

October 23, 2001

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

SUBJECT: NRC INSPECTION REPORT 07007001/2001-008(DNMS) - PADUCAH

Dear Mr. Brown:

On October 2, 2001, the NRC completed a routine resident inspection and a routine announced nuclear criticality safety 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, the inspectors discussed the findings with members of your staff.

Areas examined during the routine resident inspection period are identified in the report. Within these areas, the inspections consisted of a selective examination of procedures and representative records, interviews with personnel, and observations of activities in progress.

Based on the results of this inspection, the NRC has determined that a violation of NRC requirements occurred. This certificatee-identified violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region III, the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001, and the NRC Resident Inspector at the Paducah Gaseous Diffusion Plant.

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J. Brown

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

Sincerely,  
*/RA/*

Patrick L. Hiland, Chief  
Fuel Cycle Branch

Docket No. 07007001  
Certificate No. GDP-1

Enclosure: Inspection Report 07007001/2001-008(DNMS)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 07007001  
Certificate No: GDP-1

Report No: 07007001/2001-008

Facility Operator: United States Enrichment Corporation

Facility Name: Paducah Gaseous Diffusion Plant

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

Dates: August 22, 2001, through October 2, 2001

Inspectors: B. L. Bartlett, Senior Resident Inspector  
M. L. Thomas, Resident Inspector  
M. P. Phillips, Senior Fuel Cycle Safety Inspector  
D. J. Hartland, Portsmouth Senior Resident Inspector  
R. G. Krsek, Acting Senior Resident Inspector  
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F. Gee, Nuclear Criticality Safety Inspector, NRC  
Headquarters

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 07007001/2001-008(DNMS)

#### Operations

- The inspectors identified a weakness in the plant staff's adherence to the procedure for tracking the alarm status, including several non-safety alarms returned to service without updating the logbooks, incorrectly placed or missing out-of-service stickers on non-safety alarm indicator lights, and incomplete reviews of the alarm status for each control panel on a monthly basis. The inspectors acknowledged that these matters were being addressed through the certificatee's corrective action system. (Section O1.1)
- The inspectors walked down portions of the uranium recovery system, the spray booth, and the cylinder wash areas in Building C-400 during normal day shift operations and determined the risk-significant Nuclear Criticality Safety (NCS) controls were capable, available, and reliable to conduct operations safely. (Section O2.1)
- The inspectors conducted a walkdown of the laboratory in Building C-710 pertaining to the amendment request to permit analysis of assay samples during Criticality Accident Alarm System (CAAS) outages to determine whether the NCS was maintained. No violations or deviations were identified. (Section O2.3)
- The loss of all double contingency controls was reported on July 19, 2001. The contingency controls were meant to ensure that when equipment was restored to service that moisture was not introduced to the system. A non-cited violation for an inadequate procedure was not cited per Section VI.4 of the NRC's Enforcement Policy. (Section O3.1)
- Documents, procedures, and instructions reviewed by the inspectors related to training contained the necessary information to comply with regulations and the certificate. (Section O5.1)
- The practice of month-after-month accepting past due worker's training was considered poor, and the question was raised whether the intent of the re-training requirements were being met. The inspectors determined that there was a minimal effort to have past due training modules completed. This issue will be tracked as an Inspection Followup Item. (Section O5.2)
- The inspectors determined that additional follow-up was necessary to evaluate the extent of condition and the adequacy and timeliness of the certificatee's response to independent verification (IV) issues. Accordingly, the certificate holder's IV program adequacy will remain an Unresolved Item. (Section O8.4)
- The inspectors reviewed the certificatee's evaluation and trending of the less-severe incidents at Paducah Gaseous Diffusion Plant (PGDP) in Calendar Year 2001. The inspectors determined that the certificatee's NCS performance indicated a declining trend that warranted additional attention from PGDP management. (Section O8.5)

- The certificatee had procedures, safety committees and audits established as required by NRC regulations to oversee management controls of plant safety activities. (Section O8.6)

### Maintenance

- The inspectors concluded that the maintenance activities which were observed or reviewed were conducted in accordance with procedure requirements. When questions arose during maintenance activities regarding a procedure, the work was stopped and the issue resolved prior to the resumption of work. In addition, the inspectors acknowledged that when required, Assessment and Tracking Reports (ATRs) were initiated when plant staff identified issues. (Section M1.1)

### Engineering

- The inspectors performed partial system walkdowns of selected plant systems. In addition, the inspectors reviewed recent ATRs for these systems to verify that no operability concerns existed. The inspectors concluded that the system engineers and operations staff contacted were knowledgeable of the respective systems. (Section E2.1)

### Plant Support

- The inspectors observed two truck shipments of low-level radioactive waste and reviewed the waste manifests for these shipments. The inspectors determined that the shipment manifests met shipping requirements. (Section R1.1)
- The storage, posting, and labeling of the low level radioactive waste storage areas toured by the inspectors met NRC and Department of Transportation (DOT) requirements. (Section R1.2)
- The environmental air monitoring equipment observed was operating properly. Air samples were prepared and processed according to procedures. Chain of custody was maintained. The results of the observed samples were within the required limits. (Section R1.3)
- The portion of respiratory protection program inspected was maintained in accordance with the SAR and applicable procedures. (Section R1.4)

### Security and Safeguards

- The inspectors performed routine observations of plant physical security personnel and equipment. The inspectors also performed assessments of plant physical security as requested by regional management. For those areas observed and evaluated, the inspectors determined that the certificate holder was in compliance with regulations and their commitments. (Section S1.1)

## Report Details

### I. Operations

#### **O1 Conduct of Operations**

##### **O1.1 Routine Operations Activities**

###### **a. Inspection Scope (88100)**

The inspectors observed routine operations activities and discussed plant operations with the operations staff and management. The inspectors also reviewed the applicable area log books and round sheets, and observed operators' responses to various alarms. In addition, the inspectors reviewed the procedure CP3-CO-C01019, Rev. 4, "Alarm Response Guidelines and Status Control," dated June 1, 2001. The reviews and observations were performed to ensure that the certificatee complied with NRC requirements.

