

November 16, 2001

EA-01-285

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

SUBJECT: NRC PORTSMOUTH INSPECTION REPORT 07007002/2001-008(DNMS)

Dear Mr. Brown:

This refers to the routine resident inspection at the Portsmouth Gaseous Diffusion Plant completed on October 22, 2001. The purpose of the inspection was to determine whether activities authorized by the certificate were conducted safely and in accordance with the Commission's rules and regulations and with the conditions of your license. At the conclusion of the inspection, the inspectors discussed the findings with members of your staff. The enclosed report presents the results of this inspection.

Areas examined during the 6-week inspection period are identified in the report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, interviews with personnel, and observations of activities in progress.

Based on the results of the inspection, the NRC has determined that three apparent violations of NRC requirements occurred and are being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for the inspection findings at this time. In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review.

An open predecisional enforcement conference to discuss these apparent violations has been scheduled for 10:00 a.m. on December 14, 2001, in the NRC Region III Offices in Lisle, Illinois. The decision to hold a predecisional enforcement conference does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference is being held to obtain information to assist the NRC in making an enforcement decision. This may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned. The conference will provide an opportunity for you to provide your perspective on these matters and any other information

that you believe the NRC should take into consideration in making an enforcement decision. In presenting your corrective action, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violation. In addition, during the conference you should be prepared to provide your analysis of the possibility of a criticality occurring given the loss of all controls on the greater than safe mass deposit. You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding the apparent violations is required at this time.

The NRC also identified one issue that was determined to have a very low safety significance. The NRC determined that a violation is associated with this issue. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region III, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001 and the NRC Senior Resident Inspector at the Portsmouth facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available **electronically** for public inspection in the NRC Public Document Room or from the *Publicly Available Records (PARS) component of NRC's document system (ADAMS)*. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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

Sincerely,

***/RA by M. Dapas acting for/***

Cynthia D. Pederson, Director  
Division of Nuclear Materials Safety

Docket No. 07007002  
Certificate No. GDP-2

Enclosure: Inspection Report 07007002/2001-008(DNMS)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 07007002

Certificate No: GDP-2

Report No: 07007002/2001-008 (DNMS)

Facility Operator: 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 11, 2001, through October 22, 2001

Inspectors: David J. Hartland, Senior Resident Inspector  
Stephen R. Caudill, Resident Inspector  
Monte P. Phillips, Senior Fuel Cycle Inspector  
Dennis Morey, Senior Criticality Safety Inspector  
Larry J. Berg, Criticality Safety Inspector

Approved By: Patrick L. Hiland, Chief  
Fuel Cycle Branch  
Division of Nuclear Materials Safety

## EXECUTIVE SUMMARY

### United States Enrichment Corporation Portsmouth Gaseous Diffusion Plant NRC Inspection Report 07007002/2001-008(DNMS)

#### Operations

The inspectors determined that three apparent violations occurred that resulted in a situation where all criticality controls were lost for a greater than safe mass deposit of uranyl fluoride (UO<sub>2</sub>F<sub>2</sub>). Specifically, plant staff failed to monitor and adjust the dry cover gas pressure on the deposit to greater than or equal to 14 psia [pounds per square inch absolute] pressure on a greater than safe mass deposit; the single nuclear criticality control limiting condition for operation was violated by allowing the dry cover gas pressure to drop below 14 psia; and the procedure governing valving orders was inadequate to ensure that the pressure monitor for a greater than safe mass was not isolated from the area it was monitoring. Although all criticality controls were lost, the inspectors concluded that a criticality was not probable because the integrity of the pipe was maintained, preventing wet air in leakage, and the deposit was not substantially reflected. Upon discovery, plant staff took immediate corrective action to re-establish the control and ensure that other deposits were not impacted. (Section O1.1)

The inspectors concluded that the plant staff's corrective actions in response to an event involving the accumulation of fissile material inside the Building X-705 walls were adequate to ensure the deposits did not constitute a threat to the safety of the personnel or to operability of the equipment. A non-cited violation was identified due to the loss of safety controls. (Section O1.2)

The inspectors concluded that during the process of filling daughter cylinders, operations were conducted in accordance with procedural requirements. Difficulties were experienced by the operators due to not having indication of the position of the cold trap inlet valves, but this condition did not impact safe operations. Housekeeping in Building X-326 needed improvement as several items of debris had been left on the floor in a contamination control zone. (Section O1.3)

The inspectors concluded that training for fire department personnel was conducted in accordance with certificate requirements. Fire equipment was operable and was maintained in good working order. The Waverly Fire Department, a mutual aid organization, felt confident that it could respond, if need be, to any fire or other emergency at the Portsmouth facility. The Fire Department had used the Portsmouth facility's burn building in the conduct of its training program. (Section F1.1)

#### Maintenance

The inspectors observed that an autoclave steam conductivity system valve was replaced in accordance with approved work instructions; however, the instructions were not specific to ensure that the valve lineup was restored upon completion of the work. The inspectors determined that the issue was not significant, as the valve lineup was checked by operations prior to returning the autoclave to service. The plant staff took appropriate action to address the issue. (Section M1.1)

## Engineering

The inspectors noted that the plant staff did not have a formal Nuclear Criticality Safety Analysis in place for some abandoned equipment in Building X-705 nor did they have a plan or time frame for resolving the issue other than returning the equipment to Department of Energy jurisdiction. In addition, the inspectors identified an unresolved item regarding compliance with the Technical Safety Requirement for performing significance determinations for greater than safe mass deposits. (Section E1.1)

