC approval was required.

4. Exit Meeting

The inspectors presented the inspection results to members of the facility management on November 12, 2003. The inspectors asked the certificatee staff whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

1. **PARTIAL LIST OF PERSONS CONTACTED**

United States Enrichment Corporation

*R. Starkey, General Manager
*S. Cowne, Nuclear Regulatory Affairs Manager
*M. Boren, Nuclear Regulatory Affairs
*R. Helme, Engineering Director
*O. Hickman, Health Physics Manager
*L. Jackson, Operations Manager
*P. Jenny, Plant Support Manager
*M. Keef, Production Support Manager
*J. Labarraque, Quality Assurance
*S. Penrod, Plant Manager
*T. Sorrell, Nuclear Regulatory Affairs
*M. Wayland, Maintenance Manager

* Denotes those present at the exit meeting on November 12, 2003.

2. **INSPECTION PROCEDURES USED**

IP 88100	Plant Operations
IP 88101	Configuration Control
IP 88102	Surveillance Observations
IP 88103	Maintenance Observations
IP 88105	Management Organization and Control
IP 92701	Follow-up

3. **ITEMS OPENED, CLOSED, AND DISCUSSED**

<u>Opened</u>	<u>Type</u>	<u>Summary</u>
07007001/2003010-01	URI	Inspection of crane structural supports.

<u>Closed</u>	<u>Type</u>	<u>Summary</u>
07007001/2001-02-03	VIO	Failure to revise work package.
07007001/2001-02-04	IFI	Development of an acceptable centrifugal compressor disassembly NCSA.
07007001/2001-02-05	IFI	Development of an acceptable NCSA/E to bound cylinder washing above 2% assay in the C-409 facility.

07007001/2001-02-06	IFI	Revision of the C-710 laboratory NCSAs to support operational upgrades such as processing laboratory solution in the C-409 facility without assay dilution.
07007001/2001-02-07	IFI	Upgrade to C-400 General Maintenance NCSA requirements to include the C-409 facility.
07007001/2001-02-08	IFI	Revision of the UF ₆ /R-114 separation unit NCSA to support an increase in the assay limit to 3%.

4. **ACRONYMS and INITIALISMS**

ACR	Area Control Room
ADAMS	Agencywide Documents Access and Management System
ATR(s)	Assessment and Tracking Report(s)
CAAS	Criticality Accident Alarm System
CFR	Code of Federal Regulations
DOE	Department of Energy
FLM	Front Line Manager
GDP	Gaseous Diffusion Plant
HR	Human Resources
NCSA	Nuclear Criticality Safety Analysis
NCSE	Nuclear Criticality Safety Evaluation
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PDR	Public Document Room
PGDP	Paducah Gaseous Diffusion Plant
PM	Preventative Maintenance
PSS	Plant Shift Superintendent
QA	Quality Assurance
SAR	Safety Analysis Report
SCAQ	Significant Condition Adverse To Quality
TSR	Technical Safety Requirements
UF ₆	Uranium Hexafluoride
USEC	United States Enrichment Corporation