###### **b. Observations and Findings**

The inspectors observed that in the Building C-333 Area Control Room (ACR), the No. 3 diesel panel high oil temperature alarm had been disabled by lifting a lead. The inspectors also observed that an out-of-service (OOS) sticker had not been placed on the alarm indicator light. Step 6.3.3D of procedure CP3-CO-C01019 specified that OOS stickers be placed on Alarms that had been disabled. In addition, the inspectors observed that the C-333 Unit 5 Cell 6 and Unit 4 Cell 2 general and coolant alarms, and the Unit 4 Cell 5 coolant alarm had been returned to service without obtaining the first line manager's (FLM) approval as specified by the procedure. Lastly, the FLM had failed to complete the alarm status logsheet (Form A-19429), as specified by steps 6.4.1 and 6.4.3 of procedure CP3-CO-C01019. Since these alarms were classified as non-safety (NS) components, compliance with the procedural steps for these alarms was not required by the Technical Safety Requirements (TSRs).

The inspectors reviewed the alarm status book in the Building C-335 ACR, and observed that the review for June 2001 was not completed during June, but on July 4, 2001 instead. Three days later, July 7, the July 2001 review was completed. The August 2001 review was done on August 4, 2001; yet as of September 27, 2001, the monthly review had not been completed. While the intent of the procedure was for a review of each panel's Alarm Status Monthly Review sheet (Form A-19430) to be done approximately every 30 days, in one case there was a 3 day gap between monthly reviews and in another case, there was a 38 day gap. The inspectors also observed that two coolant alarm lights were returned to service; yet the out of service (OOS) stickers had not been removed.

The inspectors observed in the C-337 ACR that the alarm status logbook had several monthly review sign-offs missing on Form A-19430 for the Unit 2 auxiliary and freezer sublimator panels. The plant staff documented the inspectors' findings in ATR 01-4960.

The inspectors also observed some minor recordkeeping discrepancies; specifically, step 6.62 of the procedure requires that Form A-19430 was to be retained in the alarm status logbook for one year after completion; yet several logbooks in the ACRs did not have last year's forms.

The inspectors noted that on August 28, the plant staff identified similar alarm status logbook discrepancies during management by walking around (MBWA) reviews of ACR logbooks, including a case in C-333 where Unit 4 Cell 7 NS alarms were returned to service without updating the logbook. These problems were documented in ATR 01-4715. The plant staff identified several more alarm status logbook review discrepancies on September 13, 2001 and documented these in ATR 01-4704. The inspectors identified that these matters were classified as a condition adverse to quality (CAQ), and corrective actions were being tracked in the certificatee's Business Prioritization System. An Immediate corrective action was to review all Alarm Status Logbooks to ensure they were current and correctly maintained. Long-term corrective actions being considered included revising the procedure, log sheets, and logbook formats to be more "user-friendly" and less prone to human error.

c. Conclusions

The inspectors identified a weakness in the plant staff's adherence to the procedure for tracking alarm status, including several non-safety alarms returned to service without updating the logbooks, incorrectly placed or missing OOS stickers on non-safety alarm indicator lights, and for incomplete reviews of the alarm status for each control panel on a monthly basis. The inspectors acknowledged that these matters were being addressed through the certificatee's corrective action system.

## **O2 Operational Status of Facilities and Equipment**

### **O2.1 Routine Operations Activities**

a. Inspection Scope (88015)

The inspectors walked down portions of the uranium recovery system, the spray booth, and the cylinder wash areas in Building C-400 during normal day shift operations to determine whether the risk-significant Nuclear Criticality Safety (NCS) controls were capable, available, and reliable to conduct operations safely. These particular areas were risk significant from an NCS standpoint because they involved Special Nuclear Material (SNM) in solution systems and potentially unsafe geometries.

b. Observations and Findings

#### Building C-400 Uranium Recovery System

The highly concentrated fissile solution in the Number 5 dissolver had an assay greater than 1.5 weight percent Uranium-235 ( $^{235}\text{U}$ ) in tanks which had a 20 inch diameter. Solution enrichment was limited using both administrative and engineered controls. A dual valve system, with locks, was used to limit the amount of SNM bearing solution being transferred to the Number 5 dissolver. Dual, independent samples that were representative of the solution were used to verify the 1.5 weight percent  $^{235}\text{U}$  before solution transfer. Geometry was controlled by administrative and passive engineered

controls. Portable containers entering the operations area were administratively controlled to ensure they did not exceed the safe geometry for 1.5 weight percent  $^{235}\text{U}$  solutions. The geometries of the system tanks and floor pan were safe for the  $^{235}\text{U}$  enrichment and solution concentration in the system. Administrative controls were used to limit  $^{235}\text{U}$  concentration in solution. Dual, independent, and representative samples were analyzed and verified to ensure 100 grams of SNM per liter or less before transfer of fissile solutions to the system. Adverse system interactions were limited by administrative and passive engineered controls. Interactions between system components and portable containers entering the operations area were administratively controlled to ensure the minimum 2-foot edge-to-edge spacing. Interactions between fixed system components were controlled by means of configuration management. The inspectors verified operability of the NCS-related controls during a walkdown of the area; they determined that the NCS controls were capable, available, and reliable to perform their safety functions, and the operations were conducted safely.

