U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	70-7002
Certificate No:	GDP-2
Report No:	70-7002/98003(DNMS)
Applicant:	United States Enrichment Corporation
Facility Name:	Portsmouth Gaseous Diffusion Plant
Location:	3930 U.S. Route 23 South P.O. Box 628 Piketon, OH 45661
Dates:	January 26 through March 8, 1998
Inspector:	D. J. Hartland, Senior Resident Inspector
Approved By:	Patrick L. Hiland, Chief Fuel Cycle Branch Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

United States Enrichment Corporation
Portsmouth Gaseous Diffusion Plant
NRC Inspection Report 70-7002/98003(DNMS)

Plant Operations

- The inspector observed that the certificatee did not have a program in place to monitor shutdown equipment with deposits greater than safe mass to verify that a fluorinating environment was maintained. As a result, one violation of a nuclear criticality safety approval (NCSA) requirement was identified. (Section O1.1)

- The inspector concluded that the certificatee's response to a valving order error during cell treatments was appropriate. The inspector will monitor the effectiveness of the certificates's corrective actions. (Section O1.2)

- In response to reportable events resulting from valve misalignments at the X-343 and X-705 Buildings, the certificates has committed to revise applicable operating procedures to include valve line-ups. One inspector followup item (IFI) was identified. (Section O1.3)

Maintenance and Surveillance

- The inspector identified a violation of a Technical Safety Requirement (TSR) when two plant employees entered the X-102 Cafeteria during maintenance on the criticality accident alarm without alternate means of alarm notification. The inspector concluded a contributing cause to the event was that signs were not posted to warn personnel of the requirements for entry into the restricted area. (Section M1.1)

- The certificatee continued to have problems with TSR compliance during maintenance/surveillance activities. The certificatee's planned corrective actions to a previous violation appeared to adequately address the latest event. One violation was identified. (Section M1.2)

Engineering

- The inspector concluded that the certificates failed to correct a problem with the low cylinder pressure shutoff setpoint in a timely manner. As a result, the certificatee operated two autoclaves at the X-343 Building for approximately six months, during which time the setpoint drifted below the TSR minimum. One violation was identified. (Section E2.1)

Report Details

I. Operations

01 Conduct of Operations[1]

O1.1 Failure to Maintain NCSA Control For PEH Equipment

a. Inspection Scope (88020)

The inspector reviewed the certificatee's surveillance program to verify compliance with NSCA controls for cascade equipment containing greater than safe mass.

b. Observations and Findings

On January 30, 1998, the inspector identified that the certificatee did not have a surveillance program in place to verify and maintain a fluorinated environment in cascade equipment that was shut down, contained greater than safe mass, and not buffered with dry air.

In response, the certificatee implemented an administrative control, through daily operating instructions, to sample weekly to verify that affected equipment was not at a Uranium Hexafluoride (UF6) negative. In addition, cascade operators were to monitor the pressure of the equipment each shift to ensure that wet air in-leakage was not occurring.

On February 4, 1998, the certificatee took the first sample from compressor cooler 29AB3 per the new instructions. The sample indicated that the cooler was at a UF6 negative. The operators pressured the cooler to greater than 14 psia with dry air to maintain compliance with TSR 2.2.3.15.

Technical Safety Requirement (TSR) 3.11.2 required, in part, that all operations involving uranium enriched to 1.0 weight percent or higher U-235 and 15 grams or more of U-235 shall be performed in accordance with a documented NCSA. NCSA-330-004.A02, "Cascade Operations in the X-330 Building," required any cascade equipment shutdown (motor turned off) and at a UF6 negative shall have a plant dry air or nitrogen buffer at greater than or equal to 14 psia. Contrary to the above, on February 4, 1998, compressor cooler 29AB3 was discovered to be at a Uranium Hexafluoride (UF6) negative without a dry air or nitrogen buffer at greater than or equal to 14 psia, a **Violation (VIO 70-7002/98003-01).**

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[1] Topical headings such as 01, M8, etc., are used in accordance with the NRC standardized inspection report outline contained in NRC Manual Chapter 0610. Individual reports are not expected to address all outline topics, and the topical headings are therefore not always sequential.

c. Conclusions

The inspector identified that the certificatee did not have a program in place to monitor shutdown equipment with deposits greater than safe mass to verify that a fluorinating environment was maintained. As a result, one violation of an NCSA requirement was identified.

