U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report No:	70-7002/98015(DNMS)
Facility Operator:	United States Enrichment Corporation
Facility:	Portsmouth Gaseous Diffusion Plant
Location:	3930 U.S. Route 23 South P.O. Box 628 Piketon, OH 45661
Dates:	August 31 through October 13, 1998
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EXECUTIVE SUMMARY

United States Enrichment Corporation Portsmouth Gaseous Diffusion Plant NRC Inspection Report 70-7002/98015(DNMS)

This inspection report includes aspects of plant operations, maintenance, engineering, and plant support. The report covers a six week period of routine resident inspections.

Plant Operations

- The inspectors performed an initial review of the certificatee's identification and handling of an as-found condition that involved apparent differences between current plant operational controls and assumptions made as a part of the Safety Analysis Report accident analysis. Further review of the issue will be tracked as an unresolved item. (Section O1.1)
- The inspectors observed two weaknesses in the certificatee's emergency response to a minor out-gassing in Building X-333. (Section O1.2)
- The inspectors performed an initial review of the certificatee's testing of smoke detection systems as required by Compliance Plan Issue 42. The inspectors' further review of the scope of testing, the testing methods, and the acceptance criteria will be tracked as an unresolved item. (Section O1.3)

Maintenance and Surveillance

- The inspectors identified that the certificatee conservatively expanded the inspection and repair of a festoon cable for a UF₆ liquid handling crane to include all wires housed in the festoon sheathing. However, the certificatee did not procure a replacement festoon cable in a timely manner following implementation of a temporary fix to the cable. (Section M1.2)
- The inspectors noted that a lack of rigor in the completion of out-of-service tracking sheets and a lack of specific work package and procedural guidance contributed to two safety systems being declared operable prematurely, following surveillance activities. (Section M1.3)

Engineering

 The inspectors determined that the certificatee demonstrated a positive questioning-attitude in the identification of a previously unrecognized fault in the operability testing methodology used for the autoclave thermocouples. However, the inspectors also concluded that the certificatee-proposed initial corrective actions were insufficient to ensure that other possible fault modes were also precluded. Subsequent revisions to the proposed corrective actions appeared to be adequate. (Section E1.1)

Report Details

I. Operations

O1 Conduct of Operations

O1.1 Potential Discrepancy Between Routine Plant Operations and Safety Analysis Report Assumptions

a. Inspection Scope (88100)

The inspectors performed an initial review of the certificatee's handling of an as-found condition involving the withdrawal station accumulators.

b. Observations and Findings

On September 25 the certificatee identified that the accident analysis of Safety Analysis Report (SAR) Section 4.2.3.3, "UF₆ Piping (UF₆ Condenser and Accumulator System)," which described the consequences associated with a liquid line rupture at the withdrawal stations, may not have evaluated the worst case operating scenario. Specifically, the SAR analysis assumed a maximum release from a rupture of the accumulator and condenser piping at the Extended Range Product (ERP) and Low Assay Withdrawal (LAW) Stations to be 500 pounds (lbs.) each and at the Tails Station to be 2,000 lbs. However, the accumulators in the ERP and LAW each had a capacity of 2,500 lbs. and the Tails accumulator had a capacity of 13,000 lbs.

Following identification of the apparent discrepancy between routine plant operations and the SAR assumptions, the certificatee implemented immediate compensatory measures. The compensatory measures included venting off and isolating the ERP and LAW Station accumulators and restricting Tails operations to the use of a smaller (maximum capacity of 2,500 lbs.) accumulator. In addition, the certificatee convened the operational assessment team (OAT) to review the finding. Based upon the OAT's review of the finding, the certificatee concluded that the current withdrawal operations were within the SAR-described accident analysis. Specifically, the OAT concluded that normal plant operations did not result in significant amounts of liquid uranium hexafluoride (UF₆) being maintained in the accumulators. Therefore, the SAR-described accident, which resulted in a release of the total volume of the accumulators, was not credible. In addition, the OAT determined that a release of the total volume of the accumulators was bounded by another design basis accident, the rupture of a UF₆ liquid-filled cylinder. Given the conclusions developed by the OAT, the certificatee lifted the initially implemented compensatory measures.