#### Building C-400 Spray Booth

The NCS of most concern in Building C-400 was spraying a cleaning agent on and in equipment or components potentially containing an unsafe mass of fissile material. (The water and the cleaning agent could act as a moderator). Administrative controls were used to limit the mass of SNM-bearing compounds contained in equipment or components to a safe mass for the  $^{235}\text{U}$  enrichment involved. Two independent nondestructive assay (NDA) estimates were performed on each piece of equipment and component before washing to identify and quantify the SNM contained. The  $^{235}\text{U}$  enrichment was also determined by independent samples or independent confirmation of the  $^{235}\text{U}$  enrichment at the equipment or component removal *in-situ* location. Portable containers entering the operations area were administratively controlled to ensure they did not exceed the safe geometry for 5.5 weight percent  $^{235}\text{U}$  solutions. The geometries of the system tanks and floor pan were safe for 5.5 weight percent  $^{235}\text{U}$ . Adverse systems interactions were limited by administrative and passive engineered controls. Interactions between the system and portable SNM bearing containers entering the operations area were administratively controlled to ensure the minimum of 2-foot edge-to-edge spacing. Interactions between fixed system components were controlled by means of configuration management. The inspectors verified operability of the NCS controls during a walkdown of the area and determined that the controls were capable, available, and reliable, to perform their safety functions, and operations were conducted safely.

#### Building C-400 Cylinder Wash

The Building C-400 cylinder wash NCS of most concern was washing a cylinder containing a large mass of SNM. Cylinder selection was controlled administratively through independent verification of cylinder history documentation. The documentation was maintained according to the nuclear materials controls and accounting program. Cylinders with questionable or incomplete documentation were not selected for washing. The enrichment of SNM in cylinders washed was limited to 2.0 weight percent  $^{235}\text{U}$  and was maintained through administrative controls. The mass of SNM in cylinders washed was limited to a maximum of 72 pounds, and was also maintained through administrative controls. The geometries of the system tanks and floor pan were appropriate for 2.0 weight percent  $^{235}\text{U}$  or less. Portable containers entering the operations area were administratively controlled as safe geometry for 5.5 weight percent

<sup>235</sup>U or less. System interactions were limited by administrative and passive engineered controls. Interactions between the system components and portable containers entering the operations area were administratively controlled to ensure a minimum of 2-foot edge-to-edge spacing. Interactions between fixed system components were controlled by means of configuration management. The inspectors verified operability of the NCS controls during a walkdown of the area and determined that the NCS controls were capable, available, and reliable, to perform their safety functions and that observed operations were conducted safely.

c. Conclusions

The inspectors walked down portions of the uranium recovery system, the spray booth, and the cylinder wash areas in Building C-400 during normal day shift operations and determined that the risk-significant NCS controls were capable, available, and reliable to conduct operations safely.

O2.2 Higher Assay Operations Status at Paducah Gaseous Diffusion Plant (PGDP)

After the NRC approved PGDP's increase to the current maximum assay, the certificatee successfully increased the assay-products up to 4.95 percent. The certificatee also verified that the cascade production models and isotopic gradient behaved as predicted. The product that was withdrawn to a total of twenty-five 10-ton cylinders was approximately 500,000 pounds of enriched uranium hexafluoride (UF<sub>6</sub>). The certificatee did not encounter any technical problems during the assay ascension or during the summer holding period. As of September 12, 2001, the certificatee began the restart from the summer holding period. The certificatee planned to reach a maximum assay of 4.95 percent by the end of November 2001. The inspectors determined that the portion of the higher assay program observed in operation was being performed in accordance with procedures.

O2.3 Walkdown of the Laboratory in Building C-710

a. Inspection Scope (88015)

The NRC project manager requested that the inspectors conduct a walkdown of the laboratory in Building C-710 pertaining to the amendment request to permit analysis of assay samples during Criticality Accident Alarm System (CAAS) outages to determine whether the NCS was maintained.

b. Observations and Findings

The certificatee's amendment request proposed to revise the CAAS technical safety requirement (TSR 2.6.4.1) of non-cascade facilities for operations that may be required to meet the surveillance requirement of TSR 2.4.4.3, "Cascade Equipment Assay Limitations." The proposed revision would modify TSR 2.6.4.1 to specifically permit the handling, transportation, analysis, and processing of assay samples, when required, to meet the surveillance requirement of TSR 2.4.4.3 in the event that the CAAS system for the laboratory in Building C-710 became inoperable. As such, the proposed revision would eliminate a potential source of conflict between the CAAS TSRs and the assay limit TSR.

The revision to the CAAS TSRs was necessary to avoid a situation in which PGDP would be unable to meet the TSR surveillance requirement for product assay in the event that a CAAS outage occurred while the online assay machines were inoperable. If such a situation occurred under the current TSRs, then PGDP would be forced to request enforcement discretion for product assay surveillance requirements contained in TSR 2.4.4.3. Assay sampling was vital to ensure that the plant stayed within the bounds of NCS analyses which assume that the assays will not exceed a given value in sections of the cascade and equipment that was not geometrically optimum.

The existing TSRs prohibit operations with fissionable material in areas, equipment, or processes in the laboratory in Building C-710 that contained more than 700 grams of  $^{235}\text{U}$  at greater than or equal to 1 weight percent enrichment when CAAS coverage was not available. The assay samples taken to meet TSR 2.4.4.3 entered the laboratory in sample tubes.

The inspectors performed a walkdown of the laboratory in Building C-710 to observe the location of criticality safety accident detectors and the certificatee's calibration measurements. The inspectors observed the location of the assay sampling station and the measurements of the assay samples from the cascade. The inspectors verified that the tubes were small, with an outside diameter of less than 1 inch, and a maximum length of 6.5 inches for straight tubes. In addition, the inspectors verified that space at the counting station does not allow for multiple sample tubes, thereby, limiting the collection of uranium mass.