O1.2 Error With Valving Order During Cell Treatments

a. Inspection Scope (88100)

The inspector reviewed the certificatee's investigation into a valving error during cell treatments.

b. Observations and Findings

On February 17, 1998, while aligning building headers to place a treatment shot into Cell 31-3-3, a valving error occurred that inadvertently tied the cell to Cell 29-4-2, which was undergoing static cell treatment at the time. As a result, due to the pressure differential, the contents of Cell 29-4-2 began to bleed into Cell 31-3-3.

Upon identification of the problem, the operators took action to isolate the two cells. The operators then added nitrogen gas to Cell 29-4-2 to maximize the dilution pressure as allowed by the operating procedure. The operators also shut down Cell 31-3-3, isolated the lube oil and hydraulic oil to the cell, and valved off the seals as a precautionary measure. The operators then performed scans on the cells to verify that explosive mixtures did not develop.

The certificatee put a hold on cell treatments until a preliminary investigation by operations into the event and an independent review by a QA auditor were completed. Both investigations concluded that the root causes of the event were that border valves were not included in the valving order and an independent cross check of the valve line-up sheets during preparation was not performed. A contributing cause was that the concurrent treatments of the two cells was an infrequently performed evolution which may have warranted some additional oversight.

As corrective action, the certificatee committed to change plant Procedure XP4-CO-CA2228, "Valving Orders," to require that cross checks be performed independently. In addition, the certificatee also committed to develop a procedure to provide guidance for performing infrequent and other special evolutions.

Failure to include the border valves in the valving order was a violation of the plant procedure. This non-repetitive, certificatee-identified and corrected violation is being treated as a **Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy. (NCV 70-7002/98003-02)**

c. Conclusion

The inspector concluded that the certificatee's actions in response to the event were appropriate. The inspector will monitor the effectiveness of the certificatee's corrective actions. One NCV was identified.

O1.3 Valve Misalignments Result In Reportable Events

a. Inspection Scope (88100)

The inspector reviewed two reportable events that occurred as a result of valve misalignments.

b. Observations and Findings

The inspector reviewed two reportable events that occurred during the inspection period as a result of valve misalignments:

- On February 9, 1998, during a transfer evolution with the microfiltration system at the X-705 Building, operations discovered two valves out of position that resulted in a spill of approximately 80 gallons of uranium bearing solution to the floor. The spill was contained within the contamination controlled area in the building.

  During the review, the inspector determined that the valves were not addressed in the NCSA as a control to prevent transfer of a greater than safe mass to an unsafe geometry. As a result, an event notification was made to the NRC due to the deficient NCSA.

  The certificatee determined that the system contained only 32 grams of U-235, much less than the 350 grams maximum allowed in the system. The certificatee shut down the microfiltration system until the NCSA could be revised to include the appropriate controls. At the time of this event, NRC specialist inspection of the Portsmouth Nuclear Criticality Safety Program was in progress. The results of the NRC specialist review of this event were to be documented in NRC Inspection Report 70-7002/98-204.

- On February 24, 1998, Autoclave Number 2 at the X-343 Building had a high condensate level safety system actuation. During review, the certificatee discovered that a normally open valve was closed which allowed the condensate to back up in the condensate drain line.

  The inspector reviewed the applicable operating procedures and noted that valve line-ups were not performed prior to placing these systems in service. The procedures addressed the valves that were required to operate to support specific evolutions. Border valves, as well as other valves that were not normally operated, were not checked to verify that they were in their required positions.

The inspector also noted that the certificatee did not have a process to control valve position during troubleshooting evolutions which were not included in the lock out-tag out process. The valving order procedure discussed in Section O1.2 above applied only to uranium hexafluoride and freon systems in the cascade buildings.

As corrective action to these events, the certificatee committed to change operating procedures for the autoclaves and X-705 systems to include valve line-ups prior to placing systems in service. The certificatee also committed to implement the valving order procedure for valve manipulations not covered by existing procedures. The inspector's review to verify the implementation of these commitments is an **Inspection Follow-up Item. (IFI 70-7002/98003-03)**

c. Conclusion

The certificatee committed to revise X-705 and autoclave operating procedures to include valve line-ups. One IFI was identified.