Subsequent to the OAT's evaluations, the inspectors reviewed the associated documentation and determined that the conclusions did not appear to completely address the safety implications. Specifically, the inspectors determined that the evaluations did not include a review of current plant procedures, which allowed unlimited filling of the withdrawal accumulators. Unlimited filling of the accumulators, as a part of routine plant operations, could result in an accumulator liquid UF₆ inventory greater than that assumed in the accident analysis and considered credible in the OAT evaluation. The inspectors also concluded that the SAR did not include an authorization for plant operations based upon an assessment that the operations could not result in an

accident release greater than that expected following the rupture of an UF₆ liquid-filled cylinder. The inspectors discussed their findings with the certificatee.

Based upon an independent review of the inspectors' findings, the certificatee, on September 29, initiated new compensatory measures for withdrawal operations and a second review of the potential discrepancy between routine plant operations and the SAR assumptions. The inspectors noted that the new compensatory measures were designed to maintain plant operations within the SAR assumptions. Specifically, the new compensatory measures required the plant staff to vent the withdrawal stations back to the cascade whenever the flow to the withdrawal cylinders was interrupted for more than 15 minutes. The certificatee indicated that venting the withdrawal station within 15 minutes of the flow to the cylinders being interrupted would preclude the accumulator levels from exceeding the SAR assumptions. The second SAR review was also expected to cover all possible normal plant operating conditions. The new compensatory measures were documented in a Plant Operations Review Committee (PORC) reviewed and approved operability evaluation.

Pending the certificatee's completion of the second SAR and implementing procedure review, and the inspectors' independent review of the results, the issue will be tracked as an unresolved item (URI) (URI 70-7002/98015-01).

c. <u>Conclusions</u>

The inspectors performed an initial review of the certificatee's identification and handling of an as-found condition that involved apparent differences between current plant operational controls and assumptions made as a part of the SAR accident analysis. Further review of the issue will be tracked as an URI.

O1.2 "See and Flee" Emergency Response Observations

a. Inspection Scope (88100)

The inspectors observed the certificatee's emergency response to a minor uranium hexafluoride out-gassing.

b. Observations and Findings

On October 6 the certificatee's emergency response team responded to a "see and flee" event in Building X-333. The "see and flee" event was precipitated by a minor out-gassing from a seal on Cell 33-5-3. At the time of the out-gassing, the cell was operating at a pressure above atmospheric pressure. During a followup review of the event and the certificatee's response actions, the inspectors noted the following weaknesses:

 The inspectors noted that the certificatee did not take the cell off-stream and did not reduce the cell operating pressure below atmospheric pressure until approximately an hour after the event was first identified.

Following the event, the inspectors reviewed the chronology of activities for the "see and flee" response and determined that the incident command post was informed within 20 minutes of the initial call-out that concentrations of hydrogen

fluoride (HF), in the area of the local control center (LCC), were less than minimum detectable levels. The command post was also informed approximately 10 minutes later that a release had been confirmed. Finally, the inspectors determined that operators, dispatched to the LCC after the release was confirmed, took 15 minutes to isolate the cell. Given the above described chronology, the inspectors determined that a dispatching of the operators to the LCC following confirmation of the less than detectable HF levels in the LCC area could have decreased the total time the out-gassing occurred.

During the response, health physics staff assisted the fire department personnel in locating the out-gassing. Most of the health physics and fire department personnel's efforts were performed on an elevated walkway above the cell housing. The inspectors noted that during the time the work was being performed the health physics staff and fire protection personnel were wearing different levels of respiratory protection. Specifically, the health physics staff were wearing full-face respirators while the fire department personnel were wearing self-contained breathing apparatus (SCBA). Also, the inspectors noted that the fire department personnel had not determined the HF concentrations present on the walkway at the time both the health physics and fire department personnel were on the walkway.

Following the response, the inspectors discussed the observations with both the health physics manager and the incident commander. Both individuals acknowledged the observations and indicated their belief that the observations were not consistent with plant management expectations. Specifically, both managers indicated that all response personnel should normally be provided similar levels of personal protective equipment. Also, the managers indicated that response personnel, without SCBA, should not be allowed into an area until after the unknown environment had been evaluated. The incident commander also indicated that, during the response, some confusion existed regarding previous reports that the "cell floor" area had been "cleared" of HF and that some communications difficulties were experienced as a result of the building horns.