The inspectors also verified that the standard used to calibrate the machine was a National Institute of Standards and Technology traceable source. The certificatee stated that the capacity of the largest sample tube, if packed full of  $\text{UF}_6$ , was only 77.1 grams of uranium. Even with a maximum product assay of 5.0 weight percent  $^{235}\text{U}$ , the certificatee stated that the sample tube would contain only 3.855 grams of  $^{235}\text{U}$ . Also, sample tubes were controlled by NCSA to a batch size that was always appropriate by volume and mass. The NCSE for handling sample tubes evaluated upset conditions, such as double batching and spacing upsets, and demonstrated double contingency for the operation.

During the walkdown, the inspectors inquired about the independent verification of cascade samples. The certificatee stated that the assay limits specified by TSR 2.4.4.3 kept plant operation within the bounds of the existing approved NCS analysis. The online machines were point calibrated using an assay sample standard that was incorporated into the machine. The calibration was essentially continuous; thus, no periodic calibrations were specified. The certificatee further stated that independent verification of assay results from this particular measurement was not required for NCS purposes. The purpose of this sample was to confirm that the assay at a particular location in the cascade was consistent with the planned assay at that location and, if applicable, did not exceed the TSR-required assay limit at that location.

c. Conclusions

The inspectors conducted a walkdown of the laboratory in Building C-710 pertaining to the amendment request to permit analysis of assay samples during CAAS outages in order to determine whether the NCS was maintained. No violations or deviations were identified.

### **O3 Operations Procedures and Documentation**

#### **O3.1 Deficient Nuclear Criticality Safety Evaluation of Nuclear Criticality Safety Approvals**

##### **a. Inspection Scope (88015)**

The inspectors assessed certificatee report number 38155 issued pursuant to Bulletin 91-01 on July 19, 2001, concerning deficient Nuclear Criticality Safety Evaluation of Nuclear Criticality Safety Approvals GEN-10 and CAS-011.

##### **b. Observations and Findings**

On July 19, 2001, the NRC received a 4-hour Bulletin 91-01 report concerning the loss of all double-contingency controls applicable to a fissile material operation, which resulted from an inadequate NCS evaluation. Nuclear criticality safety approval (NCSA) GEN-010, which dealt with equipment removal or replacement, and NCSA CAS-011, which dealt with cell shutdown and the controls for equipment moderation were found to be deficient. The revision of NCSA CAS-011 failed to establish necessary moderation controls to ensure that double-contingency controls were maintained for the transition between equipment removal and cell shutdown.

If a cell was taken out of service and plant equipment was taken out of service, there were no NCS controls in place to ensure that when the equipment was returned to service, it had met the requirements of Control 3.3.6 of CAS-011. Control 3.3.6 was intended to prevent moderation by heating the equipment to 140°F for 60 hours to drive off moisture. Control 3.3.6 also established a baseline hydration level to maintain double-contingency controls for shutdown process equipment. However, no NCSA controls had been established to ensure that moderation control was being maintained during the transition from equipment installation activities performed under NCSA GEN-010 and cell shutdown approved under NCSA CAS-011. Therefore, double-contingency controls were not ensured during this transition.

Since the event, the certificatee revised NCSA GEN-010, nuclear criticality safety evaluation (NCSE) GEN-10, NCSA CAS-011, and NCSA CAS-002 to correct the deficiencies. In addition, areas of the cascade containing equipment that was installed following implementation of NCSA CAS-011 were reviewed to ensure that the drying requirements had been met. Therefore, the inspectors determined that the certificatee had taken adequate corrective actions to address these deficiencies.

Title 10, CFR 76.93, "Quality Assurance," requires, in part, that the certificatee shall establish and execute a quality assurance program.

Section 2.2.2.b of the Quality Assurance Program (QAP) requires, in part, that the QAP applies to augmented quality (AQ) items to the extent described in Appendix A. Section 2.5 of Appendix A states that Section 2.5 "Instructions, Procedures, and Drawings" of the Q program applies. Section 2.5.3.1 of the Quality Assurance Program requires, in part, that: 1) activities affecting safety or quality are prescribed and performed in accordance with documentation instructions, procedures, or drawing of a type appropriate to the circumstances, and 2) these documents include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities were satisfactorily performed.

This non-repetitive, certificatee-identified and corrected violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A.8 of the NRC Enforcement Policy. This violation is in the certificatee's corrective action program as Assessment and Tracking Report (ATR) 01-3729. **(NCV) 70-7001/2001-008-01.**

c. Conclusions

The loss of all double contingency controls was reported on July 19, 2001. The contingency controls were meant to ensure that when equipment was restored to service, moisture was not introduced to the system. A violation for an inadequate procedure was issued not cited per Section VI.A of the NRC's Enforcement Policy.

**O5 Operator Training and Qualification (88010)**

O5.1 Documents, Procedures and Instructions Related to Training

a. Inspection Scope

The inspectors reviewed documents, procedures and instructions related to training, and training personnel were interviewed to determine if the certificatee was complying with regulations and the license certificate.

b. Observations and Findings

The inspectors verified by direct inspection that 10 CFR 19.12, "Instruction to Workers," NRC Form 3, was posted where workers could read it and know their rights for reporting concerns to the NRC.

