

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No. 70-7002

Certificate No. N/A

Observation Report No. 70-7002/96006 (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: September 5, 1996 through October 25, 1996

Inspectors: C. R. Cox, Senior Resident Inspector
D. J. Hartland, Resident Inspector

Approved By: Gary L. Shear, Chief
Fuel Cycle Branch

EXECUTIVE SUMMARY

United States Enrichment Corporation Portsmouth Gaseous Diffusion Plant NRC Inspection Report 70-7002/96006(DNMS)

This observation report includes aspects of plant operations, maintenance/material condition, engineering, and plant support. 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 followup and evaluation, as appropriate.

Plant Operations

The inspectors identified several examples of operations personnel not knowing the operational status of the High Pressure Fire Water diesel fire pump (Section 01.2).

Engineering

A lack of as-found data validating the six month replacement cycle for autoclave o-rings, the failure of o-rings after a few days in service, and the two X-343 Building autoclaves having o-ring gaps and failing the pressure decay test all contributed to the inspectors conclusion that autoclave o-ring reliability was questionable (Section E2.1).

Plant staff's operability declaration regarding the autoclaves was not consistent with established policies and procedures (Section E2.1).

Improper use of the Title 10 Code of Federal Regulations (CFR) Part 76.68 review process for procedure approval and an incorrect unreviewed safety question determination (USQD) led the inspectors to conclude that the facility was unfamiliar with the 76.68 process and still unfamiliar with the USQD process (Section E2.2).

Plant Support

An event investigation of a shipment of internally contaminated cylinders to a testing lab indicated problems in root cause determination and the lack of a questioning attitude by plant personnel (Section R8.1)

Three events requiring Operations Assessment Team (OAT) and Incident Command responses revealed weaknesses in the responses (Section P1).

REPORT DETAILS

Summary of Plant Status

The plant operated at approximately 1400 MW during most of 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 Out of Service Diesel Fire Pump

a. Inspection Scope

The inspectors walked-down the High Pressure Fire Water System, reviewed log entries, and interviewed facility personnel.

b. Observations and Findings

On September 19, 1996, the inspectors walked-down the High Pressure Fire Water System. During the walk-down, the inspectors noted that the X-640-1 Building diesel fire pump was tagged out of service. The inspectors finished the walk-down in the X-300 Building (Plant Control Facility). The inspectors noted that there was no Cascade Coordinator log entry nor any indication at the control panel for the diesel fire pump indicating the out of service status of the pump. When interviewed, the Cascade Coordinator acknowledged that he did not know that the pump was out of service. After calling the fire protection group and verifying that the diesel fire pump was out of service, the Cascade Coordinator placed an out of service sticker by the controls for the pump. The inspectors noted that the diesel fire pump status was noted on the Plant Shift Superintendent's (PSS) equipment status board.

During the daily tour of the Plant Control Facility on September 24, 1996, the inspectors noted that according to the PSS status board the diesel fire pump had been returned to service. The inspectors also noticed that the out of service sticker on the

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.

diesel fire pump controls was still in place. The PSS indicated that the diesel fire pump had been returned to service on September 23, 1996. However, the Cascade Coordinator was unaware that the pump had been returned to service. The Cascade Coordinator removed the out of service sticker from the pump controls.

Further review of the PSS logs indicated that the diesel fire pump had been out of service from September 13, 1996 through September 23, 1996. The Cascade Coordinator's log had one entry on September 15, 1996 noting that the diesel fire pump was out of service and not available for a routine surveillance. The inspectors also noted that the Cascade Coordinator had procedural responsibilities to start the High Pressure Fire Water pumps upon failure of an automatic start-up upon demand.

c. Conclusions

The inspectors concluded that the Cascade Coordinators' unawareness of the diesel fire pump's status demonstrated another example of the lack of rigor in operations that was noted in Observation Report 70-7002/96005 Section 01.2. Poor log keeping, poor turnovers, and a lack of communications between the Cascade Coordinator and the PSS supported this observation.

II. Engineering

E1. Conduct of Engineering

Throughout the observation period, the inspectors observed facility engineering activities, particularly the engineering organization's performance of routine and reactive site activities, including identification and resolution of technical issues and problems.