As an immediate response to the observations, the health physics staff, involved in the response, were requested to provide samples for urinalysis. The results were later determined to be negative. As a corrective action to the observations, the health physics manager documented, in the event critique, a need to ensure that all personnel were provided proper personnel protective equipment for the environments in which they were assigned to work or respond.

c. Conclusions

The inspectors observed two weaknesses in the certificatee's emergency response to a minor out-gassing in Building X-333. The certificatee was reviewing both weaknesses to determine the appropriate level of corrective actions.

O1.3 Smoke Detection System Operability Testing

a. Inspection Scope (88100)

The inspectors reviewed the certificatee's actions to conduct operability testing of smoke detectors using the testing methodology developed in accordance with Compliance Plan Issue 42.

b. Observations and Findings

Compliance Plan Issue 42 required, in part, that the certificatee developed a testing method for the smoke detection system that correlated the detectability of "test smoke" with the detectability of UF₆. In addition, the certificatee was required to implement the revised testing methodology for Technical Safety Requirement (TSR) surveillances conducted after July 31, 1997. The NRC staff identified in Inspection Report 70-7002/98014(DNMS), issued on October 23, 1998, that all the actions required to fully implement Compliance Plan Issue 42 had not been completed. Specifically, the inspectors identified that the certificatee had not fully implemented the revised testing methodology for all TSR surveillances conducted since July 1997.

Based upon an independent review of the inspectors' findings, the certificatee declared the affected detectors inoperable and initiated the TSR-required compensatory actions. The inspectors reviewed the certificatee's actions to perform the calibrated smoke sensitivity test (CSST) for the required smoke detectors. The inspectors noted that the certificatee developed a work instruction to perform the required CSST. The inspectors reviewed a sampling of completed work instructions and noted that the number of "puffs" of smoke required to activate the smoke detectors was recorded; however, the paperwork did not include formal acceptance criteria for the test.

The inspectors discussed the findings with certificatee staff and were informed that a work instruction was used to perform the work based upon the one-time nature of the activity. In addition, the certificatee staff indicated that test acceptance criteria had been developed and were documented in an engineering evaluation. During a further review of the Compliance Plan Issue and the supporting documentation, the inspectors identified a commitment by the certificatee to utilize the revised testing methodology for all TSR-related tests conducted after July 1997. In addition, the inspectors noted that Section 6.11 of the SAR appeared to require that all activities that implemented the TSRs were to be implemented using PORC approved procedures with defined acceptance criteria.

The inspectors communicated the latter findings to the certificatee and as of the end of the inspection period, the certificatee was performing a further review of the Compliance Plan issue and the requirements of Section 6.11 of the SAR. Pending completion of the certificatee's review of the Compliance Plan issue and the inspectors' independent review of the completed testing program, the issue will be tracked as a URI **(URI 70-7002/98015-02).**

c. Conclusions

The inspectors performed an initial review of the certificatee's testing of smoke detection systems as required by Compliance Plan Issue 42. The inspectors' further review of the

scope of testing, the testing methods, and the acceptance criteria will be tracked as an URI.

O8 Miscellaneous Operations Issues

08.1 Certificatee Event Reports (90712)

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

Number	Date	Status	Title
34743	09/06/98	Open	Smoke detector actuation due to a small uranium hexafluoride (UF _e) release.

08.2 Bulletin 91-01 Reports (97012)

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

Number	Date	Title
34726	09/01/98	24 Hour Report - 2S sample container was placed in a glove box next to a nominal one liter metal beaker creating a spacing violation.
34731	09/02/98	24 Hour Report - A polybottle was stored less than 12 inches from an inside door constituting a loss of control.
34736	09/03/98	24 Hour Report - A polybottle was found in a nonsecured holder creating a spacing violation.
34784	09/15/98	24 Hour Report - Excess amount of process seal cans stored in a group in Building X-333 storage area.
34792	09/17/98	24 Hour Report - Two small diameter polybottles discovered not meeting the minimum spacing requirement of 23 inches center-to-center.
34805	09/18/98	4 Hour Report - Deficient NCS approval: Spacing of Uncomplicated Handling Equipment.
34820	09/21/98	24 Hour Report - Deficient NCS approval: Converter disassembly at Building X-700