The following documents, procedures, and training instructions were reviewed by the inspectors to determine if the training regulations were fully covered in the following:

- Safety Analysis Report (SAR), Revision 3, Section 6.6 Training, dated May 31, 1996. Section 6.6 provided an overview of the training program at the Paducah Gaseous Diffusion Plant (PGDP), including the training applicable to personnel who were "...relied upon to operate, maintain, or modify the GDPs ....." Personnel were trained to recognize and cope with safety hazards of licensed material, or protection of the environment.
- CP2-TR-TR1032, "Conduct of Systematic Approach to Training (SAT)," Revision 4, dated July 6, 2001. The purpose of this procedure was to establish the requirements for the development, implementation, and maintenance of the SAT for training at the PGDP in order to meet the requirements of the SAR, Section 6.6.
- Training Development and Administrative Guide (TDAG) for Cascade Operation, Revision 6, Dated March 25, 2001. This TDAG provided the training and qualification program for cascade operators and FLMS supporting the operation of the PGDP.

- Training Development or Change Request Number 01CR744 for procedure change to CP4-CO-CN2013, dated August 23, 2001. The needs analysis worksheet resulted in having the cascade operation manager developing and conducting cascade operators crew briefings.
- Exam “A” for Module CO 3772, “Introduction to Freezer/Sublimers.” This exam was reviewed for question content and instructor grading remarks.

**NOTE:** This exam was marked “**PROPRIETARY NOT FOR PUBLIC DISCLOSURE**” None of the content of this exam was included in this report.

c. Conclusions

Documents, procedures, and instructions reviewed by the inspectors related to training contained the necessary information to comply with regulations and the certificate.

O5.2 Records for Retraining Experienced Employees

a. Inspection Scope (88010)

The inspectors reviewed training records and interviewed training personnel to determine if retraining requirements have been met.

b. Observations and Findings

The inspectors held discussions with training personnel and reviewed training records for 3 health physics technicians, 6 maintenance personnel, and 6 cascade operators. There were several records for some of these personnel. Of the twenty-eight records reviewed, 12 recorded that all retraining module requirements were met, 7 records recorded that some retaining modules were not met because of medical restrictions to perform the work, and 9 records recorded that training on the module was past due. The inspectors discussed the past due training with the training personnel and learned that these modules were not for the building in which the workers normally worked, but were for a building in which a worker may be called upon to work.

Each month the worker’s training records were reviewed with his/her building manager regarding the past due training modules. Then, the building manager and the worker would sign the following statement,

“WORK LIMITATION -You shall not perform tasks related to the training module indicated above as ‘Incomplete’, ‘Past Due’, or ‘Medical Restriction’. This limitation will remain in place until the training is satisfactorily completed.”

If the worker was assigned work in a building in which he/she had not completed all the training modules, it was the worker’s responsibility to inform the building manager of said worker’s lack of current training on those modules. The certificatee believed that this practice was acceptable as the worker would not perform work that he/she was not trained to perform. After discussions with training personnel, the inspectors determined that there was a minimal effort to have past due training modules completed. The only focus on correcting the deficient training was that every month the building manager and worker would sign the training record for the same past due training modules. The

inspectors considered this a poor practice and will evaluate it further during a future inspection. This issue will be tracked as Inspection Followup Item **IFI 70-7001/2001-008-02.**

c. Conclusions

The practice of month-after-month accepting past due worker's training was considered a poor practice, and raised the question of whether or not the intent of retraining requirements were being met. The inspectors determined that there was a minimal effort to have past due training modules completed. This issue will be tracked as an Inspection Followup Item.

**O8 Miscellaneous Operations Issues**

O8.2 Certificatee Event Reports (90712)

The certificatee made the following operations-related event report during the inspection period. The inspectors reviewed any immediate safety concerns indicated at the time of the initial verbal notification. The inspectors will evaluate the associated written reports for the event following submittal, as applicable.

<u>Number</u>	<u>Date</u>	<u>Status</u>	<u>Title</u>
38335	10/01/01	Closed	Activation of the High Voltage UF <sub>6</sub> Release Detection System Due to a UF <sub>6</sub> Leak to Atmosphere

O8.3 Bulletin 91-01 Reports (90712)

The certificatee made the following report pursuant to Bulletin 91-01 during the inspection period. The inspectors reviewed any immediate NCS concerns associated with the reports at the time of the initial verbal notification; the reports are considered closed unless discussed specifically below. The events 38265 and 38266 are considered closed based on the inspectors' review. Event 38155 was discussed in Section O3 above.

<u>Number</u>	<u>Date</u>	<u>Title</u>
38265	09/04/01	24-Hour Report - NCSA Violation; Receipt of High-High Moisture Alarm at the air plant. A subsequent update on 9/12/01 included information that the NCS limit of 1300 ppm had, in fact, not been exceeded.
38266	09/06/01	4-Hour Report - NCSA Violation; Process Building C-337, Unit 1 Cell 2, Freon R-114 moisture content at 2100 ppm with the limit at 1760 ppm.
38155	7/19/01	4-Hour Report - Deficient Nuclear Criticality Safety Evaluation of Nuclear Criticality Safety Approvals GEN-10 and CAS-011 (Follow-up during next annual Nuclear Criticality Safety Inspection)

#### O8.4 Independent Verification Issues in Bulletin 91-01 Reports

The inspectors reviewed the 14 NCS incident reports for Calendar Year (CY) 2001 that had been issued as of the date of the inspection. Seven of the 14 NCS incident reports appeared to have root causes related to inadequate independent verification (IV). The NCS reports indicated that some IV issues resulted from poor procedures, while other IV issues resulted from inadequate implementation of procedures. The inspectors determined that the certificatee had already identified the pattern and had initiated a Significant Condition Adverse to Quality (SCAQ) ATR and self-assessment, SCAQ 01-3465. The inspectors' review of the SCAQ determined that regulatory compliance issues related to IV were being addressed by the licensee. The inspectors determined that additional follow-up was necessary to determine the extent of condition, the adequacy, and the timeliness of the certificatees' response. Accordingly, the certificate holder's IV program adequacy will remain an Unresolved Item **URI 70-7001/2001-008-03**.