II. Maintenance

M1 Conduct of Maintenance

M1.1 TSR Violation During CAAS Slave Alarm Maintenance

a. Inspection Scope (88103)

The inspector observed maintenance evolutions to verify compliance with the TSRs.

b. Observations and Findings

On March 6, 1998, while walking by the X-102 Cafeteria, the inspector observed two plant employees crossing yellow boundary tape marked "Do Not Enter." The tape had been installed across all accesses to the cafeteria to prevent entry during maintenance on the criticality accident alarm that was slaved to the X-710 Laboratory detectors.

The inspector interviewed the individuals upon their exit from the cafeteria a few minutes later and determined that they did not have an alternate means of notification as required by TSR 2.8.1.3 for entry during the maintenance. The individuals, who worked in Facilities Maintenance as carpenters, apparently believed that the boundary was installed as part of another ongoing maintenance activity that they were supporting. The carpenters apparently did not hear the announcement on the plant PA system earlier in the morning that notified personnel to not enter the cafeteria.

The inspector reviewed the work package and noted that it did not include the requirement to install the boundary tape across the accesses to the cafeteria. The plant security department, who was responsible for installing the barriers, used Procedure XP4-SS-SP1108, "Protective Force Pre And Post Maintenance Activities: Criticality Accident Alarm System," to provide guidance to perform the activity. The procedure, which was modeled for use in the cascade buildings, required the use of metal chains and magnetic signs. The signs annotated the requirement that an emergency pocket dosimeter or radio

was required for entry. However, since the structural supports at the cafeteria were non-metal, security personnel used the tape instead and no signs were installed.

Technical Safety Requirement (TSR) 2.8.1.3 required that the criticality accident alarm be operable (audible) in areas where the maximum foreseeable absorbed dose in free air exceeds 12 rad. Those areas included the X-102 Cafeteria, which was within 200 feet of the X-710 Laboratory, where criticality accident detection was required. For areas that did not have an audible alarm, the TSR required action was to provide personnel allowed in the area with an alternate means of criticality alarm notification such as a device that will alarm on sensing a 10 mr/hr dose rate, or a radio in constant communication with the plant control facility (PCF).

Contrary to the above, on March 6, 1998, two individuals entered a restricted area as described above without alternate means of notification which is a **Violation (VIO 70-7002/98003-04).**

c. Conclusion

The inspector concluded a contributing cause to the event was that signs were not posted to warn personnel of the requirements for entry into the restricted area.

M1.2 TSR Violation During Maintenance on ERP Crane

a. Inspection Scope (88103)

The inspector reviewed maintenance activities to verify compliance with TSRs.

b. Observations and Findings

On February 20, 1998, the certificatee identified that preventive maintenance was performed on the extended range product (ERP) crane, including an oil change, without declaring it inoperable. As a result, the certificatee did not tag the crane out of service within one hour of rendering the crane inoperable as required by TSR 2.5.3.10. The operations supervisor apparently did not perform an adequate review of the work package prior to providing start work approval to the maintenance crew. In addition, the inspector noted that the work package/procedure did not address the TSR actions.

Failure to tag the ERP crane out of service within one hour of making the crane inoperable is **a Violation of TSR 2.5.3.10 (VIO 70-7002/98003-05).**

c. Conclusion

The certificatee continued to have problems with TSR compliance during maintenance/surveillance activities.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Failure To Correct Setpoint Discrepancy

a. Inspection Scope (88101)

The inspector reviewed the adequacy of corrective actions taken in response to identified deficiencies.

b. Observations and Findings

On April 18, 1997, during a review of surveillance data, the certificatee identified two autoclaves outside the acceptance criteria for the low cylinder pressure shutoff system. The two autoclaves affected were Autoclave Number 2 at the X-342 Building and Autoclave Number 3 at the X-344 Building.

Technical Safety Requirement (TSR) 2.1.3.9 required quarterly functional checks to verify steam shutoff to the autoclaves when after the first hour of heating the cylinder, pressure remained less than 20 pounds per square inch absolute (psia). The basis for this requirement was that heating of a cylinder with a closed or plugged valve would negate the protection afforded by the cylinder high pressure shutoff system. The certificatee discovered that the "as-lefts" during the previous quarterly checks on these autoclaves were below 20 psia.

The certificatee declared these autoclaves inoperable and removed them from service. The certificatee determined that the setpoint was at 20 psia, and therefore did not account for instrument drift and uncertainties during normal operation. As corrective action, the certificatee committed to revise the setpoint and incorporate the change in the surveillance procedures.

