

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No. 70-7002

Certificate No. GDP-2

Observation Report No. 70-7002/97001(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 25 - March 2, 1997

Inspectors: C. R. Cox, Senior Resident Inspector
D. J. Hartland, Resident Inspector
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Approved By: Timothy D. Reidinger, Acting Chief
Fuel Cycle Branch

EXECUTIVE SUMMARY

United States Enrichment Corporation Portsmouth Gaseous Diffusion Plant NRC Inspection Report 70-7002/97001(DNMS)

This observation report includes aspects of plant operations, maintenance, and engineering. Observations were made by the resident inspectors as part of their routine duties.

Authority Statement: The Department of Energy (DOE) and the Nuclear Regulatory Commission (NRC) have agreed to cooperate to facilitate the NRC's obtaining of information and knowledge regarding the gaseous diffusion plants and the United States Enrichment Corporation's (USEC) operation thereof through observation/inspection activities during the interim period before the NRC assumes regulatory responsibility. This report is a summary of NRC observations for the period stated. Each of the observations was communicated to the DOE site safety staff and USEC site staff during and at the end of the observation period to allow for their future follow up and evaluation, as appropriate.

Plant Operations

The inspectors observed weaknesses in the command and control of the plant's response during a power outage on February 9, 1997, and the lack of available procedural guidance for recovery from the X-300 Plant Control Facility (Section 01.2).

The inspectors noted another example of inadequate corrective actions when the Tails Withdrawal Station was discovered not using required pigtail plugs. The Extended Range Product Withdrawal Station had the same problem as noted in Observation Report No. 70-7002/96008(DNMS) (Section 01.3).

Adequate corrective actions were taken in response to the movement of a liquid cylinder event on December 16, 1996 (Section 01.4).

Maintenance

Maintenance problems during the observation period highlighted continuing communications problems between the various organizations (Section M1.1).

Engineering

The use of engineering notices as work instructions resulted in bypassing the procedure review process (Section E3.1).

Plant Support

The inspectors noted that the facility was adequately implementing the Physical Security Plan (Section S1.0).

Based upon an incomplete review of application documents, a failure to use the regulatory processes of 10 Code of Federal Regulations (CFR), and a misinterpretation of NRC regulations, USEC could have been in possession of greater than authorized possession limits upon regulatory transition had not the inspectors identified the incomplete review (Section S8.1).

The inspectors noted poor contamination control practices in several facilities due to poor housekeeping (Section R8.0).

REPORT DETAILS

Summary of Plant Status

The plant operated at approximately 1450 MW during most of this observation period. High enriched uranium (HEU) refeeding operations were resumed during this observation period.

I. Operations

01 Conduct of Operations¹

01.1 General Comments

The inspectors observed selected operational activities. Specific events and noteworthy observations are detailed in the sections below.

01.2 Power Loss to Plant Facilities

a. Inspection Scope

The inspectors observed the plant staff's response to the loss of power to several plant facilities.

b. Observations and Findings

At 3:10 a.m., on February 9, 1997, the plant lost power to several facilities including the steam plant, X-300 plant control facility, and the X-710 laboratory building. The power loss occurred due to a fault in a cable from feeder M4. Alternate power source M3 had failed a few weeks prior to the event.

The safety implications from the power loss were minimal. Steam to the X-333 building was isolated briefly due to reduced steam pressure. The steam plant restored pressure to normal in a timely manner using back-up turbine-driven systems. An emergency diesel generator started and loaded automatically to provide power to the X-300 building. The cable fault was isolated and normal power was restored to the X-710 and X-300 buildings by 2:00 p.m. Power was restored to the steam plant using a diesel generator that was previously staged when M3 failed.

The inspectors reported to the site and observed some weaknesses in the plant's response:

¹Topical 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.

- The plant displayed poor command and control during special evolutions. The plant failed to conduct a plant briefing to provide guidance on anticipated actions and did not take any contingencies prior to an initial attempt to switch back to normal power after ground fault isolation at the X-300 building. During that attempt, the plant could not close the normal feed breaker and then had problems restoring the diesel power. As a result, the X-300 building was without power to cascade monitoring instrumentation for about 30 minutes. Since no notifications were made ahead of time, the cascade coordinator had to notify each cascade building individually of the power loss due to the loss of PA capability.

