

**U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
CRITICALITY SAFETY INSPECTION REPORT**

Docket No. 70-7002

Certificate No. Gaseous Diffusion Plant (GDP)-2

Report No. 70-7002/1999-206

Applicant: United States Enrichment Corporation

Location: Piketon, OH 45661

Inspection Dates: August 23 to 27, and October 25 to 27, 1999

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Enclosure

**UNITED STATES ENRICHMENT CORPORATION
PORTSMOUTH GASEOUS DIFFUSION PLANT
NRC INSPECTION REPORT 70-7002/1999-206**

EXECUTIVE SUMMARY

Introduction

The NRC performed a routine announced criticality safety inspection at the Portsmouth Gaseous Diffusion Plant located in Piketon, OH from August 23 to 27, and October 25 to 27, 1999. The inspection focused on the status of open items including Compliance Plan Items, implementation of administrative controls and recent reportable events. The inspectors reviewed documents, interviewed plant staff, and conducted walkdowns of selected plant areas. The inspection effort was intended to help maintain a risk focus for future inspection efforts by closing and consolidating open items.

During this inspection, the inspectors identified several weaknesses with the Nuclear Criticality Safety (NCS) program, identified two Non-Cited Violations (NCVs), opened two Inspector Follow-up Items (IFIs), and closed 21 open items from previous criticality safety inspections.

Results

- The inspectors determined that certificatee implementation of posted administrative controls has improved overall although several infractions of minor safety significance were observed.
- The inspectors did not agree with the characterization of the safety significance of an event involving liquid in a waste drum and concluded that the event was of more than low safety significance. Because the event was licensee-identified, the inspectors determined that the failure to prevent introduction of moderator into uncharacterized waste was an NCV.
- The inspectors determined that the certificatee process for flowing administrative controls from Nuclear Criticality Safety Analysis (NCSAs) to plant operations is cumbersome and therefore, programmatically weak.
- The inspectors concluded that implementation of Augmented Quality (AQ)-NCS requirements was generally adequate.
- A certificatee identified and corrected failure to take timely corrective actions for items identified in a certificatee vertical slice report was reclassified from a URI and identified as a Non-Cited Violation (NCV).

REPORT DETAILS

1.0 Plant Operations

a. Scope of Inspection

The inspectors conducted extensive walkdowns in fissile material operating areas in order to observe implementation of and compliance with NCS controls. The inspectors conducted interviews with and were accompanied by operations staff who were involved in an ongoing NCS upgrade.

b. Observations and Findings

The certificatee is presently engaged in a long-term NCS upgrade project to correct previously identified deficiencies with the development and implementation of adequate NCSA limits and controls. This work is being done in accordance with a published schedule with the NCSAs prioritized according to safety significance. Most certificatee NCS resources are concentrated on completing and implementing NCSAs which have been designated priority one. The inspectors conducted walkdowns in the autoclave buildings 342, 343, and 344, the cascade buildings 330 and 333, the decontamination facility 705, and the laboratory building 710 to review the progress of implementation. The inspectors selected completed and implemented priority one NCSAs from the respective facilities to focus the walkdown activities on specific controls.

The inspectors observed improvement in the use of posted requirements. A significant improvement was the use of a uniform criticality safety sign which could be identified from a distance as a criticality safety posting. The yellow sign postings were placed in a way that identified areas where criticality safety was a concern. The inspectors noted that the use of temporary signs is not well controlled. The temporary signs were not all yellow as required by procedure XP2-EG-NS1031. The temporary signs were not always removed following installation of permanent signs. All observed infractions were immediately corrected and no safety significant issue was identified.

The inspectors observed an instance where a criticality safety posting was obscured by tools. The sign was completely obscured by three mopheads. The situation was immediately corrected by plant staff. This issue may be related to the certificatee approach to housekeeping. The inspectors noted that housekeeping standards varied widely from location to location within the facility with some areas littered with tools, parts, and trash. Although no immediate safety concerns were identified, the inspectors noted that poor housekeeping may lead to other poor work practices.