- O8.3 (Closed) VIO 70-7002/97003-07: Failure to establish a TSR required purge gas on a Planned Expeditious Hamoing (PEH) component. While cutting out one PEH component in connected piping with another PEH component, the certificatee failed to re-establish a nitrogen or dry air purge within the TSR time frame. An error in interpreting the TSR was identified as the cause of the violation. Training was conducted for the staff regarding the formal process of requesting TSR clarifications. The inspectors concluded the certificatee's corrective actions were reasonable and considered the violation closed.
- O8.4 (Closed) VIO 70-7002/97005-01: Failure to have an Nuclear Criticality Safety Approval (NCSA) for a PEH component. The certificatee determined that the root cause was a failure to follow a procedure with contributing factors of human error related to the procedure structure, a failure to properly label the status of the component, and management failure to verify that the NCSA requirements were fully applied to the component. A specific NCSA (NCSA-0333-023.0A1) was implemented to properly store the component. A Cascade Operations Council was formed to facilitate discussions between the facility managers so that lessons learned in one building could formally be passed to other managers. Further violations resulting in escalated enforcement, EA 98-012, dated March 19, 1998, revealed weaknesses in the NCS program. An NCS corrective action plan was being tracked separately. The inspectors concluded the certificatee's corrective actions were reasonable and considered the violation closed.
- O8.5 (Closed) VIO 70-7002/97010-01: Failure to take action to prevent recurrence of a reportable autoclave safety actuation, a significant condition adverse to quality. On October 18, 1997, the certificatee returned Autoclave No. 4 at the X-343 facility to service following a high steam pressure safety actuation without verifying the root cause and taking action to preclude recurrence. The certificatee determined that the root cause was a lack of specific guidance detailing the actions that should be taken to determine the reason for an actuation before returning an autoclave to service. Section policies were issued for the autoclave facilities instructing operators not to return an autoclave to service after a safety system actuation until the incident had been investigated and corrective actions implemented. Required reading on the lessons learned from the event was completed by the plant shift superintendents (PSSs). An organization policy was issued as a final corrective action which provided the PSSs with the same guidance as the operators and referenced the Quality Assurance Plan. The inspectors concluded the certificatee's corrective actions were reasonable and considered the violation closed.
- O8.6 (Closed) VIO 70-7002/97010-02 and VIO 70-7002/97012-01: Failure to store F-cans in accordance with the NCSA. The certificatee determined that the root cause of both violations was a lack of specific knowledge of NCSA-PLANT025.A01 requirements for F-can storage. The operators did not know that the storage spacing requirements also applied to F-cans in use. The F-cans identified in the violations were immediately spaced in accordance with the NCSA. Training was provided to the operators and an "all hands" meeting with the plant manager was held to discuss recurring problems in NCS and to review the NCS corrective action plan. An evaluation on the use of operator aids was also conducted. Other corrective actions were incorporated in the NCS corrective action plan which was being tracked separately. The inspectors concluded the certificatee's corrective actions were reasonable and considered these two violations closed.

- O8.7 (Closed) VIO 70-7002/97012-03: Failure to follow procedure while treating a cell. During cell treatment on November 11 and 12, 1997, operators continued operations even though their procedure required evacuation of the cell when they had detected hydrocarbons. The certificatee determined the root cause was an inadequate procedure and a failure of the operators to follow the plant policy regarding the use of procedures, i.e., place the equipment in a safe condition and stop work when a procedure deficiency is noted. The Procedure, XP4-CO-CN2118-TMP, "Static Cell Treatment in X-330," was revised. Lessons learned training for operations personnel was completed. The inspectors concluded the certificatee's corrective actions were reasonable and considered the violation closed.
- O8.8 (Closed) VIO 70-7002/97015-01: Numerous spacing violations of uranium bearing equipment as required by NCSAs. The certificatee determined that the root cause was inadequate NCS training and confusing and/or conflicting NCSA requirements. As an immediate corrective action, the pieces of equipment, noted in the violations, were spaced according to their proper NCSAs. Due to this and other NCS violations, the certificatee submitted an NCS corrective action plan to address long term corrective actions. The corrective action plan was being tracked separately. The inspectors concluded the certificatee's corrective actions were reasonable and considered the violation closed.