In addition, while placing the diesel in service to power the steam plant, the evacuation horn sounded due to an apparent power surge. After Plant Shift Superintendent's (PSS) discussion with plant staff, it was determined that the alarm was spurious and that it would be a greater risk to evacuate at that time and leave the plant unattended. The inspectors reviewed the licensee's decision and found it appropriate. However, with better command and control, the plant could have addressed the issue ahead of time and taken appropriate compensatory actions to establish alternative means of evacuation notification.

- The inspectors also noted that the plant did not have any procedural guidance for the PSS for a loss of power event. The plant did have a loss of power procedure for the cascade; however, it applied only to the operation of that system. A procedure could have alleviated some of the uncertainty regarding the status of radio communications, PA and CAAS systems, and evacuation horns. A procedure could also have provided guidance regarding compensatory actions for inoperable or degraded safety systems.

c. Conclusion

The safety implications of the event were minimal. However, the inspectors observed weaknesses in the command and control of the plant's response and the lack of available procedural guidance.

01.3 Failure to Use Pigtail-Plug Switches at Tails Station

a. Inspection Scope

The inspectors reviewed the circumstances regarding the plant's inadequate corrective action to ensure that pigtail-plug switches were being used at the Tails station as described in the FSAR.

b. Observations and Findings

On February 25, 1997, the plant's safety analysis department identified that pigtail-plug switches were not being used at the Tails station as described in the FSAR. When properly installed, the switch would prevent an operator from moving the cart from the station with the pigtail attached to the cylinder.

Observation Report No. 70-7002/96008(DNMS) discussed a similar issue regarding failure to use the switches at the ERP station. As short term corrective action to that event, the plant conducted training for operations personnel regarding the requirement to use the plugs. However, changes to applicable procedures to require the use of the plug were delayed until the transition date to NRC regulation, March 3, 1997.

c. Conclusion

The inspectors concluded that the plant's immediate corrective action to prevent recurrence was inadequate.

01.4 Corrective Action to Liquid Cylinder Handling Event

a. Scope

The inspectors reviewed the plant's corrective actions to the recent liquid cylinder handling event.

b. Observations and Findings

The inspectors reviewed the plant's corrective actions to the December 16, 1996, liquid cylinder handling event. The event involved the movement of a tails cylinder by a straddle carrier before its cooldown period was completed (Observation Report 70-7002/96008(DNMS)). The plant's corrective actions were as follows:

- Demarcation of areas where liquid cylinders are stored, now designated as liquid uranium cylinder areas (LUCAs).
- Implemented the use of a physical device and lock out/tag out (LOTO) in lieu of administrative controls.
- Modified the Dynamic Materials Control and Accounting System (DYMCAS) data base to prevent transfer request generation until the cylinder cooling period is satisfied.
- Required first line manager approval prior to moving any cylinder from a LUCA.

- Reviewed and revised the applicable procedures to ensure that all requirements are included.

c. Conclusion

The inspectors concluded that the plant's corrective actions taken were adequate and will monitor activities to ensure proper implementation of the new requirements.

II. Maintenance

M1.0 Conduct of Maintenance

M1.1 Poor Coordination Between Maintenance And Operations

a. Scope

The inspectors assessed the implementation of the plant's work control system with regard to the coordination between the maintenance and operations organizations.

b. Observations and Findings

During the period, the inspectors noted several examples of poor coordination between operations and maintenance. Specifically, maintenance was performing work on safety-related systems without operator knowledge/approval. The significance of this issue was that, beyond the potential that compensatory actions for inoperable equipment might not be taken as required by the TSRs, injury to plant personnel could also result. Examples noted include:

- An operator was adjusting tails assay using the intermediate drum inventory. With the Tails station out of service at the time, the plant was withdrawing tails at the Low Assay Withdrawal (LAW) station. The operator was not aware that the Tails mass spectrometer, which was being monitored for assay, as flow from the drums was being adjusted, had been removed from service by maintenance. As a result, too much flow was introduced and a cell was tripped due to surging.
- An operator attempted to operate the X-333 building's cold recovery system, unaware that instrument calibration by the maintenance department was in progress.
- Maintenance performed work on the X-600 building's evacuation horns and X-330 building's battery chargers without obtaining work start approval from operations.

c. Conclusion

None of the above examples resulted in violation of regulatory requirements or injury to plant personnel. However, they are more examples of a lack of communication among organizations in the plant.