E2 Engineering Support of Facilities and Equipment

E2.1 Operability of Autoclave O-Rings

a. Scope

The inspectors reviewed the circumstances surrounding repeated steam leaks around the autoclave o-rings in the X-344 (Toll Transfer Facility) Building.

b. Observations and Findings

On October 7, 1996, steam was noted leaking out of Autoclave Number 2 during a transfer operation. The operation was stopped, the autoclave was declared inoperable and a problem report was filed. The o-ring was replaced and the autoclave passed the post maintenance pressure decay test.

On October 15, 1996, Autoclave Number 2 and Number 3 both experienced steam leaks around their o-rings. Both the autoclaves were removed from service and declared inoperable and problem reports were filed. The o-rings were replaced and the autoclaves were placed back in service after they passed the post maintenance pressure decay test.

On October 18, 1996, Autoclave Number 2 experienced another steam leak around its o-ring. The autoclave was removed from service and the o-ring was inspected. The operators noticed that the o-ring had a gap where the o-ring material had been spliced to form the ring. As a result of this last o-ring failure, an engineering evaluation in the form of a formal written operability evaluation was completed. The operability evaluation identified that the material specifications and the maintenance procedure for replacing the o-rings were lacking in detailed specifications. The primary short term compensatory action from the operability evaluation was to require visual inspections of all autoclave o-rings prior to each use.

The visual inspections revealed two additional autoclaves in the X-343 facility having small gaps in their o-rings. The two autoclaves were then subjected to the pressure decay test. They both failed. The operators did not indicate whether they had seen steam leaks prior to discovering the o-ring separation.

The inspectors noted that in June 1996, the facility implemented a schedule for replacing autoclave o-rings after every 6 months of use. The new schedule was based on a failure analysis by the system engineer that determined the old annual cycle was not frequent enough. The earlier failures were detected when other maintenance on the autoclaves required conducting the pressure decay test prior to the end of the annual cycle. When the new six month cycle was initiated, the inspectors questioned whether any as-found pressure decay testing would be conducted prior to replacing the o-rings to validate the new replacement periodicity. At the time, the engineering staff thought that as-found testing data would be worth collecting. When the rash of early failures began in October, the inspectors asked about the as-found data for the new six month cycle. The system engineers stated that the maintenance procedures had made the as-found test optional. The inspectors' discussion with operations personnel indicated that the optional testing was not being conducted. The Operations Manager had been unaware that the as-found testing had been made optional and his staff had not been collecting the data. The Operations Manager immediately issued a policy statement that as-found pressure decay testing would be required until further notice.

Also during this period, the facility was in the process of conducting the new pressure decay test at the higher credible accident pressures. This was part of the planned transition to

the NRC technical safety requirements (TSRs). Prior to running the autoclaves after transition, each autoclave would be required to pass the decay test at the higher pressure. Thereafter, the test frequency would be quarterly. The Operations Manager assured the inspectors that o-rings would not be changed out until as-found pressure decay tests were conducted to verify the old rings were still able to perform their required safety function.

c. Conclusions

The early failure of the autoclave o-rings called into question the reliability of the containment safety function of the autoclaves. While the inspectors questioned the timeliness, i.e., after multiple failures, of the formal operability evaluation, the format and quality of that evaluation was an improvement over past formal evaluations. The identification of the procedure problems and the material specification problems were significant.

However, the evaluation fell short in compensatory actions. The lack of as-found data validating the six month replacement cycle, the failure of o-rings after a few days in service, and the two X-343 Building autoclaves having o-ring gaps and failing the pressure decay test without noticeable steam leaks all contributed to the inspectors conclusion that the autoclaves should have been declared inoperable until they had passed a new pressure decay test. A visual inspection of o-rings prior to service would only reveal noticeable deformation of the o-rings but would not verify that the o-rings were capable of performing their intended safety function. The plant's staff's operable declaration was not consistent with plant policies and procedures regarding operability.

However, while the o-ring reliability was indeterminate under the old test regime, the recently initiated TSR surveillance test requiring an increased testing frequency and as found data should provide a basis for determining the o-ring reliability. The inspectors will follow up on this issue by observing the TSR tests and reviewing the TSR test data. (Observation Report Followup Item GDC 70-7002/96006-01).

