

October 13, 2000

Mr. J. N. Adkins
Vice President - Production
United States Enrichment Corporation
Two Democracy Center
6903 Rockledge Drive
Bethesda, MD 20817

SUBJECT: NRC INSPECTION REPORT 70-7001/2000007(DNMS)

Dear Mr. Adkins:

On September 29, 2000, the NRC completed a routine resident inspection at your Paducah Gaseous Diffusion Plant. The enclosed report presents the results of this inspection. During the period covered by the inspection report, the conduct of safety-related activities at the Paducah Gaseous Diffusion Plant was generally adequate.

Based upon the information developed during the inspection, no cited violation of NRC requirements was identified. Your staff maintained a questioning attitude in identifying problems and developed short-term compensatory or corrective actions, as appropriate. However, the NRC notes that the development of long-term corrective actions to prevent recurrence continues to be a challenge in resolving some issues at the site.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available **electronically** for public inspection in the NRC Public Document Room or from the *Publicly Available Records (PARS) component of NRC's document system (ADAMS)*. *ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html>* (the Public Electronic Reading Room).

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

Sincerely,

/RA by M. Phillips acting for/

Patrick L. Hiland, Chief
Fuel Cycle Branch

Docket No. 70-7001
Certificate No. GDP-1

Enclosure: Inspection Report 70-7001/2000007(DNMS)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 70-7001
Certificate No: GDP-1

Report No: 70-7001/2000007(DNMS)

Licensee: United States Enrichment Corporation

Facilities: Paducah Gaseous Diffusion Plant

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

Dates: August 16 through September 29, 2000

Inspectors: K. G. O'Brien, Senior Resident Inspector
J. M. Jacobson, Resident Inspector

Approved By: Patrick L. Hiland, Chief
Fuel Cycle Branch
Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

United States Enrichment Corporation Paducah Gaseous Diffusion Plant NRC Inspection Report 70-7001/2000007(DNMS)

Plant Operations

- The inspectors concluded that the certificatee maintained an appropriate methodology for ensuring that minimum staffing levels for various site facilities and activities were maintained after the reduction in force in July 2000. (Section O1.1)
- Following a minor out-gassing of uranium hexafluoride from a cascade buffer system, the plant staff appropriately identified and initiated corrective actions to remedy previous instances of inadequate corrective actions, to ensure plant staff rigorously implemented plant procedures for degraded or inoperable alarms, and to ensure plant procedures included sufficient guidance necessary for consistent handling of degraded or inoperable alarms, especially those created during summer outages. (Section O1.2)

Maintenance

- The inspectors identified weak communications and a lack of rigor associated with control of maintenance for fire protection system work in Building C-631-3 which houses two of the site's four high-pressure fire water pumps. The problems resulted in the building's sprinkler system remaining unnecessarily isolated. (Section M1.1)

Engineering

- The plant staff identified a condition in which the process gas leak detectors associated with autoclave heated housings were exposed to temperatures above the manufacturer's rating. Based upon a review of an engineering operability evaluation and quarterly surveillance results, the inspectors concluded the plant staff's determination of continued operability was reasonable. (Section E1.1)

Plant Support

- The plant staff made changes during the inspection period to the process for providing site access for NRC personnel which were positive. The changes were made as additional corrective actions for continued problems with ensuring a consistent process for all NRC personnel arriving onsite. The ultimate efficacy of the changes in providing a more consistent program required additional time to evaluate. (Section S1.1)

Report Details

I. Operations

O1 Conduct of Operations

O1.1 Transition to New Organization After Staff Reductions

a. Inspection Scope (88100)

The inspectors reviewed the minimum staffing for various process buildings and plant support activities across a number of shifts on weekdays, week nights, and weekends. The minimum staffing requirements for the Paducah plant were specified in Technical Safety Requirement (TSR) 3.2.2, "Facility Staff."

b. Observations and Findings

As part of the continuing NRC review of the activities at the site after the reduction in force which occurred on July 14, 2000, the inspectors reviewed the staffing levels for the critical positions identified in TSR 3.2.2. The TSR Table 3.2.2.1 specified the required minimum staffing levels for the various process buildings, health physics, utilities, power operations, fire services, and security services. On a number of different occasions during the inspection period, the inspectors verified that the on-duty staff responsible for facility operations and plant support met the TSR staffing requirements for the current mode of operations. The inspectors reviewed a number of the shift staff availability sheets as well. The inspectors did not identify any instances in which the minimum staffing levels were not met. The plant staff had an appropriate method of tracking the staff available to meet the staffing levels specified for each shift. Operations and plant support management were aware of the staffing requirements and the need to ensure that an adequately sized pool of appropriately qualified operators, technicians, and other staff was maintained.

c. Conclusion

The inspectors concluded that the certificatee maintained an appropriate methodology for ensuring that minimum staffing levels for various site facilities and activities were maintained after the reduction in force in July 2000.