III. Engineering

E3 Engineering Procedures and Documentation

E3.1 Improper Use of Engineering Notices As Work Procedures

a. Scope

The inspectors reviewed the plant staff's use of engineering notices and other "plans" as instructions for special maintenance evolutions.

b. Observations and Findings

During the period, the inspectors noted that the staff was using engineering notices and other "plans" to provide instructions for special maintenance evolutions. The inspectors noted that the plant did not perform safety evaluations for these documents to ensure that they were not deviating from the plant licensing basis. Specific examples included:

- Engineering notice EN-X-ME-97-001 was issued to provide instructions for the temporary repair and treatment of an expansion joint containing a Prompt Expedited Handling (PEH) deposit.
- A plan was issued to provide instructions to support the removal of a 4" valve from the side purge supply header.

As a corrective action, the plant intended to revise the work control process such that the 10 CFR 76.68 screening process would be used to evaluate non-routine work activities not covered by procedure or work instructions.

c. Conclusion

The inspectors reviewed the above instructions and determined that there were no apparent deviations from existing plant procedures and licensing basis. However, the plant was bypassing the procedure review process which required a formal safety analysis to verify that there was no deviation from the licensing basis.

IV. Plant Support

S1 Conduct of Security and Safeguards Activities

a. Inspection Scope

The inspectors reviewed the Physical Security Plan (PSP), the implementing procedures, security training lesson plans, test results, other training files, toured various facilities, and observed various security activities to verify compliance with Chapter 5 of the PSP and with the implementing procedures.

b. Observations and Findings

USEC submitted a Physical Security Plan (PSP) dated January 19, 1996, titled "Physical Security Plan for the Protection of Special Nuclear Material of Low Strategic Significance", in accordance with 10 Code of Federal Regulations (CFR) 73.67 and 76.35. This PSP was further revised by letters dated May 31, 1996, (Revision 3) and July 26, 1996, (Revision 4). NRC's letter of November 11, 1996, accepted this PSP and these Revisions.

Chapter 5, "Fixed Site Requirements for Special Nuclear Material of Low Strategic Significance" contained the bulk of the commitments relative to the protection afforded the low enriched uranium (LEU). Chapter 9, "Reporting Safeguards Events", discussed the licensee's program for meeting 10 CFR 73.71.

The inspectors toured the Protected Area, Material Access Areas and the Controlled Access Areas which included the 326, 333, 343, 344 and 705 buildings. The operations of the Extended Range Product and the LAW functions were witnessed. Exterior storage pads for LEU containers were also inspected. The Primary Alarm Station and the Secondary Alarm Station were inspected to verify alarm annunciation and communication capabilities. The inspectors visited the Operations Center Facility and the Emergency Operations Center.

Security Officers posted at access control points, and other officers on patrol, were found to be equipped, trained and knowledgeable of their duties and responsibilities. The inspectors witnessed the badging and escorting of vendors, the verification of appropriate clearances and the searching of "non-cleared" visitor vehicles. Locks/keys, communication equipment and special purpose detectors used to control personnel access were verified to be performing the intended functions. The use of seals was also verified to be appropriate.

The following Security Procedures (SP) were reviewed:

- SP1106-X705 Operating Procedure
- SP1107-Hand-held and walk-through monitors
- SP1110-X326 Operating Procedure
- SP1111-X345 Operating Procedure
- SP1030-Entrance, Badge, Vehicle Processing
- SP1132-Container Movement
- SP1135-Ingress/Egress
- SP1137-Seal Administration

The inspectors noted that the security officers were "Q" cleared and engaged in an Personnel Assurance Program. In addition to 40 hours of classroom training, the officers also received six weeks of on-the-job experience followed by an interview with their supervisor who authorized the officer to assume duties. All appropriate topics relative to the protection of LEU were addressed in the training program. The previously listed SPs were also found in the Training Program. The inspectors observed the security force conducting routine duties and noted a high degree of training was prevalent.