## Plant Support

The inspectors concluded that training for operators working in Building X-343 was conducted in accordance with certificate requirements. (Section T1.1)

The inspectors identified several examples of a minor violation concerning completion of required surveillances on emergency equipment. The plant staff documented the issues in problem reports and initiated appropriate corrective actions. Emergency plan and procedure changes were made in accordance with certificate requirements, and none of the plan changes warranted NRC approval prior to implementation. (Section P1.1)

The inspectors identified that an internal plant security memo that potentially contained classified information was not properly controlled. The plant staff took immediate action to control the memo and initiate an investigation. An unresolved item was documented pending review of the plant staff's completed investigation. (Section S1.1)

## Report Details

### I. Operations

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

##### **O1.1 Cascade Deposit Event (CER 38305)**

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

The inspectors reviewed a recent event involving the failure to meet criticality safety requirements for a large fissile material deposit in Building X-330 cascade process piping. The inspectors reviewed the risk significance of the event and the effectiveness of the plant staff's immediate corrective actions.

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

On September 22, the plant staff identified that the pressure in a portion of the cascade, with a large fissile material deposit, was less than 14 psia [pounds per square inch absolute] and that a previously established dry air buffer had been lost. The deposit in question was in the bypass piping between Cells 31-5-6 and 31-5-8 in an area identified as the Cell 31-5-6/8 A-Drop (See Figure 1 below). The affected cascade piping had previously been isolated in May 2001 along with Cell 31-5-8 in order to establish and maintain the required dry air buffer on the large deposit. Prior to that time, the cell and deposit had been in a fluorinating environment.

Plant staff determined that valves 31-5-8AB1 and 31-5-8AB2, which were required to be maintained open so that the buffer pressure could be monitored from Cell 31-5-8, were closed and that the buffer pressure on the deposit had been reduced to 5.8 psia due to leakage through another nearby valve. As immediate corrective action, plant staff took the following steps:

- opened valves 31-5-8AB1 and 31-5-8AB2 and reestablished the required buffer pressure;
- placed caution tags on the affected valves to further control the valve line-up;
- checked other large cascade deposits to assure adequate dry air buffer;
- placed caution tags on affected valves in unusual line-ups associated with other deposits as needed to further control the line-ups; and
- reported the 4-hour event to the NRC Operations Center in accordance with NRC Bulletin 91-01 due to the loss of the single control (moderation) for a cascade cell containing a greater than safe mass deposit.

The plant staff initiated an investigation to identify the root causes of the event and to establish long term corrective actions. The inspectors reviewed the results of the preliminary investigation, performed walkdowns of the affected equipment, and conducted interviews with the plant staff. According to the plant staff, cell block valves 31-5-8AB1 and 31-5-8AB2 were verified to be open on May 26, 2001 (approximately

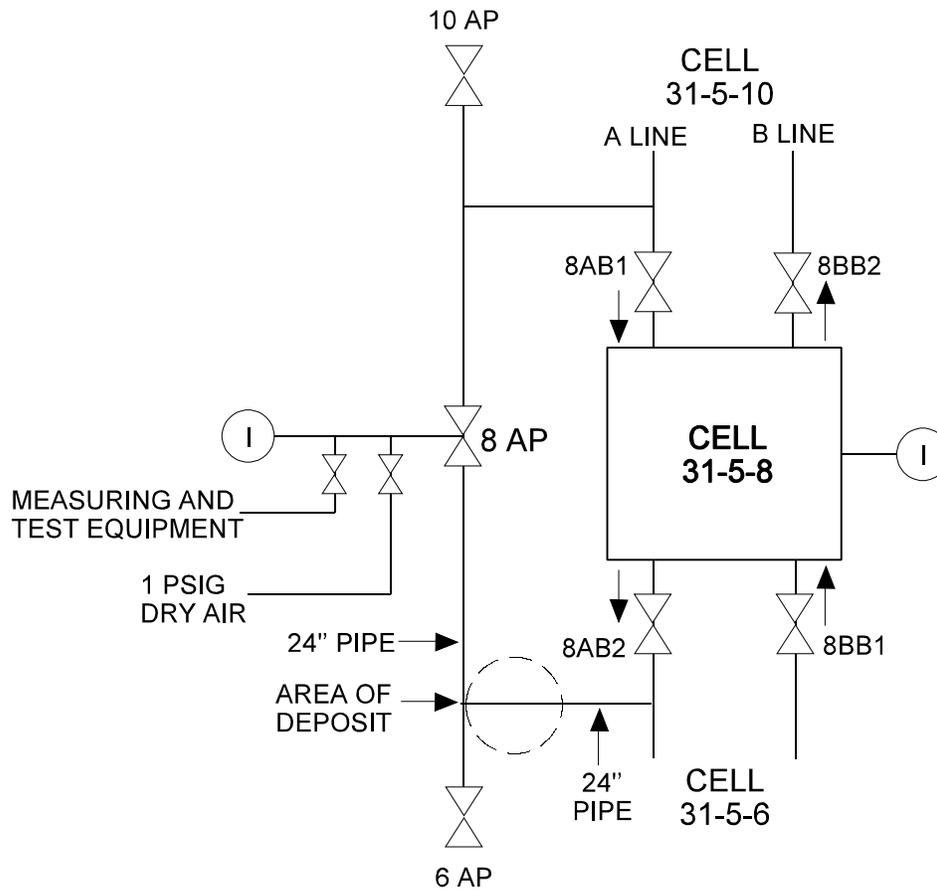


Figure 1 PORTSMOUTH CASCADE DEPOSIT

four months prior to the condition being identified) by a physical check on the valve stems locally and a visual verification of the valve position indicator lights at the control panel. The plant staff also indicated that the breakers for the block valves were tripped at that time as an added measure of safety. However, no caution tags were hung on either the valves or the breakers to ensure that the valve lineup would be maintained such that the dry air pressure to the deposit could be monitored via the pressure indicator on cell 31-5-8 to ensure compliance with Technical Safety Requirement (TSR) 2.2.3.15.