The inspectors observed an infraction concerning a bucket placed in a sample container storage area in apparent violation of posted requirements. Plant staff removed the bucket and initiated a problem report (PR). The identified that the NCSA did not clearly define empty container and the bucket was not considered a container with respect to the posted controls. The NCS staff indicated that the NCSA would be revised

to clearly define empty container and sample container. Clarification of the definition of empty container will be tracked as **Inspector Follow-up Item (IFI) 70-7002/99-206-01**.

The inspectors observed a posting in the 705 lab that had been modified by the operators. The NCS staff investigated and determined that three postings had been altered but still contained correct information. Correctly printed postings are available at 710 lab and will be sent to 705. NCS staff indicated that hand modification of posted requirements is a temporary expedient only.

c. Conclusions

The inspectors determined that certificatee implementation of posted administrative controls has improved overall although several infractions of low safety significance were observed. One infraction involving an ambiguous control will be tracked due to the significance of certificatee definition of empty container.

2.0 NCS Function

a. Scope of Inspection

The inspectors reviewed three recent events that the certificatee had reported in accordance with NRC Bulletin 91-01 requirements. The inspectors interviewed certificatee NCS staff to determine how the events had been characterized and assessed overall safety significance.

b. Observations and Findings

DAW Drum Water Event

The certificatee reported that more than one quart but less than two quarts of water had been found in a Dry Active Waste (DAW) drum inside of a large plastic bag. The plastic bag was damaged during handling causing the water to be emptied onto the floor so the amount stated is an approximation. DAW drums are located throughout the facility to collect uncharacterized contaminated dry waste. NCS controls on the drums include a limit of one quart of free liquid in a drum which is based on a safety limit of one gallon of free liquid in a drum. The inspectors determined that the water was discovered at the collection point where the drums are unloaded and the material is placed into B-25 containers. The water was discovered after approximately three-quarters of the uncharacterized waste had been removed from the drum. The investigating NCS engineer did not observe visible fissile material in the drum but was not able to comment on the waste which had been already removed from the drum. The inspectors noted and certificatee staff agreed that the event does not appear to be something that would happen inadvertently. The inspectors determined that this event has more than low safety significance due to the amount of liquid involved, the uncharacterized nature of the waste, and the possibility that the event was not accidental. The certificatee indicated that a regulatory Significant Condition Adverse to Quality (SCAQ) investigation is being conducted with which will include root cause analysis and identification of

corrective actions. This certificatee identified and corrected failure to prevent introduction of moderator into uncharacterized waste is **Non-Cited Violation (NCV) 70-7002/99-206-02**. The inspectors noted that the previous modification of the controlling NCSA to establish the one quart limit for free liquids in these containers demonstrated a focus on the risk significance of DAW waste stream and was a good NCS practice because it expends limited certificatee resources on safety significant issues.

CAAS Setpoint Event

The certificatee reported that the plant Criticality Accident Alarm System (CAAS) setpoint was 8.5 mrem when the requirement was actually 5 mrem. The inspectors reviewed the event and determined that the certificatee had performed analysis demonstrating that the CAAS would still detect the minimum accident of concern with the setpoint at 8.5 mrem. The analysis was found to be adequate and established a legitimate basis of safety without operational impacts. Technical details of this determination are contained in Section 4.0 of this report. The inspectors also determined that the code (MCNP4a) used to analyze the CAAS lacks documentation of verification and benchmarking. The certificatee committed to review the analysis supporting the CAAS operation to determine how to cover benchmarking or if, in fact, the area has already been covered in a separate report. Certificatee action to establish calculational bias through verification and benchmarking will be tracked as **IFI 70-7002/99-206-03**.