E2.2 Unreviewed Safety Question Determination (USQD) on Procedure Change for Cell Treatment

a. Inspection Scope

The inspectors reviewed the USQD for the procedure change in response to the cell treatment problem identified in Observation Report 70-7002/96005 Section 01.2.

b. Observations and Findings

On August 24, 1996, the Plant Operations Review Committee (PORC) reviewed and approved the USQD (POEF-831-96-1258) for the coolant system pressures during cell treatment. That USQD provided the basis for the Justification for Continued Operations (JCO) to the Department of Energy for continued cell treatment with the gas side of the isolated cell at a slightly higher pressure than the freon side of the cell. That operation was contrary to the Safety Analysis Report (SAR) Section 5.1.1.2.2 "Accumulation of Solid Masses of Uranium Compounds" which was the reason for the USQD. The facility was to pursue a SAR amendment to reconcile the actual field practice with the SAR while continuing to operate under the JCO. In response to the PORC direction that the procedure used for cell treatment be changed to reflect the JCO, a procedure change was initiated. The facility had just implemented the Title 10 Code of Federal Regulations (CFR) Part 76.68 plant change review process and so the new form for conducting the 76.68 review was used. The inspectors reviewed the completed 76.68 form for the procedure change. The 76.68 review found that the proposed changes did not constitute an unreviewed safety question (USQ) referring to the JCO as the basis for that determination.

However, the USQD for the referenced JCO identified the issue as a USQ. The inspectors also noted that the required 76.68 review form had not been signed by the PORC Chairman and General Manager. Rather, the blocks were filled with "signed off on JCO" in lieu of signatures. The facility had also identified this issue and had processed a problem report before the procedure was implemented.

c. Conclusions

The inspectors concluded that facility personnel were unfamiliar with the new 10 CFR 76.68 review process and were still unfamiliar with the USQ process. This was evident when facility personnel attempted to use the PORC's direction to change the procedure as the PORC review and approval of the actual procedure change. In addition, the 76.68 review conclusion that the procedure change was not a USQ while the JCO that the change was based upon identified the issue as a USQ further supports this observation. The required SAR amendment request will be tracked as an Observation Report Follow-up Item (Observation Report Followup Item GDC 70-7002/96006-02).

III. Plant Support

R8 Miscellaneous Radiation Protection & Chemistry Controls

R8.1 Shipment of Cylinders with Internal Contamination

a. Inspection Scope

The inspectors reviewed the events involving the shipment of three, two and one half ton cylinders with internal contamination and their over-packs for testing at Southwest Research Institute (SRI) in San Antonio, Texas. Inspection activities included reviewing reports, observing the critique, and interviewing personnel.

b. Observations and Findings

On September 27, 1996, SRI in San Antonio, Texas, received three, two and one half ton cylinders and their shipping over-packs from Portsmouth Gaseous Diffusion Plant. SRI was to test the over-packs with the cylinders for compliance with Type-B package testing requirements under 10 CFR 71 "Packaging and Transportation of Radioactive Material". Upon receipt, SRI surveyed the over-packs and cylinders for contamination. Surveys of the over-packs and the external surfaces of the cylinders indicated no contamination. However, internal surveys of the cylinders identified contamination of uranium and its daughter products. The facility was expecting "clean" cylinders since part of the test was to fill the cylinders with steel shot to simulate the weight of uranium when testing the over-packs. Internal contamination would contaminate the steel shot used in testing.

SRI contacted Portsmouth regarding the cylinders' internal contamination. An event investigation was conducted and a critique was held on October 2, 1996. The critique identified the root cause as being that the facility used an inappropriate procedure for shipping the cylinders. The basis for that root cause determination was that the procedure used, XP2-TE-EA1806 "Customer Order and Miscellaneous Product Shipments and Receipts", was supposed to be used for customer orders or product shipments. That procedure did not require internal contamination surveys since used product cylinders are assumed to be contaminated. In this case, the cylinders were being shipped as "clean empties". The "clean empties" shipment would not qualify as a customer order or product shipment. Therefore the shipment should have been made using UE2-US-PC1037 "Shipping Orders". That procedure would have required an internal contamination survey for the cylinders prior to shipment.

In discussions during and following the critique, the inspectors determined the following:

- By telephone, USEC headquarters requested from Portsmouth that the cylinders and over-packs be shipped to SRI. USEC did not want to use new cylinders due to possible damage, therefore USEC requested "clean empties". They did not realize that clean empties would have residual internal contamination.
- Onsite Customer Order Management (COM) took the verbal order and since they were shipping cylinders, used the procedure they were familiar with for shipping cylinders. COM then generated the written order using the customer order procedure.
- Feed and Transfer personnel took the customer order and identified the cylinder and over-packs to be used and processed the paperwork and cylinders.
- Health physics personnel conducted the external contamination surveys required for a product shipment.
- Packaging and Transportation personnel then processed the final paperwork, again using the product shipment process. The net uranium content on the shipping papers was noted as being zero.