II. Maintenance and Surveillance

M1 Conduct of Maintenance and Surveillance

M1.1 Maintenance and Surveillance Observation

a. Inspection Scope (88102 and 88103)

The inspectors observed all or portions of the following work activities:

- Work Order No. 9834792-01, "Trouble shoot/repair cause of Cell 33-7-6 S/I PIC red pointer reading division in Building X-333."
- Work Order No. 9834676-01, "Replace smoke heads as listed in work order in Building X-333."
- Work Order No. 9833505-01, "Remove and replace the 7A seal for Cell 33-7-3 in Building X-333."
- Procedure XP4-CU-UG6206, "High Pressure Fire Water System Underground Distribution Loop Testing."
- Work Order No. 9837634-01, "Trouble shoot and repair Autoclave No. 2 conductivity system in Building X-344."
- Work Order No. 9832914-01, "Trouble shoot and repair middle crane in Building X-344, crane would not operate in the north and south direction."
- Work Order No. 9832914-02, "Replace the Building X-344 middle crane's trolley drive."

b. Observations and Findings

The inspectors found the work performed under the above listed maintenance and surveillance activities to be professional and thorough. All of the work observed was performed with the work package present and in active use. Personnel performing the work were knowledgeable of their assigned tasks. The inspectors frequently observed supervisors and system engineers monitoring job progress, as applicable. When applicable, appropriate radiation control measures were in place and any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

c. <u>Conclusions</u>

Maintenance activities observed by the inspectors were generally completed thoroughly and professionally.

M1.2 Untimely Replacement of a UF, Liquid Crane Festoon Cable

a. Inspection Scope (88102 and 88103)

The inspectors observed partial performance of Work Order No. 9832914-03, "Replace the Building X-344 middle crane's trolley festoon cable," and reviewed the completed work package.

b. Observations and Findings

During implementation of Work Order No. 9832914-03, the instrument mechanics identified, during a test run, that the trolley drive would not operate in both directions. Subsequently, the mechanics discovered three broken wires in the trolley festoon cable and proceeded to pull three new wires through the festoon sheathing. The following morning, the building manager requested the instrument mechanics to remove the festoon sheathing and to check all wires to ensure that no other broken wires were present. During a check of all of the festoon cabling, the instrument mechanics did not identify any additional wire defects.

Following completion of the check of all of the festoon wiring, the inspectors noted that the instrument mechanics reused the festoon sheathing to cover the wires. The instrument mechanics split the sheathing to facilitate the initial inspection and had taped the sheathing around the wires approximately every 6 inches with electrical tape following completion of the work. The resheathed festoon cable was then installed on the Building X-344 UF₆ liquid handling crane.

On September 1 the inspectors discussed the function of the festoon cable's sheathing with the Engineering Manager and Crane System Engineer. The inspectors were informed that the festoon cable's sheathing protected the wires from abrasion and the outdoor environment. During the discussions, the inspectors noted that the festoon cable supplies the electrical power and controls to operate the crane hoist and trolley. The inspectors also noted that without a proper level of sheathing an increased potential appeared to exist for a cylinder to become suspended if a hoist wire became damaged (open, shorted, or grounded). The Engineering Manager and Crane System Engineer agreed with the inspectors' assessment and further explained that an approved

procedure existed for handling a UF₆ liquid-filled cylinder suspended from a crane. In addition, the Engineering Manager and Crane System Engineer explained that each UF₆ liquid handling crane was equipped with a pendant shutdown switch and wall mounted electrical power disconnect to stop all movement of a UF₆ liquid handling crane during any type of crane malfunction.

The inspectors noted that during a pendant shutdown or electrical power interruption, the crane's mechanical and electrical hoist brakes would engage and stop any downward movement of the hoist. These two hoist brakes were quality components and were tested in accordance with TSR surveillance requirements. However, the Engineering Manager and Crane System Engineer stated that a suspended cylinder would result in an abnormal operating condition and could challenge a safety system (hoist brakes). Based upon the discussions, the certificatee determined that the taped festoon cable was an adequate temporary fix, but that the purchase of a new festoon cable should be expedited.