Unanalyzed Material Event

The inspectors conducted a walkdown at X-326 to review corrective actions for a recent reportable event involving the identification of unanalyzed material in the cascade. The new material was formed in the cascade near a cell involved in a recent fire and was believed to have formed as a result of the fire. The inspectors reviewed NCSA PLANT-062 which covers maintenance on cascade equipment and NCSA 326-042 which covers new fissile material found in the cascade which does not meet the Moderator to Uranium Ratio (H/U) criteria of NCSA PLANT-062. The inspectors noted that the certificatee is removing and cleaning cell equipment, elbows and expansion joints and is planning to clean manifolds and transfer piping in place. The in-place cleaning will be the subject of a new NCSA that is currently being developed. The new fissile material formed in the cascade is in the form of low H/U deposits inside the equipment. The inspectors did not identify any new or immediate safety concerns regarding the new material but noted that the manifolds and transfer piping would have to be cleaned in short sections to avoid collecting more than a safe mass during cleaning operations.

c. Conclusions

The inspectors determined that the certificatee event corrective actions were adequate. The inspectors did not agree with the characterization of safety significance of the DAW drum liquid event and concluded that the event was of more than low safety significance.

3.0 Administrative Controls

a. Scope of Inspection

The inspectors reviewed the certificatee use of administrative controls including development, implementation, and compliance.

b. Observations and Findings

The inspectors observed that the certificatee relies heavily on administrative controls to achieve safe fissile material operations. The inspectors determined that most administrative controls are implemented through inclusion in procedures. The certificatee also relies on posted limits and controls in areas where fissile material is processed. Although the certificatee refers to the posted limits and controls as operator aids, the postings are specifically called out in NCSAs which makes them intrinsically an administrative control equivalent to proceduralized requirements. The inspectors noted that the absence of an operator aid would not violate a requirement *per se* but the absence of an NCSA required posting would violate that NCSA.

The inspectors reviewed the certificatee process for developing, approving, and implementing an NCS control. The certificatee drafts an NCSA in response to a request from a production organization for an NCS review. The NCSA results in a list of controls for the particular equipment or process. NCS staff then initiates a process called Implementation Action Worksheet (IAW) which will track the implementation of the NCSA driven controls. The IAW lists the procedures or other areas affected by the new or changed controls. The NCS staff develops the IAW after researching several databases for information regarding procedures. The IAW is then used by all other agencies involved in the implementation process. The inspectors determined that once an NCSA control had been developed, it was very difficult to track the implementation process. Once the new controls had been implemented in procedures, postings, or training, the inspectors could roughly follow implementation but could not follow the IAW process or make an informed decision regarding the adequacy of the initial IAW determination.

The inspectors informed certificatee management that the implementation process for NCS controls was cumbersome. The inspectors did not identify a clear example of a failure to correctly implement a requirement, however, recent infraction and reporting history contains numerous examples. The inspectors determined that the certificatee IAW process relies on the skill of the responsible staff member to establish the extent of implementation requirements. Certificatee management admitted that this was a weakness in their program but did not make any commitment regarding resolution. The inspectors declined to further track this issue because it is being tracked by NRC licensing staff during review of the certificatee NCS upgrade program.

c. Conclusions

The inspectors determined that the certificatee process for flowing administrative controls from NCSAs to plant operations is cumbersome and therefore, programmatically weak. This issue is being tracked by NRC licensing staff.

4.0 CAAS Issues

a. Scope of Inspection

The inspectors reviewed a recent event involving incorrect alarm settings for CAAS clusters.

b. Observations and Findings

On July 1, 1999, the certificatee reported that there was an error in the alarm set point on the CAAS. Technical Safety Requirements (TSRs) governing the operation of the CAAS clusters require that the clusters be set to alarm at a 5 mrad/hr dose rate. The certificatee had determined that the alarm setting was actually set as high as 8.57 mrad/hr. On July 2, 1999, the NRC issued a temporary Notice of Enforcement Discretion (NOED) to allow plant operations to continue beyond the 48-hour time limit associated with the certificatee Limiting Conditions for Operation (LCO). EVAL-CS-1999-0423, Rev. 0, was released. This evaluation determined that there were some areas of partial coverage during the period of time that the alarm cluster set points were in error. On July 3, 1999, the affected CAAS set points were all adjusted to dose thresholds compliant with the TSR.