The inspectors noted that, at the time of the event discovery, the breakers for the block valves were in the closed position. However, the plant staff could not provide an explanation for this change in configuration. According to the plant staff, at the time of discovery the First Line Manager (FLM) was performing routine checks prior to start up of the cell for chemical treatment of the deposit. These checks included valving in a pressure gauge located on the bypass block valve 31-5-8AP (See Figure 1 above). Upon valving in, the FLM recognized the loss of dry air buffer on the deposit and then discovered the closed status of block valves 31-5-8AB1 and 31-5-8AB2. Because the pressure of the deposit was monitored by surveillance of pressure indication from the

cell, the pressure change was never noticed during the surveillance because the closure of the valves isolated the pressure transmitter from the deposit that was to be monitored by the surveillance. Since plant staff could not determine when the valves were isolated, this condition could have existed for up to four months.

Nuclear Criticality Safety (NCS) staff initiated an analysis to establish the risk significance of the as-found condition. The analysis determined that the maximum size of the deposit was approximately 930 pounds, and the maximum enrichment was determined to be 3.1 weight percent (wt%). This was larger than a critical mass for this configuration which was about 690 pounds. A certificatee calculation of a fully reflected sphere of 3.1 wt% enriched material with a limiting H/U [hydrogen to uranium] ratio of 4 resulted in a  $k_{\text{eff}}$  of greater than one. This calculation leads to the conclusion that a criticality was possible under conditions involving significant reflection. The certificatee also performed calculations under nominal reflection conditions resulting in a  $k_{\text{eff}}$  of .932. The inspectors noted that the affected portion of the cascade equipment was protected by the single contingency of covering large deposits with a blanket of dry air. Although piping integrity was maintained based on the pressure in the pipe being less than atmospheric, the cover gas control was lost over time so that no controls were available for the contingency of wet air in-leakage. Approximately five months are required for a  $\text{UO}_2\text{F}_2$  deposit to absorb enough wet air to effectively moderate the deposit and cause a significant criticality safety concern.

Technical Safety Requirement (TSR) 2.2.3.15, "Moderation Control, Limiting Control For Operation," required in part, that moderation control be maintained for a uranyl fluoride ( $\text{UO}_2\text{F}_2$ ) deposit that was greater than safe mass by maintaining a nitrogen or dry air buffer at greater than or equal to 14 psia to prevent moderation of large deposits by wet air in-leakage. To ensure that this requirement was met, TSR Surveillance Requirement 2.2.3.15 required that on each shift when the 14 psia dry air buffer was required, the shift was to monitor the system pressure and adjust pressure to greater than or equal to 14 psia. With block valves 31-5-8AB1 and 31-5-8AB2 closed, the use of the cell pressure indicator to monitor system pressure was inappropriate. Also, the failure to verify that the block valves were open before taking a pressure reading from the cell meant that there was no assurance that whatever pressure reading was obtained was representative of the pressure at the deposit, which was what was required to be monitored by the TSR. The failure to properly monitor the pressure of the cover gas on the greater than safe mass deposit is an apparent violation of TSR SR 2.2.3.15 **(EEI 70-7002/2001-008-01)**. Similarly, the failure to maintain the cover gas blanket at a pressure greater than or equal to 14 psia was an apparent violation of the Limiting Control for Operation **(EEI 70-7002/2001-008-02)** as prescribed in TSR 2.2.3.15.

Although a valve lineup change occurred sometime between May 26, 2001 and September 22, 2001, there was no documentation in the operating area logs that such a lineup change had occurred. Also, no caution tags were hung on either the valves, nor the associated breakers, to ensure that they were maintained in the proper configuration.

The inspectors reviewed the activities of the plant staff that led up to this event. Although the valves were verified open on May 26, 2001, the inspectors noted that Procedure XP4-CO-CA2228, "Valving Orders," which provided instructions for valving operations that were not covered or directed by another procedure, was apparently not implemented. The procedure provided for independent review of valving orders using

approved drawings prior to implementation and independent or concurrent verification of valve positions after the orders were performed. The procedure also required that valve positions be checked on a weekly or quarterly basis.

During followup discussions, plant staff indicated that the procedure was not intended to be used because Step 2.1 indicated that cell block valves were examples of valves covered by other operating procedures and were, therefore, exempted. However, the inspectors determined that the exemption appeared to apply when the cascade was operating, as there was not an operating procedure that directed the closure of the block valves subsequent to May 26, 2001.