During a subsequent review of the situation, the inspectors noted that the new festoon cable was not requisitioned until September 16, was not received until September 28, and was not installed until October 7.

c. <u>Conclusions</u>

The inspectors identified that the certificatee conservatively expanded the inspection and repair of a festoon cable for a UF₈ liquid handling crane to include all wires housed in the festoon sheathing. However, the certificatee did not procure a replacement festoon cable in a timely manner following implementation of a temporary fix to the cable.

M1.3 Work Control Process Observation

a. Inspection Scope (88100)

The inspectors reviewed the certificatee's processes for returning safety-related equipment to an operable status following maintenance and surveillance activities.

b. Observations and Findings

The inspectors reviewed two circumstances where equipment was inadvertently declared operable prior to completing required tests or equipment mode changes:

 On September 20 the certific the identified that ten cascade automatic data processing (CADP) smoke heads were declared operable in Building X-333 prior to performing the required calibrated smoke sensitivity test (CSST).

During a review of the finding, the inspectors noted that the out-of-service (OOS) tracking sheets for the ten smoke heads had not been adequately completed. Specifically, Block 1 of the OOS tracking sheets did not include an adequate description of the OOS purpose, that is, to perform the CSST. As a result, operators performed the "old" operability test, a self-diagnostic high voltage ramp test, instead of the new CSST. Subsequent to successfully performing the ramp test, the operators signed the OOS tracking sheet attesting that the smoke

heads were operable. The inspectors reviewed the status of equipment at the time the smoke heads were returned to service and noted that a TSR violation did not occur. Specifically, the inspectors determined that 50 percent of the smoke heads in the affected cascade units remained operable, as required by TSR 2.2.3.3.

On September 15 the certificatee identified that electric fire pumps No. 1 and No. 2 in Buildings X-640 and X-6644 were declared operable prior to the system being aligned for automatic operations. Specifically, the certicatee staff signed and faxed the OOS tracking sheet to the PSS, indicating that all actions to return the system to operability had been completed, approximately 40 minutes before the fire pumps were switched from the manual to automatic mode. The inspectors noted that the OOS tracking sheet was signed in one location and the actions to switch the pumps from manual to automatic mode were completed in contrar location. Following receipt of the OOS tracking sheet, the PSS declared the System operable without verifying that the pumps were placed in automatic.

The inspectors determined that no TSR violation occurred because the pumps were returned to the automatic mode within 8 hours, as required by TSR 2.2.3.4. However, the inspectors noted weaknesses in the work package and associated test procedure, in that, neither specified the required equipment configuration prior to declaring the system operable. As a result, the PSS did not have a definitive way to verify that the switches were in the required position prior to declaring the system operable.

c. <u>Conclusions</u>

The inspectors noted that a lack of rigor in the completion of OOS tracking sheets and a lack of specific work package and procedural guidance contributed to two safety systems being declared operable prematurely, following surveillance activities.

III. Engineering

E1 Conduct of Engineering

E1.1 Autoclave Thermocouples

a. Inspection Scope (88100)

The inspectors reviewed an engineering evaluation (EE) associated with the autoclave UF_6 cylinder high temperature thermocouples.

b. Observations and Findings

On September 30 the certificatee issued Problem Report 98-06767 which identified a potential problem with the procedures for calibrating the autoclave instrumentation. Specifically, the certificatee identified that an approved post-installation operability test for the autoclave thermocouples may not detect thermocouple wires that were shorted together. As an immediate response to the issues documented in the problem report, the certificatee declared the autoclaves inoperable and an EE was initiated.

Engineering Evaluation SH-1998-0280 concluded that thermocouple wires that were shorted together would create a new thermocouple junction. In addition, the EE documented that the autoclave temperature recorder would display the temperature of the closest thermocouple junction (the shorted wires) and not the temperature sensed at the thermocouple. Based upon the EE, the certificatee concluded that the approved post-installation operability test of the autoclave thermocouples would not identify shorted thermocouple wires.

As a followup to the EE, the certificatee performed as-found testing, using a calibrated heat source, for all the autoclave thermocouples to determine if any of the thermocouple wires were shorted together. During the as-found testing, the certificatee applied a calibrated heat source to the thermocouples at 110 degrees Fahrenheit (°F) and 220 °F and documented the temperature displayed on the autoclave temperature recorders. The inspectors noted that all autoclave thermocouples passed the calibrated heat source test and the autoclaves were returned-to-service following completion of the testing.