#### O8.5 NCS Violation Trending for CY 2001

The inspectors reviewed the certificatee's evaluation and trending of the less-severe incidents at PGDP in CY 2001. The inspectors determined that the number of NCS violations had notably increased, by comparison to the same period in CY 2000. The certificatee classified four of the five violations as significant conditions adverse to quality, which warranted a root cause analysis and an associated corrective action plan. The inspectors determined that the certificatee's NCS performance indicated a declining trend that warranted additional attention from PGDP management.

#### O8.6 Management Organization and Controls

##### a. Inspection Scope (88005)

The inspectors reviewed the safety analysis report, procedures, plant operational review committee minutes, plant performance review committee charter, and an audit to determine if the certificatee has established procedure controls, safety committees and internal audits and reviews.

##### b. Observations and Findings

The inspectors reviewed the Safety Analysis Report Section 6.11, "Procedures," which described the management controls program for the development, issuance, and control of procedures. The inspectors also reviewed Uranium Enrichment (UE) Procedure Control Process, UE-PS-PS1031, Revision 10, dated June 29, 2001. The purpose of this procedure was to implement requirements from the SAR, Section 6.11, for Uranium Enrichment facilities procedure management processes. The inspectors determined that these documents contained requirements on how to write, review, validate, modify, communicate the change, and perform periodic reviews and use procedures.

The inspectors reviewed the Safety Analysis Report Section 6.2, "Safety Committees." This section established the requirements and responsibilities of the Plant Operational Review Committee (PORC). The inspectors also reviewed Plant Operation Review Committee Procedure UE2-PO-OR1030, Revision 2, dated January 1, 1997. This procedure applies to all business conducted by the PORC, which was to perform multi-discipline reviews of day-to-day and proposed plant activities to ensure these activities would be conducted in a safe manner.

After reviewing the above documents, the inspectors reviewed the following PORC minutes: PORC Meeting 01-052 on September 11, 2001, when the PORC deleted Condition 16 from the PGDP Certificate of Compliance after NRC approval and PORC Meeting 01-053 on September 14, 2001, when changes to two procedures were approved. During both of these meetings, a quorum of members attended with all functional areas represented. The inspector did not identify any nuclear safety issues involving the conduct of the PORC.

The inspectors reviewed the "Plant Performance Review Committee (PPRC) Charter," Revision 3, dated September 18, 1998. The objectives of the PPRC were: to identify areas where plant performance didn't meet industry standards or corporate goals; to provide guidance to facilitate improvements; to assess overall progress toward improvements; and to report findings or concerns to executive and line management. The members of the PPRC would consult and meet in fulfilling these objectives. Members might also report to management on an individual basis. The inspectors had no concerns with this element of management controls.

The inspectors reviewed Paducah Internal Audit Report, KP-TR-2001-A212 "Training" for the period January 01 to March 31, 2001. This audit concluded that the plant's systematic SAT and Non-SAT training processes and programs were found meeting the requirements of governing procedures. Some training administrative deficiencies were observed and documented for corrective actions. The (NCS) training for plant personnel was implemented and all personnel sampled having unescorted access to fissile control areas were current in their required NCS training. The inspectors did not identify any issues with this management control.

c. Conclusions

The certificatee had procedures, safety committees and audits established as required by NRC regulations to oversee management controls of plant safety activities.

## **II. Maintenance and Surveillance**

### **M1 Conduct of Maintenance and Surveillance**

#### M1.1 Maintenance Activity Reviews

a. Inspection Scope (88103)

The inspectors observed selected safety system maintenance activities to verify that the activities were performed safely, and in accordance with the Technical Safety Requirements and applicable procedure requirements.

b. Observations and Findings

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 Operation 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 Safety Analysis Report; and, any deficiencies or out of tolerance values identified during the testing were properly documented, reviewed, and resolved by appropriate management personnel.

#### Maintenance Activities

- \* Work Order 0102956-01, "Installation of Replacement R-114 Sight Glass at C-335 Unit 4, Cell 4"
- \* Work Order R0110576-01, "Replace seal at C-335 Unit 2, Cell 8, Stage 3B"
- \* Work Order 0103181-01, "Troubleshoot and Repair C-333 Unit 3, Cell 6 Process Gas Leak Detection System"
- \* Minor maintenance, "Troubleshoot Motor Brake at C-337 Unit 1, Cell 2"

#### c. Conclusions

The inspectors concluded that the maintenance activities which were observed or reviewed were conducted in accordance with procedure requirements. When questions arose during maintenance activities regarding a procedure, the work was stopped and the issue resolved prior to the resumption of work. In addition, the inspectors acknowledged that when required, ATRs were initiated by plant staff for identified issues.

### **III. Engineering**

#### **E2 Engineering Support of Facilities and Equipment**

##### E2.1 System Walkdowns

###### a. Inspection Scope (88101)

The inspectors performed walkdowns of portions of selected systems. As part of the walkdowns, the inspectors reviewed the applicable Technical Safety Requirement and Safety Analysis Report Sections, process and instrumentation diagrams, and engineering analyses and documentation. The inspectors also discussed the systems with operations, maintenance and engineering staff, and reviewed recent ATRs identified by the certificatee for the system.

###### b. Observations and Findings

The inspectors performed partial field walkdowns of the following systems and respective components:

- High Pressure Fire Water; and
- Chlorine/Fluorine.

As part of the walkdowns, the inspectors reviewed and compared the as-built configuration to the appropriate design documents, including process and instrumentation diagrams. In addition, the inspectors also discussed the systems with the respective system engineers.