Conclusions

While the internal contamination levels posed no threat to the health and safety of the general public, the levels did exceed DOE levels for shipping and therefore, required the event to be reported to DOE.

The root cause determination failed to go beyond the fact that the wrong procedure was used to identify why the wrong procedure was used.

Also, a number of personnel involved in the shipment failed to demonstrate a questioning attitude. No one asked why the customer order process was being used to ship empty cylinders to a test laboratory.

P1 Conduct of Emergency Planning (EP) Activities

a. Inspection Scope

The inspectors observed several Operations Assessment Team (OAT) activations and Incident Command responses during the observation period.

b. Observations and Findings

Sanitary Water Leak During Excavation

On October 8, 1996, an OAT activation occurred in response to a Sanitary Water System pipe break caused by a backhoe striking the pipe during excavation. A two inch Sanitary Water pipe was cut by a backhoe digging near the X-533 switchyard. To isolate the leak, Sanitary Water to the X-533 building had to be isolated, thereby isolating fire water to that building.

The inspectors observed the OAT response to the event. Initial communications to the OAT from the on-scene Incident Commander were poor until an OAT member was sent to the scene. The inspectors also noted that the OAT did not follow the valving evolutions used to isolate the leak utilizing plant drawings. Finally, when the Incident Commander stated that the response was complete and that a two hour fire watch was to be initiated, no one in the OAT questioned why initiation of the firewatch over two hours after the fire water had been isolated was adequate. Further follow-up by the inspectors determined that the response was adequate because an initial fire watch had been initiated in the required time frame.

Criticality Accident Alarms and Fire Alarms at the X-345 Building

On October 8, 1996, simultaneous Criticality Accident Alarm System (CAAS) alarms and fire alarms were received in the X-300 Plant Control Facility from the X-345 Building. The alarms were the result of a voltage spike, caused by diesel generator testing, burning out some circuit boards associated with those alarm systems. The inspectors observed the on-scene response of the Incident Commander (IC). The inspectors noted a large number of personnel standing around the building while the security force focused to control vehicle traffic by establishing traffic control points. The inspectors also noted that the IC was so focused on the initial response that he was unaware of the status of the security forces actions in surveying personnel leaving the X-325 Building and the locating of one of the security check points apparently within the exclusion area.

Tractor Trailer Separation Onsite with Filled Customer Cylinders

On October 9, 1996, a truck and its' trailer separated while traveling west on 20th Street, onsite. The trailer was carrying five, solid uranium hexafluoride filled, two and one half ton customer cylinders in over-packs. The truck driver stopped his truck and the trailer rolled up on the back of the truck and became lodged on the truck. The inspectors observed the IC response to the event. The inspectors observed unauthorized personnel moving a radiation area posting in an attempt to help isolate the area. The movement of the posting was not in

accordance with radiation protection procedures. The inspectors also noted that the truck driver required security escorting and that for a period of time during the response the assigned escort left the driver alone without formally turning over escort duties to another security officer.

The cylinders and their over-packs were undamaged. The locking pin was later determined to be undamaged and the fifth-wheel that locks the pin to the truck was locked. Therefore the cause for the separation was unknown. In discussions after the event the driver indicated that the same thing had happened when he left the customer's facility the day before. They had to re-hook the trailer and he took the truck and trailer to his shipping company's garage and had the rig inspected. No problems had been noted. The trucking company was continuing the investigation to determine if it was personnel error or equipment failure.

Conclusions

The three events requiring Operations Assessment Team (OAT) and the Incident Command responses revealed weaknesses in the responses. These identified weaknesses were due to personnel being unfamiliar with response procedures and failed to question the activities of others supporting the response. The inspectors will continue to review OAT and Incident Command activities.

IV. 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 October 22, 1996. 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
*J. V. Anzelmo, Work Control Manager
*R. W. Gaston, Nuclear Regulatory Affairs Manager
*C. F. Harley, Engineering 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)

C. R. Cox, Senior Resident Inspector
D. J. Hartland, Resident Inspector
C. B. Sawyer, Project Manager

* Denotes those present at routine resident exit meeting held on
October 22, 1996.

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

70-7002/96006-01 OFI review new autoclave o-ring test data
70-7002/96006-02 OFI review SAR amendment request on cell treatment

Closed

None

Discussed

None

Certification Issues - Closed

None