Subsequent to the certificatee-performed testing using a calibrated heat source, the inspectors noted that the certificatee had also concluded in EE SH-1998-0280 that an uncalibrated heat source could be used to demonstrate that the thermocouple wires had not shorted together between the thermocouple and autoclave temperature recorder. The EE further documented that applying a heat gun to the thermocouple and observing a rise in temperature at the autoclave temperature recorder would ensure that the thermocouple wires were not shorted together between the thermocouple and autoclave temperature temperature that the thermocouple wires were not shorted together between the thermocouple and autoclave temperature recorder.

During an independent review of the EE, the inspectors identified a thermocouple wiring failure mechanism that was not considered in the evaluation. Specifically, the inspectors identified that thermocouple wires, inadvertently stripped of their insulated covering, had several other potential shorting possibilities. In one case, if the live thermocouple wire grounded to the autoclave, the potential existed to alter the actual autoclave temperature at the temperature recorder. In response to the inspectors' findings, the certificatee performed EE SE-1998-0294 which confirmed the possibility of various combinations of autoclave wire short circuits. Based on the results of EE SE-1998-0294, the certificatee initiated actions to change the applicable calibration procedures to include the use of a calibrated heat source.

c. <u>Conclusion</u>

The inspectors determined that the certificatee demonstrated a positive questioning-attitude in the identification of a previously unrecognized fault in the operability testing methodology used for the autoclave thermocouples. However, the inspectors also concluded that the certificatee-proposed initial corrective actions were insufficient to ensure that other possible fault modes were also precluded. Subsequent revisions to the proposed corrective actions appeared to be adequate.

E8 Miscellaneous Engineering Issues

E8.1 (Closed) IFI 70-7002/96010-01: Autoclave "as-found" pressure decay testing data was inconclusive for determining autoclave O-ring reliability. Initially, the certificatee failed to take "as-found" data from the pressure decay test resulting in no data to establish O-ring

reliability. An appendix was added to the maintenance work sheets to facilitate data collection. The appendix was later incorporated into the O-ring maintenance procedure. The system engineer has conducted reviews of the data. The systems engineer determined in his latest review (POEF-821-98-040) that the O-ring data was adequate enough to determine O-ring reliability. The inspectors concluded the certificatee's corrective actions were reasonable and considered the inspection followup item closed.

- E8.2 (Closed) VIO 70-7002/97003-08: Failure to have an NCSA for a PEH component. The certificatee determined that the root cause was an absence of an administrative NCSA specific to handling material discovered that is PEH. The component, an old converter stored in Building X-330, was buffered with dry air in accordance with TSRs shortly after the NRC inspectors identified the non-compliance. A specific NCSA (NCSA 330-013) was developed and implemented within 24 hours. Further surveys were conducted to determine if there was any more stored old equipment that was PEH. Several other pieces of equipment were found and stored in accordance with the NCSA. A tracking program was implemented for tracking the status of PEH equipment. A generic NCSA (NCSA Plant 077.A00) was issued. The requirements from the NCSA were flowed down into the appropriate procedures. The inspectors concluded the certificatee's corrective actions were reasonable and considered the violation closed.
- E8.3 (Closed) VIO 70-7002/97010-03: Failure to have two operable autoclave high steam pressure shutdown channels when placing autoclaves into heating cycles. The certificatee determined that the root cause was technical error in reviewing the TSRs in the initial application. There were three pressure switches, two were used for a steam isolation, while one was used for high steam shutdown. All the autoclaves were declared inoperable after discovery. The certificatee determined that recalibration of all three available pressure switches at the lower steam shutdown pressure of 8 lbs. per square inch gauge provided a high steam pressure shutdown with at least two channels. The certificatee returned the autoclaves to service after the pressure switches were recalibrated. The system description in the SAR was revised and procedures changed to reflect the recalibration at the lower stepoints. The certificatee reviewed other TSRs against SAR system descriptions and determined that the error was an isolated event. The inspectors concluded the certificatee's corrective actions were reasonable and considered the violation closed.
- E8.4 (Closed) VIO 70-7002/97012-05: Failure to calibrate infrared analyzer. The certificatee determined that a misinterpretation of the temporary modification procedure and the inappropriate use of mobile test equipment for routine monitoring in lieu of the installed equipment led to the violation. Use of the mobile test equipment was stopped and administrative controls were implemented to limit use. System engineers and the PSS organization were also briefed on the correct application of the temporary modification procedure and the proper use of mobile test equipment. The inspectors concluded the certificatee's corrective actions were reasonable and considered the violation closed.