10 CFR 76.93, requires, in part, that the Corporation establish, maintain, and execute a quality assurance program satisfying each of the applicable requirements of ASME NQA-1-1989, "Quality Assurance Program Requirements for Nuclear Facilities." The Corporation shall execute the criteria in a graded approach to an extent that is commensurate with, the importance to safety. ASME NQA-1-1989, Section 5, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by and performed in accordance with documented instructions, procedures, or drawings of a type appropriate to the circumstances. The failure to have instructions or procedures appropriate to the circumstances to ensure that cell block valves being utilized to monitor pressures of greater than safe mass deposits were not inappropriately isolated is an apparent violation of Section 5 of NQA-1 **(EEI 70-7002/2001-008-03)**.

c. Conclusions

The inspectors determined that three apparent violations occurred that resulted in a situation where all criticality controls were lost for a greater than safe mass deposit of uranyl fluoride (UO<sub>2</sub>F<sub>2</sub>). Specifically, plant staff failed to adequately monitor and adjust the dry cover gas pressure on the deposit to greater than or equal to 14 psia pressure on a greater than safe mass deposit; the single nuclear criticality control limiting condition for operation was violated by allowing the dry cover gas pressure to drop below 14 psia; and the procedure governing valving orders was inadequate to ensure that the pressure monitor for a greater than safe mass was not isolated from the area it was monitoring. Although all criticality controls were lost, the inspectors concluded that a criticality was not probable because the integrity of the pipe was maintained, preventing wet air in leakage, and the deposit was not substantially reflected. Upon discovery, plant staff took immediate corrective action to re-establish the control and ensure that other deposits were not impacted.

O1.2 Building X-705 Event (CERs 38294, 38298, and 38316)

a. Inspection Scope (88100)

The inspectors reviewed a recent event involving the discovery of fissile material deposits in the walls of Building X-705. The inspectors reviewed the risk significance of the event and the effectiveness of plant staff's immediate actions.

b. Observations and Findings

On September 25, the plant staff reported that a concrete wall in Building X-705 had holes, cracks, and penetrations which could have accumulated fissile material. The plant staff investigated the affected areas and determined that fissile material had accumulated in the interior spaces of the wall. The plant staff identified four places where fissile material appeared to have accumulated in the walls with the largest deposit consisting of 225 grams  $\pm$  50 percent.

The plant staff had not fully determined the source of the accumulations; however, the inspectors noted that in two parts of the recovery area, open topped overflow columns had splashed onto an inner wall resulting in dissolution of the cement between the bricks by the uranyl nitrate. Building X-705 is a steel frame building with inner and outer non-load bearing walls around the exterior. The walls making up the uranium recovery area consist of a double row of ceramic bricks with a row of elongated holes down the middle making the bricks semi-hollow. In some places, the inspectors observed a gap between the inner and outer walls, and the splashed solutions, over time, eventually entered the wall and created deposits.

Immediate actions by the plant staff included:

- placing the recovery area into an anomalous condition and restricting entry and other activities;
- patching and repairing holes, cracks and penetrations in the affected areas; and
- performing detailed non-destructive assay surveys to quantify the deposits.

The inspectors determined that immediate corrective actions by the plant staff were timely to ensure prevention of nuclear criticality involving deposits in unknown locations. The plant staff also initiated an investigation to determine the root causes of the event and to develop long-term corrective actions. Intended actions included preparation of a nuclear criticality safety analysis (NCSA) in order to facilitate removal, decontamination or containment of the deposits. The plant staff also evaluated system process changes to strengthen existing NCS controls in the building.

The inspectors determined that the Building X-705 recovery area continued to fall under inadvertent container restrictions due to the availability of fissile material solutions in sufficient quantity and enrichment to cause criticality safety concerns. Inadvertent container controls were system integrity and container geometry. Both of these controls were lost during this event. However, the inspectors noted that insufficient fissile material for criticality was involved and that the geometry of the wall was not well suited for a fissile configuration. This led the inspectors to conclude that the risk significance of the event was low. Therefore, the loss of NCS controls that were appropriately identified and corrected by the plant staff are being treated as a non-cited violation per Section VI.A.8 of the NRC Enforcement Policy.

c. Conclusions

The inspectors concluded that the plant staff's corrective actions in response to an event involving the accumulation of fissile material inside building walls were adequate to

ensure the deposits did not constitute a threat to the safety of the personnel or to operability of the equipment.

### O1.3 Operational Safety Review

#### a. Inspection Scope (TI2600/003)

The inspectors observed selected operations at the facility to ensure that they were conducted safely and in accordance with certificate requirements.

#### b. Observations and Findings

The inspectors observed activities in Building X-344 involving the transfer of the product from a parent cylinder into daughter cylinders that were subsequently shipped to customers. The inspectors observed that the operators had the appropriate procedures in hand and verified the completion of steps as required. However, it was difficult to determine whether the operators had placed the cold trap inlet valves in the open or closed position throughout the procedural evolution.

The cold trap inlet valves were interlocked with the chemical trap inlet valves such that only one set of valves could be open at one time. The valves were operated by a spring-loaded switch that was momentarily moved to the "cold trap inlet valves open" or the "chemical trap inlet valves open" position, after which the switch was returned to a central position. There were no indicating lights on the panel; so the operators were required to remember which position the switch was last moved to know which sets of valves were open or closed. Operators stated this was difficult, and during the evolution there were at least two occasions when operators could not remember whether the step that opened the cold trap valves was completed, so that step was repeated. The inspectors concluded that, since this operation was procedurally in a section that continually alternated between the two switch positions while reducing the pressure in the lines connecting the two cylinders, repeating the step was not a violation of the procedure nor a safety issue.

The inspectors also observed the removal of the lines connecting the two cylinders to the main piping manifold, and the subsequent relocation of the cylinders. The parent cylinder was allowed to cool and then was moved to storage. A hot cylinder, which had been in Autoclave No. 2, was moved to Autoclave No. 1 while maintenance was being performed on Autoclave No. 2. When the operators initiated the procedure to drain the hot cylinder, they noted that the cylinder's internal pressure exceeded the allowable cold pressure limit. The procedure had no provisions to address a situation when the cylinder was already hot prior to being heated. The operators appropriately stopped work and awaited a correction to the procedure to address this situation.