O1.2 Control of Process Alarms

a. Inspection Scope (88100)

The inspectors reviewed the circumstances surrounding a cascade buffer alarm and minor uranium hexafluoride (UF₆) release from a buffer panel associated with Building C-337, Unit 1, Cell 10. In addition, the inspectors reviewed the following documents associated with control of alarms:

- Procedure CP3-CO-CO1019, Revision 0, "Alarm Response Guidelines and Status Control," effective October 18, 1999;

- Functional Directive No. OP-00-001, "Guidance for Handling 'Locked-In' Alarms," dated February 2, 2000;
- Assessment and Tracking Report (ATR) C-00-4499, dated September 7, 2000; and
- ATRC-99-2282, dated April 22, 1999.

b. Observations and Findings

The inspectors observed an emergency response to a minor uranium hexafluoride release from a buffer panel supplying dry air to cascade process valve bellows associated with Building C-337, Unit 1. The emergency response was conducted in accordance with the Emergency Plan. The release quickly terminated, and no intakes were identified for the involved personnel. The buffer alarm and subsequent identification of a small release occurred after power was restored to the buffer alarm as part of preparing to return Unit 1, Cell 10 to service. The plant staff had removed the alarm power to the cell general alarm after the cell was shut down as part of the 2000 summer power reduction.

In following up on the event, the plant staff identified that a corrective action plan for ATRC-99-2282 dealing with the possibility of masking buffer alarms on equipment in-service by turning off the alarm power to shutdown cells had been closed inappropriately. The ATR identified that a number of the block valve buffer alarms for an entire cascade unit were tied into general alarms for three out of eight cells in the Area Control Room. With the general alarms for these cells disabled, the control room operator would not have any indication of releases from the block valve buffer system tied into the general alarm. The ATR recommended reviewing the current procedural guidance to ensure that individual nuisance alarms were disabled, but the general alarm associated with in-service equipment would remain active. The inspectors noted that the ATR documentation indicated that a review of the alarm control procedure and alarm response procedure had been completed; however, the procedure was not changed to specifically address the buffer alarm issue when the general alarms were disabled.

The inspectors noted that the guidance in Functional Directive No. OP-00-001, "Guidance for Handling 'Locked-In' Alarms," dated February 2, 2000, was not rigorously followed. The functional directive provided guidance on the logic to use when deciding how to disable locked-in alarms and whether or not compensatory actions were required after the alarms were disabled. Specifically, the operations staff did not consider that the area control room general alarm warned operators of a potential uranium hexafluoride buffer system release and, as such, its disablement should have required compensatory actions to check other indications for a buffer system abnormality on some appropriate frequency. The inspectors also noted that in dispositioning the ATR documenting the ineffective corrective action for the previous problem, the Plant Shift Superintendent (PSS) did not identify any interim compensatory measures, although there were other disabled general alarms potentially involving block valve buffer alarms in the plant due to the summer power reduction. However, the operations staff did initiate a walkdown of all the shutdown cells with alarm power turned off and restored power or implemented buffer panel checks, as appropriate.

The Quality Assurance Plan required, in part, that the plant staff identify and correct conditions adverse to quality consistent with their importance to safety. The failure to correct a condition adverse to quality identified in April 1999 was identified by the plant staff who took short-term corrective action to restore power to in-service buffer systems or develop appropriate compensatory actions, including reopening the corrective action plan for the prior assessment and tracking report. In addition, the operations staff initiated a change to the applicable procedures to further clarify the means and methods to be used to monitor system activities with degraded alarms. The failure to fully correct the previous condition adverse to quality and to fully implement plant procedures associated with degraded or inoperable alarms constitutes a violation of minor safety significance and is not subject to formal enforcement action.

c. Conclusion

Following a minor out gassing of uranium hexafluoride from a cascade buffer system, the plant staff appropriately identified and initiated corrective actions to remedy previous instances of inadequate corrective actions, to ensure plant staff rigorously implemented plant procedures for degraded or inoperable alarms, and to ensure plant procedures included sufficient guidance necessary for consistent handling of degraded or inoperable alarms, especially those created during summer outages.

08 Miscellaneous Operations Issues

08.01 Certificatee Event Reports

The certificatee made the following operations-related event reports during the inspection period. The inspectors reviewed any immediate safety concerns indicated at the time of the initial verbal notification. In the case of retracted notifications, the inspectors reviewed the basis for the certificatee's retraction of the notification at the time of the retraction. The inspectors will evaluate the associated written report for each of the events following submittal.