The inspectors verified that operators assigned to those areas were familiar with the operation and current condition of the respective systems. The inspectors also reviewed recent ATRs for the systems to verify that the safety functions of the systems were not affected by any adverse conditions identified by the certificatee. In all instances, the justification for operability was evaluated and no operability concerns existed.

Finally, the inspectors verified that no temporary modifications on the systems existed which would preclude the system or components from performing the intended safety function.

c. Conclusions

The inspectors performed partial system walkdowns of selected plant systems. In addition, the inspectors reviewed recent Assessment and Tracking Reports for these systems to verify that no operability concerns existed. The inspectors concluded that the system engineers and operations staff were knowledgeable of the respective systems.

#### **IV. Plant Support**

### **R1 Radiation Protection**

#### **R1.1 Low-Level Radioactive Waste Manifest**

a. Inspection Scope (84850)

The inspectors assessed selected truck shipments of low-level radioactive waste to ensure compliance with plant procedures and NRC regulations. The inspectors also reviewed the manifests for the selected shipments.

b. Observations and Findings

The inspectors observed two truck shipments of low-level radioactive active waste and reviewed the waste manifests for these shipments. The manifests were 0691B-01-0020 and 0691B-01-0021. The inspectors determined that the shipments and manifests met regulatory requirements.

c. Conclusions

The inspectors observed two truck shipments of low-level radioactive waste and reviewed the waste manifests for these shipments. The inspectors determined that the shipment manifests met shipping requirements.

#### **R1.2 Radioactive Waste Management and Low-Level Waste Storage**

a. Inspection Scope (88035 and 84900)

The inspectors interviewed personnel, toured the low level radioactive material storage areas, inspected two truck loads of low-level radioactive waste ready for shipment, and reviewed records related to radioactive waste management and shipping.

b. Observations and Findings

The inspectors toured the low-level radioactive waste storage areas with the radioactive waste supervisor. The areas were labeled and posted as required by 10 CFR 20. The inspectors reviewed records that showed the backlog of waste packaged increased in June 2001, as bulk containers became available for filling with radioactive waste. The backlog of radioactive waste had been managed. The backlog volume of radioactive waste stowage on site as of August 01, 2001, was 23,454 cubic feet.

The inspectors interviewed the drivers of two trucks loaded with low-level radioactive waste ready for shipments. The drivers knew to keep the records in the drivers door and knew the emergency phone number to call in case of an accident. The inspectors examined the packages of radioactive waste and determined that they were properly labeled and determined that the trucks were properly placarded.

The inspectors reviewed "Uniform Low-Level Radioactive Waste Manifests" 0691 B-01-0020, and 0691 B-01-0021 and determined that they met the manifesting requirements.

c. Conclusions

The storage, posting, and labeling of those areas of the low-level radioactive waste storage toured by the inspectors met NRC and Department of Transportation requirements.

R1.3 Environmental Protection (88045)

a. Inspection Scope

The inspectors toured the site and surrounding area with the environmental supervisor and an environmental technician. The inspectors observed the status of air sampling equipment and the process of preparing and changing of air sample filters.

b. Observations and Findings

The inspectors observed the environmental technician collect and prepare for analysis the sample from the site's 200 foot air monitor. The inspectors determined that the sampling equipment was calibrated and functioning as required. The technician was proficient in collecting and splitting the sample for analysis. The technician followed procedures and properly labeled the sample. Sample cleanliness was maintained. Records for chain of custody for the samples were properly completed.

The inspectors held discussions with the environmental supervisor, and the inspectors observed the environmental technician prepare filters, collect and replace filters in environmental air sampler on-site and in areas around the site. The technician performed these tasks properly. The inspectors observed at three locations, the proper operation of the air sampling equipment and proficiency in the methods used by the technician to maintain cleanliness of the sampling equipment and custody of the collected sample filters. The technician also evaluated and recorded the following: volume of air sampled in total cubic feet per minute of air flow since the filter was changed out; the current cubic feet per minute of air flow which indicated that the air

sampling equipment was operating properly; the total elapsed time reading which indicated that the equipment had operated continuously since the filter was changed; and the calibration date which indicated the sample equipment was within its calibration frequency. All of the readings were as expected, indicating that the air sampling equipment was operating properly.

The inspectors reviewed the results of the sample analysis and determined that the results were within the required limits.

c. Conclusions

The environmental air monitoring equipment that was observed was operating properly. Air samples were prepared and processed according to procedures. Chain of custody was properly maintained. The results of the sample were within the required limits.

R1.4 Review of Respiratory Protection Procedure

a. Inspection Scope (83822)

The inspectors reviewed procedure CP2-SH-IH1036, "Respiratory Protection Program," Revision 1, dated November 29, 1999. The inspectors also discussed the storage, frequency of canister and respirator replacement, and the tracking system for canisters with the plant staff and the individual responsible for the respiratory protection program. In addition, the inspectors evaluated the respirator storage areas in the process buildings for both the emergency and routine use respirators.

b. Observations and Findings

The inspectors reviewed the respiratory protection program procedure and verified that there was guidance for changing GMHF-C canisters in sections 6.4.10-14, such that a canister may be used for one 12-hour shift or until exposed to a release of HF/UF<sub>6</sub> detected visually or by instrumentation. The procedure places the responsibility for changing the canister on the respirator user versus a requirement for tracking the hours of use. The inspectors also discussed the storage, frequency of canister and respirator replacement, and the tracking of canisters with the plant staff and the individual responsible for the respiratory protection program. The plant staff was aware that the canisters for emergency use were tracked on a monthly basis. This tracking was conducted by the FLM on each shift and the tracking sheets kept in a three ring binder. The inspectors reviewed these tracking sheets and observed that there was an inconsistency concerning which date the FLM was to write down each month. Often, the three year shelf life expiration date was written down versus the one year after the date stamped on the canister indicating when the seal was removed. This was brought to the FLM's attention and immediately corrected.