During a review of Chapter 9 of the PSP, the inspectors were informed that all security events were documented, filed and reported (if necessary) to the NRC as part of the overall site reporting practice. Thus, there was no "Safeguards Event Log" as a stand alone document to meet the requirement of 10 CFR 73.71. However, the requirement was satisfied through a review of all security reports available in the plant-wide reporting system.

Site Security, Corporate Security and Protective Force management informed the inspectors that certain clarifications to the PSP were needed and would be addressed in a forthcoming PSP revision. For example, Paragraph 5.2.8 would be revised to describe the current badge used by a DOE contractor. Paragraph 5.2.10 would be changed to reflect that keys are under the control of the Protective Force and not the certificate holder. Paragraph 7.2.5 would reflect the requirement for armed guards was not an NRC requirement but rather a DOE regulation. Paragraphs 7.2.3 and 7.2.5 would better describe the availability of telephones or radios at various Posts.

c. Conclusions

Through observation, interview, independent verification and records review, the inspectors verified that the protection being afforded the LEU at this facility was complying with PSP commitments. The inspectors could identify no diversion paths nor other vulnerabilities to the LEU. Had the NRC regulatory oversight during the observation period, no violations nor deviations of the PSP would have been noted.

S8 Miscellaneous Security and Safeguard Issues

S8.1 Storage of High Enrichment Material in the X-326 Building

a. Inspection Scope

The inspectors reviewed the status of the Portsmouth Compliance Plan Issue A.4 "Possession of Uranium Enriched to Greater Than 10% ^{235}U ".

b. Observations and Findings

On October 31, 1996, USEC sent a letter to the NRC certifying that it had completed the necessary inventories to provide assurance that certification of the X-326 building would not cause the total quantities of SNM contained in leased and certified areas to exceed NRC Category III limits. The letters' enclosure provided the basis for the inventories and stated that X-326 building had been surveyed for any equipment bearing deposits of uranium enriched to greater than 10% ^{235}U .

Per the enclosure, four categories of material were excluded from the inventory. These were:

- Gaseous UF_6 within Units X-27-2, X-25-7, surge drums, and the interconnecting piping (From High Enriched Uranium (HEU) downblending operations).
- Solid uranium held up within installed process equipment, including operating and shutdown equipment.
- Miscellaneous items potentially containing HEU materials, including non-installed process components, legacy DOE wastes, contaminated instruments, etc., which are destined to be transferred to non-leased, DOE Material Storage Areas (DMSAs) per Compliance Plan Issue (CPI) A.5.
- Any other nuclear materials which may be discovered to be present in these areas as a result of legacy DOE operations, but which are not included on official nuclear material accounting records as described in Section 3.7 of the SAR.

During November and December 1996, USEC identified and marked areas within the X-326 building for declassing per the requirements of CPI 45. These areas contained all of the previously identified "miscellaneous items potentially containing HEU materials," which had to be transferred to DOE by March 3, 1997, in order for USEC to be in compliance with NRC certification requirements. On December 31, 1996, USEC transferred these specified areas and the included equipment to DOE.

In January 1997, DOE personnel toured the X-326 building areas designated as DMSAs and indicated that the total area encompassed within the DMSAs exceeded their previous expectations. The size of the DMSAs raised concerns with and caused some reluctance by DOE staff to assume possession of all the areas. These concerns were further discussed between DOE and USEC staff.

During the period between December 1996, to February 21, 1997, USEC staff inventoried most of the "miscellaneous items" stored in the X-326 building's DMSAs. Management was provided the inventory information which included the quantity and enrichment of uranium held up in the stored equipment. Based upon this new data, USEC and DOE recognized that the removal of any significant amount of "miscellaneous items" from the DMSAs and into leased areas could cause USEC to exceed their possession limits for SNM. USEC and DOE resolved this concern by designating the equipment SNM deposits as inaccessible. USEC believed that this designation exempted the SNM from consideration as a part of USEC's total possession limits.

USEC's assumption that the equipment SNM deposits were excluded from consideration as a part of the total possession limits was based upon the Fundamental Nuclear Material Control Plan (FNMCP) which stated,

"Inaccessible holdup of solid material enriched to greater than 9.99 weight percent ²³⁵U inside process and process support equipment previously used for HEU production activities is not included towards USEC's possession limits."