The certificatee determined that continued operation of the autoclaves was acceptable at the existing setpoint until the next scheduled surveillances, despite firm evidence that drift below the TSR minimum was possible. No operability determination was prepared to document the basis for this decision.

The issue was revisited on October 28, 1997, when the certificatee identified that instrument inaccuracies in this system may have been slightly greater than initially calculated. The operability evaluation at that time appeared to assume that the autoclaves had been calibrated to the new setpoints.

On January 23, 1998, the inspector reviewed surveillance data and noted that "as-founds" taken on two autoclaves (Autoclave Numbers 4 and 6 at the X-343) in November 1997 were below the TSR minimum.

10 CFR Part 76.93, "Quality Assurance," required that the Corporation shall establish, maintain, and execute a quality assurance program satisfying each of the applicable requirements of American Society of Mechanical Engineers (ASME) NQA-1-1989, "Quality Assurance Program Requirements for Nuclear Facilities."

American Society of Mechanical Engineers (ASME) NQA-1-1989 Basic Requirement 16, "Corrective Action," stated that conditions adverse to quality (CAQ) shall be identified promptly and corrected as soon as practical. Appendix A, of Procedure UE2-HR-CI1031, "Corrective Action Process," listed out of calibration instrumentation, including "as found" conditions, as a specific example of a CAQ.

Contrary to the above, the certificatee did not correct the problem with the autoclave low cylinder pressure shutoff system setpoint. As a result, the certificatee operated Autoclave Numbers 4 and 6 at the X-343 Building between April 18, and November 11, 1997, during which time the setpoints drifted below 20 psia, the minimum required by Technical Safety Requirement 2.1.3.9., which is a **Violation (VIO 70-7002/98003-06).**

c. Conclusion

The inspector concluded that the certificatee failed to correct a problem with the low cylinder pressure shutoff setpoint in a timely manner. As a result, the certificatee operated two autoclaves at the X-343 Building for approximately six months, during which time the setpoint drifted below the TSR minimum.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of the facility management on March 9, 1998. The facility staff acknowledged the findings presented. The inspector asked the plant staff whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Lockheed Martin Utility Services (LMUS)

J. B. Morgan, Acting General Manager
M. Hasty, Engineering Manager
*R. W. Gaston, Nuclear Regulatory Affairs Manager
C. W. Sheward, Maintenance Manager
*R. D. McDermott, Operations Manager

United States Enrichment Corporation

J. H. Miller, USEC Vice President, Production
L. Fink, Safety, Safeguards & Quality Manager

United States Department of Energy (DOE)

J. C. Orrision, Site Safety Representative

*Denotes those present at the exit meeting on March 9, 1998.

INSPECTION PROCEDURES USED

IP 88100	Plant Operations
IP 88101	Configuration Control
IP 88103	Maintenance Observations
IP 88020	Regional Criticality Safety

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

70-7002/98003-01	VIO	Cooler Discovered At UF6 Negative Without Air Buffer
70-7002/98003-02	NCV	Valving Error During Cell Treatments
70-7002/98003-03	IFI	Procedure Changes To Include Valve Line-ups
70-7002/98003-04	VIO	TSR Violation During CAAS Maintenance At Cafeteria
70-7002/98003-05	VIO	TSR Violation During Maintenance On ERP Crane
70-7002/98003-06	VIO	Failure To Correct Problem With Autoclave Low Cylinder Pressure Shutoff System Setpoint

Closed

None

Discussed

None

Certification Issues - Closed

None

LIST OF ACRONYMS USED

ASME	American Society of Mechanical Engineers
CAQ	Condition Adverse to Quality
CFR	Code of Federal Regulations
ERP	Extended Range Product
g	Gram
IFI	Inspection Followup Item
IP	Inspection Procedure
LMUS	Lockheed Martin Utility Services
mrem	milli-roentgens equivalent man
N2	Nitrogen
NCSA	Nuclear Criticality Safety Approval
NCV	Non-cited Violation
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
PCF	Plant Control Facility
PDR	Public Document Room
PEH	Planned Expeditious Handling
PGDP	Paducah Gaseous Diffusion Plant
psia	pounds per square inch absolute
TSR	Technical Safety Requirement
UF_6	Uranium Hexafluoride
VIO	Violation
wt%	weight-percent