The inspectors also toured the cell floor of Building X-326 to evaluate the material condition of the floor. The inspectors found several items of debris, including rubber gloves, loose rope, rags, and other items cluttering the contamination control zone. These conditions were brought to the attention of plant management. Problem reports were generated to document and address the inspectors' observations.

c. Conclusions

The inspectors concluded that during the process of filling daughter cylinders, operations were conducted in accordance with procedural requirements. Difficulties were experienced by the operators due to not having indication of the position of the cold trap inlet valves, but this condition did not impact safe operations. Housekeeping in Building X-326 needed improvement as several items of debris had been left on the floor in a contamination control zone.

**O8 Miscellaneous Operations Issues**

O8.1 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, and they will evaluate the associated written reports for the events following submittal, as applicable.

<u>Number</u>	<u>Date</u>	<u>Status</u>	<u>Title</u>
38295	9/19/01	Closed*	Notification to other government agency, Building X-600 boiler exceeded the opacity limit.
38297	9/19/01	Open	Safety System Actuation, Building X-344, Autoclave No. 3 High Condensate Level Shutoff.
38329	9/28/01	Closed*	Notification to other government agency, Building X-600 boiler exceeded the opacity limit.
38404	10/18/01	Closed*	Notification to other government agency, discovery of suspicious white powdery substance located in Building X-102.

\* The NRC reviewed these events and has no further issues. No 30-day reports to the NRC are required.

O8.2 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 NCS concerns associated with the report at the time of the initial verbal notification. Based on the inspectors review of the events, the events are considered closed unless otherwise noted.

<u>Number</u>	<u>Date</u>	<u>Title</u>
38294	9/18/01	4-Hour Report - NCS violation; during a walk through in Building X-705, holes in walls were identified as potential inadvertent containers. This item was identified as a non-cited violation in Section 0.1.2 above.
38298	9/19/01	24-Hour Report - NCS violation; additional issues were raised regarding exterior walls having openings that could allow for inadvertent containers. This item was identified as a non-cited violation in Section 0.1.2 above.
38305	9/22/01	4-Hour Report - NCS violation; operations personnel in Building X-330 discovered that a $UO_2F_2$ deposit with greater than safe mass was no longer being buffered with dry air to greater than or equal to 14 psia. This item is the subject of the apparent violation discussed in Section 0.1.1.
38316	9/25/01	4-Hour Report - NCS violation; unknown amount of uranium-bearing material was observed in interior spaces of block wall in Building X-705 recovery area. This item was identified as a non-cited violation in Section 0.1.2 above.
38391	10/15/01	24-Hour Report - NCS violation; during a walk down of Building X-330, inadequate spacing of contaminated items identified in equipment storage area. Corrective actions adequate; no further NRC review required.

#### F1.1 Fire Protection

##### a. Inspection Scope (88055)

The inspectors reviewed the pre-fire plans to ensure that they provided adequate information. The inspectors also reviewed the fire services staff training program for adequacy in accordance with the specifications for training described in the Safety Analysis Report (SAR). The inspectors evaluated emergency equipment for readiness, including the readiness of an offsite fire department to respond to a fire at the site.

##### b. Observations and Findings

The inspectors reviewed the pre-fire plans (emergency packets) and noted that the information provided was consistent with SAR requirements. In addition, the pre-fire plans adequately described nuclear criticality safety concerns, as applicable, and provided special instructions to address fighting fires where the potential existed to create a criticality or to deal with hazardous chemicals. However, a pen and ink change had been made to a pre-fire plan for Building X-7721 addressing NCS concerns, and the

change was illegible. This was immediately corrected upon the inspectors' raising the issue to site emergency management staff.

The inspectors reviewed the training program for the fire fighting staff. Training requirements were specified at annual, biennial, and triennial frequencies. In addition, some training was conducted as a result of procedure changes, drill deficiencies, or other site requirements (such as radiological worker access training). The fire services training officer had developed a training schedule that specified what courses would be taught and at what frequency. This schedule not only included all of the courses required by the certificate, but also included several annual drills that were not specifically required. Finally, the human resources department maintained the matrix for each firefighting staff position as part of the official training records. The inspectors reviewed the matrix and determined that the position of firefighter did not show a requirement for a two-year retraining frequency in cardiopulmonary resuscitation (CPR), although qualified individuals were being trained at that frequency. In response to this issue, site management stated that they would add the CPR training module to the firefighter training matrix.

The inspectors reviewed the records associated with the fire response equipment based at the fire station. The facility had three pumper trucks, two squad cars, one heavy rescue vehicle, and two ambulances. Routine surveillances were performed on all of the equipment and periodic inventories were conducted to ensure the equipment was always in an operable condition. When identified, deficiencies were promptly corrected. At the time of the inspection, all equipment was in good working order.

The inspectors met with the City of Waverly Fire Chief. The Waverly Fire Department is designated in the emergency plan as an organization that provides assistance to the Portsmouth site if called upon. The Waverly fire department had participated in training at the Portsmouth facility, and had used the Portsmouth facility's burn building in the conduct of the department's training program. Annual training had been provided to the Waverly Fire Department, and there was a good relationship between the department and Portsmouth facility fire staff. The Waverly Fire Department had participated in drills at the Portsmouth facility, and the Portsmouth facility fire staff had responded on occasion to handle chemical spills at the request of the Waverly Fire Department.

c. Conclusions

The inspectors concluded that training for fire department personnel was conducted in accordance with certificate requirements. Fire equipment was operable and maintained in good working order. The Waverly Fire Department, a mutual aid organization, felt confident it could respond if needed to any fire or other emergency at the Portsmouth facility, and had used the Portsmouth facility's burn building in the conduct of its training program.