<u>Number</u>	<u>Status</u>	<u>Title</u>
37277	Open	Building C-337 Criticality Accident Alarm System loss of horns due to loss of direct current power.

08.02 Bulletin 91-01 Reports

The certificatee made the following reports pursuant to Bulletin 91-01 during the inspection period. The inspectors reviewed any immediate nuclear criticality safety (NCS) concerns associated with the report at the time of the initial verbal notification. Any significant issues emerging from these reviews are discussed in separate sections of the report.

<u>Number</u>	<u>Date</u>	<u>Title</u>
No reports this period.		

II. Maintenance

M1 Conduct of Maintenance

M1.1 Fire Protection System Maintenance Activities

a. Inspection Scope (88103)

During routine facility tours, the inspectors observed the status of maintenance for the fire protection equipment in Building C-631-3 which housed two of the plant's four high-pressure fire water (HPFW) pumps and a fire water jockey pump.

b. Observations and Findings

On August 25, the inspectors observed that the sprinkler system for Building C-631-3 was isolated. In followup discussions with plant staff, the inspectors inquired why the system had been isolated. The fire department staff informed the inspectors that the system had been isolated on August 22 as part of a lock-out-tag-out (LOTO) permit to allow a leaking water supply line to the jockey pump to be replaced. The line had previously been identified as the cause of a faulted water flow alarm for the building sprinkler system. Upon identification of the alarm fault, the fire department staff issued a fire protection impairment permit (FPIP) and initiated a four-hour fire patrol for the facility. The LOTO provided protection to personnel from a pressurized water release should the sprinkler line be damaged during the pipe replacement. In reviewing the fire department logs, the inspectors noted that the work on the pipe had been completed on August 23 and an associated FPIP (disallowing hot work) had been cleared at that time. However, the fire department staff left the LOTO in place and did not return water to the sprinkler system until after the inspectors inquired about the status of the system.

In followup reviews, the fire department staff informed the inspectors that the sprinkler system had been allowed to remain isolated in order to facilitate the replacement of the faulted water flow alarm. However, the inspectors noted that as of September 29, an equivalency evaluation, required from the engineering staff to replace the vane-type flow switch involved was not available. As a result, the expectation that the maintenance job would be promptly completed was not reasonable. In addition, the inspectors noted that the task package used to control the pipe replacement did not specifically identify an LOTO was involved. Also, although the PSS was notified of the start and finish of the pipe replacement job, the PSS was not aware that the sprinkler system had been left isolated in order to facilitate the switch replacement. The operations staff responsible for activities in the facility were also not aware that the system had remained isolated. Thus, the sprinkler system providing coverage for the facility did not have suppression capability for some two days until the inspectors raised questions about the sprinkler system status.

The issue identified that communications between the operations staff and the fire department staff for certain maintenance activities were weak. Also, the fire department staff allowed a sprinkler system to remain isolated on the assumption that parts were available and the maintenance staff were ready to work the job. This was not the case. The inspectors noted that although the involved sprinkler system was classified as non-safety and that the plant staff took appropriate compensatory actions, the issues were indicative of more generic concerns associated with control of maintenance for the fire protection systems onsite.

c. Conclusion

The inspectors identified weak communications and a lack of rigor associated with control of maintenance for fire protection system work in Building C-631-3 which houses two of the site's four high-pressure fire water pumps. The problems resulted in the building sprinkler system remaining isolated unnecessarily.

III. Engineering

E1 Conduct of Engineering

E1.1 Process Gas Leak Detection System Operability Evaluation

a. Inspection Scope (88100)

The inspectors reviewed the plant staff's resolution of an issue involving the identification that process gas leak detection (PGLD) system heads for the autoclave heated housings operated at temperatures above the manufacturer's rating of 32-100 degrees Fahrenheit (32-100°F). The review included safety system TSR surveillance results from April 1998 through April 2000 and the following documents:

- Operability Evaluation OE-C-822-00-004, Revision 0, "Pyrotronics Low Voltage UF₆ Detection Heads for C-333A & C-337A," dated September 22, 2000;
- ATRC-00-4764, dated September 22, 2000; and
- Lockheed Martin Utility Services, Inc. Memorandum, "Temperature Rating Concerns with Vaporizer UF₆ Duct Detectors," dated September 15, 1995.

b. Observations and Findings

During routine testing of the PGLD heads associated with the autoclave heated housings that contained piping and isolation valves, the plant staff noticed that the detector heads were rated for operation between 32-100° F. The temperature in the heated housing was typically around 190° F. As a result of the discovery, the plant staff notified the PSS who requested that an Operability Evaluation be performed by the engineering staff to provide reasonable assurance of continued operability for the heads (a safety system covered by TSR 2.2.4.1).