In addition, the inspectors evaluated respirator storage in the process buildings for both the emergency and routine use respirators. The inspectors observed that the emergency use respirators were stored in accordance with the guidance provided by Industrial Hygiene, while many of the routine use respirators were stored with other material and equipment, such as out-dated procedures, gloves, ear muffs, and channel locks. This was brought to the Building Manager's attention and immediately corrected. In addition, several expired canisters were found in the routine use respirator storage areas. The inspectors discussed this with the respective Building Managers who

explained that the individuals to whom the respirators and canisters were assigned were no longer assigned to their particular buildings. These expired canisters were then properly disposed.

c. Conclusions

The portion of the respiratory protection program inspected was maintained in accordance with the SAR and applicable procedures.

**S1 Conduct of Security and Safeguards Activities**

S1.1 Physical Security

a. Inspection Scope

The inspectors performed routine observations of plant physical security personnel and equipment. The inspectors also performed assessments of plant physical security as requested by regional management.

b. Observations and Findings

For those areas observed and evaluated, the inspectors determined that the certificate holder was in compliance with regulations and their commitments.

c. Conclusions

The inspectors performed routine observations of plant physical security personnel and equipment. The inspectors also performed assessments of plant physical security as requested by regional management. For those areas observed and evaluated, the inspectors determined that the certificate holder was in compliance with regulations and their commitments.

**V. Management Meetings**

**X1 Exit Meeting Summary**

The inspectors presented the routine resident inspection results to members of the facility management on October 2, 2001. A tele-conference on October 1, 2001, presented the results of the nuclear criticality safety inspection to the facility management. The facility staff acknowledged the findings presented and indicated concurrence with the facts, as stated. The inspectors asked the certificatee staff whether any materials examined during the inspection should be considered proprietary. One proprietary document was identified which was not quoted in this report.

## **PARTIAL LIST OF PERSONS CONTACTED**

### United States Enrichment Corporation

- \* L. Albritton, Nuclear Regulatory Affairs
- \* M. Buckner, Operations Manager
- \* A. Canterbury, Maintenance
- \* S. Cowne, Nuclear Regulatory Affairs
- \* S. Gunn, Operations
- \* E. Hickman, Health Physics and Industrial Health Manager
- \* P. Jenny, Plant Services Manager
- \* J. Labarraque, Nuclear Safety and Quality
- \* J. McKinney, Engineering
- \* S. Penrod, Enrichment Manager
- \* H. Pulley, Senior Advisor
- \* V. Shanks, Production Support
- \* S. Penrod, Plant Manager
- \* R. Starkey, General Manager

\* Denotes those present at the exit meeting on October 2, 2001.

## **INSPECTION PROCEDURES USED**

- IP 83822: Radiation Protection
- IP 84850: Radioactive Waste Management - Inspection of Waste Generator Requirements of 10 CFR 20 and 10 CFR 61
- IP 84900: Low-Level Radioactive Waste Storage
- IP 88100: Plant Operations
- IP 88101: Configuration Control
- IP 88102: Surveillance Observations
- IP 88103: Maintenance Observations
- IP 88005: Management Organization and Controls
- IP 88010: Operator Training/Retraining
- IP 88015: Headquarters Nuclear Criticality Safety Program
- IP 88045: Environmental Protection
- IP 90712: In-office Reviews of Written Reports on Non-routine Events

## ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened</u>	<u>Type</u>	<u>Summary</u>
07007001/2001-008-02	IFI	After discussions with training personnel, the inspectors determined that there was a minimal effort to have past due training modules completed.
07007001/2001-008-03	URI	The inspectors determined that additional follow-up was necessary to determine the extent of condition, the adequacy and the timeliness of the certificatees' response. Accordingly the certificate holder's IV program adequacy will remain an Unresolved Item
<u>Closed</u>		
07007001/2001-008-01	NCV	No NCSA controls had been established to ensure that moderation control were maintained during the transition from equipment installation activities performed under NCSA GEN-010 and cell shutdown approved under NCSA CAS-011.
<u>Discussed</u>		
None		

## LIST OF ACRONYMS USED

ACR	Area Control Rooms
ADAMS	Agencywide Documents Access and Management System
ATR(s)	Assessment and Tracking Report(s)
AQ	Augmented Quality
CAAS	Criticality Accident Alarm System
CAQ	Condition Adverse to Quality
CFR	Code of Federal Regulations
CY	Calender Year
DC	District of Columbia
DNMS	Division of Nuclear Material Safety
DOE	Department of Energy
FLM	First Line Manager
IV	Independent Verification
MBWA	Managing by Walking Around
MD	Maryland
NCS	Nuclear Criticality Safety
NCSA	Nuclear Criticality Safety Approval
NCV	Non-Cited Violation
NDA	Nondestructive Assay
NRC	Nuclear Regulatory Commission
NS	Non-Safety
OOS	Out of Service
PGDP	Paducah Gaseous Diffusion Plant
PORC	Plant Operations Review Committee
PPRC	Plant Performance Review Committee
SAR	Safety Analysis Report
SAT	Systematic Approach to Training
SCAQ	Significant Condition Adverse to Quality
SNM	Special Nuclear Material
TDAG	Training Development and Administrative Guide
TSR	Technical Safety Requirement
<sup>235</sup> U	Uranium-235
UE	Uranium Enrichment
UF <sub>6</sub>	Uranium Hexafluoride
USEC	United States Enrichment Corporation