## II. Maintenance

### **M1 Conduct of Maintenance Activities**

#### M1 Maintenance and Surveillance Testing

##### a. Inspection Scope (88025)

The inspectors observed maintenance on the conductivity probes for Autoclave No. 2 in Building X-344 to determine whether maintenance and subsequent testing and calibrations were conducted in accordance with certificate requirements and approved procedures.

##### b. Observations and Findings

As a result of a high conductivity alarm on Autoclave No. 2 in Building X-344, a work package was issued to test the conductivity probes and change out a three-way valve. The inspectors reviewed the work package and observed the performance of the work. The testing of the probes was satisfactory, with the as-found readings falling within the required as-left tolerances.

The inspectors reviewed the work control steps for replacement of the valves, and noted that the work instructions were very brief and did not address all actions required to perform the work. The replacement of the three-way valve required isolating the valve; however, the work control step simply stated to replace the valve. It was left up to the instrumentation mechanics to ensure that the valve was isolated prior to removal and that the normal valve line-up was restored afterwards. Although the valve lineup was not specified in the work package, this was routinely verified by operations prior to returning the autoclave to service. A problem report was generated to document the inspectors' issue regarding the inadequate work instructions. As corrective action, the plant staff intended to implement the use of a generic form in work packages to document valve manipulations and ensure that systems were properly restored.

##### c. Conclusions

The inspectors observed that an autoclave steam conductivity system valve was replaced in accordance with approved work instructions; however, the instructions were not specific to ensure that the valve lineup was restored upon completion of the work. The inspectors determined that the issue was not significant, as the valve lineup was checked by operations prior to returning the autoclave to service. The plant staff took appropriate action to address the issue.

### III. Engineering

#### **E1 Conduct of Engineering**

##### **E1.1 Nuclear Criticality Safety Function (88015)**

###### **a. Inspection Scope**

The inspectors reviewed progress on the comprehensive NCS Corrective Action Plan (CAP) and reviewed progress in developing NCS coverage of Building X-705 abandoned equipment.

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

#### **Nuclear Criticality Safety Corrective Action Plan**

The inspectors reviewed the status of the comprehensive NCS CAP. The plant staff's actions for the NCS CAP were nearly complete with non-priority 1 and 2 NCSA revisions underway and approximately 10 unlikely event modifications remaining. The plant staff indicated that the completion date of November 15, 2002, was expected to be met for completion of all corrective actions.

#### **Recovery Area Calciner**

During a previous criticality safety inspection, the inspectors noted that a greater than safe mass of fissile material existed in the Building X-705 F-Area calciner, that could have been amenable to nuclear criticality with the availability of water from the fire suppression system and with the proximity to additional uranium masses associated with ongoing operations in nearby process areas in Building X-705. The inspectors noted that the F-Area calciner lacked a formal NCS technical evaluation (the certificatee considered this equipment abandoned in place), and that the controls for the dominant risk of introduction of moderator or additional fissile material into the calciner had not been established in an NCSA.

In response, the plant staff performed an evaluation to document an interim basis for double contingency as discussed in Inspection Report No. 07007002/2001-003. The plant staff considered the equipment a legacy situation pending turnover to the Department of Energy (DOE). To ensure nuclear criticality safety while awaiting formal turnover of the F-Area calciner to the DOE, the inspectors noted that compensatory measures had been established to control the criticality risk to acceptable levels of safety.

Based on discussions with the plant staff, the inspectors determined that a definitive schedule for turnover had not been established at the time of this inspection, and that adequate management measures for ensuring nuclear criticality safety in the long term (i.e., application of the NCS program) had not been established. Disposition of the calciner and other abandoned equipment in Building X-705 is an **Unresolved Item (URI 07007002/2001-008-04)** pending the inspectors' review of long term measures.

## Technical Safety Requirement Significance Determinations

During followup to the issue discussed in Section O1.1 regarding the failure to maintain moderation control for the greater than safe mass deposit in Building X-330 as required in TSR 2.2.3.15, the inspectors noted that the plant staff had not documented significance determinations for those deposits previously identified as required by the TSR. The requirement to perform the significance determination had existed since NRC assumed regulatory oversight in 1997, but the inspectors noted that the basis for the requirement had been revised in August 2001 to include more detail as to what types of issues required a significance determination.

The revised basis stated that the only situation where the TSR controls would be in question would be for a deposit above a minimum critical mass at a hydrogen to uranium ratio (H/U) of 4 that had been exposed to wet air for an unknown period of time, and that the deposit significance determination would provide the analysis of the adequacy of the TSR controls. For such a deposit, the basis required that the safety determination include an assessment of the following criteria:

- mass and enrichment of the deposit;
- formation mechanism and assessment of likely chemical composition of the deposit;
- distribution/configuration of the deposit relative to geometry or interaction parameters;
- presence of a fluorinating environment during deposit formation; and
- estimated amount of time/water required to reach the H/U ratio where deposit mass equals minimum critical mass and comparison to TSR controls.