The inspectors reviewed the Operability Evaluation used to justify reasonable assurance of operability for the PGLD heads for the autoclave heated housings. The evaluation included a 1995 memorandum reviewing the issue which provided the testing specifications for the Underwriters Laboratory (UL)-rated smoke detector. The specification provided that manufacturers producing 32-100° F detectors must test the detector design at various elevated temperatures, including certain components up to 194° F. The evaluation noted that although the temperature inside the heated housing could be near this value, the actual detectors were located on the outside of the housing with tubes extending into the housing. The temperature measured at the detector location was 105-115° F. The UL Standard 268A indicated that the UL-rated detectors could be operated at temperatures up to 122° F based on the testing program in the standard. In addition, the evaluation noted that the PGLD detectors were tested

quarterly in accordance with TSR surveillance requirements and no negative trends had been noted. These surveillances included tests with the heated housing at the routine operating temperatures.

The inspectors reviewed the test results for the quarterly surveillances for a two year timeframe. The inspectors noted that only one detector head had failed the TSR-required smoke test over that period for the 10-14 autoclaves in service during that timeframe. Based upon the review, the inspectors concluded that the plant staff's determination that the PGLD systems were operable and would perform their intended safety function in the elevated-temperature environment was reasonable.

c. Conclusion

The plant staff identified a condition which the process gas leak detectors associated with autoclave heated housings were exposed to temperatures above the manufacturer's rating. Based upon a review of an engineering operability evaluation and quarterly surveillance results, the inspectors concluded the plant staff's determination of continued operability was reasonable.

IV. Plant Support

S1 Conduct of Security Activities

S1.1 Control of Site Access

a. Inspection Scope (88100)

The inspectors reviewed the plant staff's resolution of problems associated with NRC staff gaining access to the Controlled Access Area at the site.

b. Observations and Findings

The plant staff developed an action plan during the inspection period to address inconsistent implementation of the site access program for NRC staff visiting Paducah. The action plan included sending the site-specific training materials to NRC staff prior to their visit date for announced inspections and visits; maintaining a current general employee training (GET) card onsite for NRC staff with current site access training; and streamlining the process for retrieving information provided in the quarterly NRC access authorization letter. The inspectors noted that the changes were positive, but would require some time to demonstrate that improvements in the consistency of providing site access for NRC personnel had been achieved.

c. Conclusion

The plant staff made changes during the inspection period to the process for providing site access for NRC personnel which were positive. The changes were made as additional corrective actions for continued problems with ensuring a consistent process for all NRC personnel arriving onsite. The ultimate efficacy of the changes in providing a more consistent program required additional time to evaluate.

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of the certificatee's staff and management at the conclusion of the inspection on September 29, 2000. The certificatee staff present for the exit meeting acknowledged the findings. The inspectors asked the certificatee staff whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

United States Department of Energy

G. A. Bazzell, Site Safety Representative

United States Enrichment Corporation

- *M. A. Buckner, Operations Manager
- *L. L. Jackson, Nuclear Regulatory Affairs Manager
- *J. A. Labarraque, Safety, Safeguards and Quality Manager
- *S. R. Penrod, Enrichment Plant Manager
- *H. Pulley, General Manager

U.S. Nuclear Regulatory Commission

- *C. A. Blanchard, Resident Inspector
- J. M. Jacobson, Resident Inspector
- *K. G. O'Brien, Senior Resident Inspector

*Denotes those present at the exit meeting on September 29, 2000.

Other members of the plant staff were also contacted during the inspection period.

INSPECTION PROCEDURES USED

- IP 88100: Plant Operations
- IP 88102: Surveillance Observations
- IP 88103: Maintenance Observations

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

37277 CER Building C-331 criticality accident alarm system loss of horns due to loss of power

Closed

70-7001/2000007-01 NCV

Discussed

NONE

LIST OF ACRONYMS USED

ATR	Assessment and Tracking Report
CFR	Code of Federal Regulations
DNMS	Division of Nuclear Materials Safety
FPIP	Fire Protection Impairment Permit
GET	General Employee Training
HPFW	High-Pressure Fire Water
IP	Inspection Procedure
LOTO	Lock-Out Tag-Out
NCS	Nuclear Criticality Safety
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PERR	Public Electronic Reading Room
PGDP	Paducah Gaseous Diffusion Plant
PGLD	Process Gas Leak Detection
PSS	Plant Shift Superintendent
QAP	Quality assurance Program
SAR	Safety Analysis Report
TSR	Technical Safety Requirement
UF6	Uranium Hexafluoride
USEC	United States Enrichment Corporation