IV. Plant Support

P8 Miscellaneous Plant Support Issues

P8.1 (Open) IFI 070-7002/98011-01: Equipment identification tagging issues. The inspectors had identified examples of inadequate equipment tagging in the plant. In response to this finding, the certificatee initiated a review of the plant's labeling program. During the current inspection period, the inspectors noted additional issues with equipment identification. Specifically, the inspectors identified that some gauges did not directly relate actual pressures at the local control centers, drum rooms, and cold recovery station of the process buildings. In discussion with inspectors, the process building managers and the operations group manager indicated that the labeling subcommittee was considering the use of operator aids in these areas.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of the facility management on October 13, 1998. The plant staff acknowledged the findings presented. The inspectors 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

- *C. Blackston, Nuclear Regulator Affairs Compliance Manager
- *J. Brown, General Manager
- *S. Casto, Work Control Manager
- *S. Fout, Operations Manager
- *P. Hopkins, Acting Engineering Manager
- *J. Morgan, Enrichment Plant Manager
- *M. Wayland, Maintenance Manager

United States Department of Energy

J. Orrison, Site Safety Representative

United States Enrichment Corporation

*L. Fink, Safety, Safeguards & Quality Manager

J. Miller, USEC Vice President, Production

*Denotes those present at the exit meeting on August 31, 1998.

INSPECTION PROCEDURES USED

IP 88100:	Plant Operations
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- IP 88101: Configuration Control
- IP 88102: Surveillance Observations
- IP 88103: Maintenance Observations
- IP 97012: In-office Reviews of Written Reports on Nonroutine Events

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

070-7002/98015-01	URI	Potential discrepance between routine plant operations and safety analysis report assumptions.
070-7002/98015-02	URI	Smoke detection system operability testing.
Closed		
070-7002/98003-07	VIO	Failure to establish a TSR required purge gas on a Planned Expeditious Handling component.
070-7002/98005-01	VIO	Failure to have a Nuclear Criticality Safety Approval for a Planned Expeditious Handling component.

070-7002/97010-01	VIO	Failure to take action to prevent recurrence of the reportable autoclave safety actuation, a significant condition adverse to quality.
070-7002/97010-02	VIO	Failure to store F-cans in accordance with the Nuclear Criticality Safety Analysis.
070-7002/97012-01	VIO	Failure to store F-cans in accordance with the Nuclear Criticality Safety Analysis.
070-7002/97012-03	VIO	Failure to follow procedure while treating a cell.
070-7002/97015-01	VIO	Numerous spacing violations of uranium bearing equipment as required by Nuclear Criticality Safety Analysis.
070-7002/96010-01	IFI	Autoclave "as found" pressure decay testing data inconclusive for determining autoclave O-ring reliability.
070-7002/97003-08	VIO	Failure to have Nuclear Criticality Safety Approval.
070-7002/97010-03	VIO	Failure to have two operable autoclave high steam pressure shutdown channels when placing autoclaves into heating cycles.
070-7002/97012-05	VIO	Failure to calibrate infrared analyzer.
Discussed		
070-7002/98011-01	IFI	Monitor action to address equipment identification tagging.
Certification Issues -	Closed	

None

LIST OF ACRONYMS USED

Cascade Automatic Data Processing
Certificate Event Report
Code of Federal Regulations
Calibrated Smoke Sensitivity Test
Division of Nuclear Material Safety
Engineering Evaluation
Extended Range Product
Hydrogen Fluoride
Inspection Followup Item
Low Assay Withdraw
Pounds
Local Control Center
Nuclear Criticality Safety
Nuclear Criticality Safety Approval
Nuclear Regulatory Commission
Operational Assessment Team
Out-of-Service
Planned Expeditious Handling
Plant Operations Review Committee
Plant Shift Superintendent
Safety Analysis Report
Self-Contained Breathing Apparatus
Technical Safety Requirement
Uranium Hexafluoride
Unresolved Item
United States Enrichment Corporation
Violation
Degrees Fahrenheit