In response, the plant staff documented the inspectors' issue in Problem Report 01-04521 to assess compliance with the TSR. The inspectors' review of the plant staff's assessment of the safety significance of the apparent non-compliance with the TSR for performing significance determinations for greater than safe mass deposits is an **Unresolved Item (URI 70-7002/2001-008-05)**.

### c. Conclusions

The inspectors noted that the plant staff did not have a formal NCS analysis in place for some abandoned equipment in Building X-705, nor did they have a plan or time frame for resolving the issue other than returning the equipment to DOE jurisdiction. In addition, the inspectors identified an issue regarding compliance with the TSR for performing significance determinations for greater than safe mass deposits.

## E8 Miscellaneous Engineering Issues

- E8.1 (Closed) Event Report 37756 (01-01): High condensate level shutoff actuation on Autoclave No. 2 in Building X-343. The plant staff determined that the root cause was that the design of a temporary condensate header as part of the Nuclear Safety Upgrade modifications did not provide an adequate vent path to allow steam in the

header to escape. As corrective action, the plant staff installed a new vent line on the header, and the plant modification process was revised to ensure that technical reviews explicitly addressed the potential of changes to increase safety system actuations. The inspectors have no further issues and this item is closed.

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

##### **T1.1 Operator Training/Retraining**

###### **a. Inspection Scope (88010)**

The inspectors reviewed the training program for operators associated with activities in Building X-343 to assess compliance with certificate requirements.

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

Operators received initial and continuing training based on the work activities that they would perform. The final step of the training activity was the independent performance of the task under the observation of the FLM, who would then sign off on the operators' qualification card if the task was performed successfully. Operators were considered to have completed training when all qualification cards for the position had been completed and signed off by the FLM. A training department specialist conducted most of the classroom training, while on-the-job training was conducted by a fellow operator.

The inspectors reviewed the training records for three of the operators working in Building X-343 and compared them to the associated training matrix. In all cases, the individuals had completed all courses required by the training matrix within the specified time interval. The inspectors also reviewed the exams completed by the operators for various courses completed. The exams were properly graded and the scores satisfied passing level requirements.

Finally, the inspectors observed a training task involving autoclave operations. The trainee performed the task under the direction of a qualified operator without any deficiencies.

###### **c. Conclusions**

The inspectors concluded that training for operators working in Building X-343 was conducted in accordance with certificate requirements.

##### **P1.1 Emergency Preparedness**

###### **a. Inspection Scope (88050)**

The inspectors reviewed the emergency preparedness program to ensure that it was maintained in an operational state of readiness and was in compliance with certificate requirements.

b. Observations and Findings

The inspectors reviewed all changes made to the emergency plan since the last inspection of the program. All of the changes made, which were minor in nature, continued to meet NRC requirements, and all were properly processed following the procedural requirements for making plan changes. None of the changes decreased the overall effectiveness of the emergency preparedness program.

The inspectors reviewed the processes in place for updating the emergency plan based on the incorporation of recommendations from audits, drills, events, and training feedback. The plan was updated utilizing the Request for Application Change (RAC) process since changes to the plan also involved a change to the SAR. The Emergency Plan Coordinator determined when a change was necessary and submitted the RAC. Emergency plan implementing procedures would be correspondingly revised, but would not be approved for implementation until after the plan change was approved by the Plant Operating Review Committee. For those changes that required NRC approval, the change and associated implementing procedures would not be put in place until the approval from NRC had been obtained. The inspectors noted that feedback was used to generate appropriate changes to the implementing procedures and plan, and that there were no significant issues identified in drill or exercise results that required a change to the emergency plan that would have required NRC approval prior to implementation.

The inspectors reviewed all of the emergency procedures that had been revised since the last inspection of the program. All of the changes made to procedures were minor in nature and were designed to improve emergency response capability. The procedures continued to provide for the detection and proper classification of accidents, mitigation of the consequences of accidents, assessments of releases, personnel accountability, notification and coordination efforts, and authority and guidance for initiating evacuation alarms. The inspectors did not identify any deficiencies with the content of the emergency procedures reviewed other than the inventory procedure, which is discussed below. All changes to procedures had been appropriately reviewed and approved.

The inspectors reviewed the inventory and equipment checks for all of the emergency equipment and kits specified in the emergency plan. Inventories and checks were specified at various frequencies per the requirements of Procedure XP2-EP-EP5034, "Maintenance of Emergency Facilities and Equipment." In reviewing the various inventories and checks, the inspectors identified the following discrepancies:

- No quarterly mutual aid dosimetry inspection was done for the fourth quarter of 2000 as required. The plant staff immediately generated a problem report (PR 01-4148) to address this issue.
- The mobile communication vehicle mechanical inspection checks for February 2001 and March 2000 were completed with all checks being marked as acceptable and annotated that the vehicle had been "started and driven"; however, a problem report had also been written and attached to the subject surveillances that stated the "battery will not start vehicle." It appeared that the surveillance records were inaccurate as they did not document the as-found condition of the vehicle, but rather what they anticipated the condition of the vehicle would be after the problem report was addressed. This issue was

brought to management attention and a problem report (PR 01-4147) was issued to address proper completion of surveillance records.

- Several surveillances indicated that the equipment being checked was not actually a part of the inventory anymore, but had either been removed or moved. Examples included the mobile communication vehicle monthly check, where the scanner and camera were always marked "no" with no corrective action taken, and contained a note for the facsimile machine (which was also checked "no") stating that there was a spare in Building X-1020. For the Emergency Operations Center computer room surveillance, checks to verify the status of various equipment and procedures were checked "N/A".
- The Plant Shift Superintendent office communications equipment checklist had all surveillances for the "emergency broadcast system receiver/monitor" checked "N/A", and there was always a note on the "STU-III," the secure phone unit, stating that it had been moved from this location to the incident command vehicle. However, the "STU-III" was not on the checklist for the incident command vehicle. The site emergency response coordinator stated that all of the checklists would be updated to ensure that equipment necessary at each location was shown on the checklist and that equipment that was not necessary would be removed.