Following this interpretation of the requirements, USEC and DOE agreed on February 21, 1997, to allow some of the "miscellaneous items" previously included in the X-326 building's DMSAs to be returned to USEC leased space. The agreement was informal and not specifically documented or reviewed by the Plant Operations Review Committee.

On February 24, 1997, the inspectors became aware of the revised USEC-DOE agreement regarding the placement of "miscellaneous items" in or out of USEC leased areas. The inspectors requested and reviewed information detailing the assays and quantities of the SNM held up in the equipment that were going to be excluded

from the DMSAs. The inspectors noted the placement of the equipment in USEC areas could potentially cause USEC to exceed the possession limits for SNM as described in SAR Table 1.3.

The inspectors raised these concerns with USEC staff and were informed of the USEC/DOE FNMCP interpretation regarding the accountability of SNM held up in equipment. During the discussions, the inspectors acknowledged the FNMCP wording but also pointed out that SAR Table 1.3 specifically included SNM held up in equipment removed from the cascade towards the possession limit. The inspectors further highlighted that during the certification process the issue of SNM holdup in removed equipment was discussed and a formal NRC position was stated. This position was provided in an NRC letter dated June 19, 1996, from John Hickey to Robert Woolley (USEC). On page 5 of Enclosure 2 to the letter, the NRC stated that the proposed footnote c in Table 1.3 of the Portsmouth (PORTS) SAR (page 1-6) should be deleted because SNM holdup in equipment was not exempt unless the equipment was installed. Table 1-3 was then changed by USEC in response to the NRC position.

Following these discussions, plant management rescinded their previous interpretation regarding SNM accountability in held up equipment. As a result, the "miscellaneous items" previously identified for storage in the DMSAs were maintained in these areas.

c. Conclusion

On October 31, 1996, USEC stated in a letter to the NRC that necessary inventories had been completed to provide assurance that NRC certification of the X-326 building would not cause the total quantities of SNM contained in leased and certified areas to exceed NRC Category III limits. Subsequent to this letter but prior to NRC assumption of regulatory oversight, plant staff took actions to negate these statements. These actions appeared to be based upon an incomplete review of application documents, a failure to use the regulatory processes of 10 CFR, and an unauthorized interpretation of NRC regulations.

R8 Contamination Control

a. Scope

During routine tours, the inspectors assessed the quality of the housekeeping in support of contamination control in the plant facilities.

b. Observations and Findings

The inspectors observed that housekeeping was generally good in the X-343 building and X-344 building. The plant established a liquid cylinder storage area on the pad outside the X-344 building, reducing most of the clutter in the building.

However, the inspectors observed that housekeeping in the cascade buildings remained poor, which resulted in problems with contamination control. Poor housekeeping was also symptomatic of a lack of accountability by plant staff for the upkeep of their work areas. The inspectors noted that the plant was taking action to improve the condition in these areas. Building managers were taking ownership of housekeeping issues, as evidenced by the increased number of problem reports generated during the inspection period.

c. Conclusion

Poor housekeeping in the cascade buildings demonstrated poor contamination control practices. The inspectors will continue to monitor the plant's efforts to improve the housekeeping in the cascade buildings.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors met with facility management representatives and the DOE Site Safety Representatives throughout the observation period and on February 28, 1997. The likely informational content of the observation report was discussed. No classified or proprietary information was identified. No disagreement with observations or findings, as described by the inspectors at these meetings, was identified.

Partial List of Persons Contacted

Lockheed Martin Utility Services (LMUS)

- *D. I. Allen, General Manager
- *J. E. Shoemaker, Enrichment Plant Manager
- *M. Hasty, Engineering Manager
- *R. W. Gaston, Nuclear Regulatory Affairs Manager
- *G. S. Price, Maintenance Manager
- *C. W. Sheward, 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. A. Crum, Site Safety Representative
- *J. C. Orrison, Site Safety Representative

Nuclear Regulatory Commission (NRC)

- G. L. Shear, Acting Deputy, Division of Nuclear Material Safety
- *C. R. Cox, Senior Resident Inspector
- *D. J. Hartland, Resident Inspector
- Y. H. Faraz, Project Manager

* Denotes those present at routine resident exit meeting held on February 28, 1997.

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

Certification Issues - Closed

None