The above examples all constituted violations of Procedure XP2-EP-EP5034; however, given that plant staff was in the process of implementing corrective actions for these examples, a notice of violation will not be issued for these violations of minor safety significance in accordance with Section VI.A of the NRC's Enforcement Policy.

c. Conclusions

The inspectors identified several examples of minor violations concerning completion of required surveillances on emergency equipment. Plant staff documented the issues in problem reports and initiated appropriate corrective actions. Emergency plan and procedure changes were made in accordance with requirements, and none of the plan changes warranted NRC approval prior to implementation.

S1.1 Security

a. Inspection Scope (88100)

The inspectors reviewed an issue regarding an internal security memo that was not properly controlled as classified information.

b. Observations and Findings

On October 3, the inspectors identified that a copy of an internal plant security memo may have included classified information that was not being properly controlled. The inspectors brought the issue to the attention of plant security management, who agreed at the time that the memo could potentially contain uncontrolled classified information.

As immediate corrective action, the plant staff collected all copies of the memo that had been distributed and purged the affected file from the computer. The plant staff

determined that there was no indication that any compromise had occurred or that the information was intentionally included in the uncontrolled document. Management appropriately documented the incident as a 24-hour loggable security event per 10 CFR95.57(a) and initiated an investigation to determine the root cause and take any required corrective actions. The inspectors review of the plant staff's completed investigation is an **Unresolved Item (70-7002/2001-008-06)**.

c. Conclusions

The inspectors identified that an internal plant security memo that potentially contained classified information was not properly controlled. Plant staff took immediate action to control the memo and initiate an investigation. An unresolved item was documented pending review of plant staff's completed investigation.

**V. Management Meetings**

**X1 Exit Meeting Summary**

The inspectors presented the inspection results to members of the facility management on October 22, 2001. The facility staff acknowledged the findings presented and indicated concurrence with the facts, as stated. 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

### United States Enrichment Corporation

P. Musser, General Manager  
\*J. Anzelmo, Plant Services Manager  
\*D. Couser, Training Manager  
\*L. Cutlip, Engineering Manager  
\*D. Fosson, Operations Manager  
\*S. Fout, Transfer and Shipping Plant Manager  
\*R. Lawton, Nuclear Safety & Quality Manager  
P. Miner, Nuclear Regulatory Affairs Manager  
\*M. Wayland, Maintenance Manager  
R. Winegar, Cold Standby Program Manager  
\*G. Workman, Production Support Manager

\*Denotes those present at the exit meeting on October 22, 2001.

## INSPECTION PROCEDURES USED

IP 88010: Operator Training/Retraining  
IP 88015: Nuclear Criticality Safety  
IP 88025: Maintenance and Surveillance Testing  
IP 88050: Emergency Preparedness  
IP 88055: Fire Protection  
IP 88100: Plant Operations  
IP 90712: In-office Reviews of Written Reports on Non-routine Events  
TI 2600/003: Operational Safety Review

## ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened</u>	<u>Item Type</u>	<u>Summary</u>
07007002/2001-008-01	EI	Failure to properly monitor the pressure of the cover gas on a greater than safe mass deposit
07007002/2001-008-02	EI	Failure to maintain the cover gas blanket at a pressure greater than or equal to 14 psia
07007002/2001-008-03	EI	Procedure XP4-CO-CA2228 inappropriate to the circumstances to ensure block valves not isolated.
07007002/2001-008-04	URI	Disposition of abandoned equipment in Building X-705
07007002/2001-008-05	URI	Review of plant's staff assessment for compliance with the TSR for performing significance determinations for greater than safe mass deposits
07007002/2001-008-06	URI	Review of plant staff's investigation into event regarding memo that contained uncontrolled classified information

38297 CER Safety System Actuation, Building X-344, Autoclave No. 3  
High Condensate Level Shutoff

Closed

38295 CER Notification to other government agency, Building X-600  
boiler exceeded the opacity limit

38329 CER Notification to other government agency, Building X-600  
Steam Plant boiler exceeded the opacity limit

38404 CER Notification to other government agency, discovery of  
suspicious white powdery substance located in Building X-  
102

37756 (01-01): CER High Condensate Level Shutoff Actuation on Autoclave  
No. 2 in Building X-343

Discussed

None

**LIST OF ACRONYMS USED**

ADAMS	Agencywide Documents Access and Management System
CAP	Corrective Action Plan
CER	Certificate Event Report
CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
DNMS	Division of Nuclear Material Safety
DOE	Department of Energy
FLM	First Line Manager
H/U	hydrogen to uranium ratio
IFI	Inspection Follow-up Item
$k_{eff}$	Effective Neutron Multiplication Factor
NCS	Nuclear Criticality Safety
NCSA	Nuclear Criticality Safety Approval
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PERR	Public Electronic Reading Room
psia	Pounds Per Square Inch Absolute
RAC	Request for Application Change
SAR	Safety Analysis Report
TSR	Technical Safety Requirements
UO <sub>2</sub> F <sub>2</sub>	Uranyl Fluoride
URI	Unresolved Item
USEC	United States Enrichment Corporation
VIO	Violation