The inspectors reviewed Evaluation No. EVAL-NS-1999-0490, Rev. 0 which demonstrated that although the alarm was "calibrated" to produce the alarm criticality signal at ~8.5 mrad/hr, prior Monte Carlo calculations had determined that the system would in fact alarm at radiation levels within the required set points of the CAAS.

DAC-NS-1999-0493, Rev. 0, used the neutron fluence numbers calculated by the Monte Carlo calculations to calculate the total neutrons counted by the detector. Rather than multiply the neutron strength by dose conversion factors, the calculation multiplied the neutron strength by a detector response function. This calculation determined that of the three locations, the detector would see at least 60,000 counts per minute-- the count rate set point of the detectors. Added conservatism is introduced into the calculation by the fact that due to the low dose contribution of low energy neutrons, the Monte Carlo N Particle (MCNP) dose calculations only tallied neutrons with energies greater than 1 MeV. However, the Portsmouth CAAS clusters have significant sensitivity to low energy neutrons. These neutrons, which would be detected by the CAAS, were not included in the dose calculations.

The calculations that demonstrate the efficacy of the Portsmouth CAAS's all utilize the Monte Carlo computer code MCNP⁴. As with other nuclear subjects in which computer calculations are used, methodology validation is very important. The inspector found the

material documenting this validation to be seriously lacking in the reports. In particular, there is not any reference to the verification of the code (conversion testing) on the computer platforms on which it is run. A conversion-testing package accompanies the code, and a record of its implementation in the quality assurance material should be referenced in any document utilizing the code for reportable results.

Furthermore, the inspectors found that in addition to the lack of verification documentation, there was also no discussion of the code validation. Although applicable benchmarks for dose calculations are not as readily available or extensive as benchmarks for critical experiments, shielding benchmarks for code validation do exist. When utilizing a code for reportable results, the report should reference efforts to quantify the code bias. This is particularly necessary when the calculated value minus the statistical uncertainty in the calculation (a measure of precision in MCNP, not accuracy) is very near the value required. For example, in Section 4.2 of DAC-NS-1999-0493, the calculated number of counts per minute is 63,834 (this number is actually incorrect – see the paragraph below) or 6.39% above the alarm set point of 60,000 cpm. The uncertainty in the MCNP calculation is 4.06%. This reduces the margin that is available for code bias. An exact quantification of the code bias is not practicable, but a representation of the bias that can be discussed with the results is necessary. In the case of the DAC-NS-1999-0493, a convincing argument for additional margin was presented and the safety of the system was defended, but the calculational methodology should be tightened up.

The inspectors also found that there were a series of calculational errors in some of the reports that form the basis of safety for the CAAS coverage. These occur in the dose rate calculation spreadsheets that are found in the appendices of POEF-LMUS-02, POEF-SH-35, and POEF-SH-39. In particular, the source rate numbers should be corrected, as these values form the calculational basis for the entire report. The certificatee is aware of some of these errors and corrects the numbers for any further calculations that are performed – such as in DAC-NS-1999-0493. However, the certificatee did not correct the source rate value in Source #2 of Appendix B in POEF-LMUS-02 (see section 4.2 of DAC-NS-1999-0493). By correcting the value, the calculated count rate number (59,760 cpm) falls below the alarm set point of 60,000 cpm. Again, the certificatee has demonstrated that there is additional safety margin introduced by the exclusion of low energy neutrons in the calculation that the CAAS would detect, so the inspectors concluded that the basis of safety is legitimate.

c. Conclusions

The inspectors concluded that EVAL-NS-1999-0490, Rev. 0 demonstrates that the basis of safety for the CAAS remained valid during the period that the CAAS set points were in error. DAC-NS-1999-0493 demonstrates that in the areas where alarm coverage was in doubt due to the set point error, the alarms would have triggered due to the normal response of the detectors and the presence of low energy neutrons which were not considered in the code calculations but which the CAAS clusters would have detected.

The inspectors also concluded that the reports summarizing the computer calculations that support the basis of safety for the CAAS coverage should reference the documents that establish the verification of the MCNP code on the computer platform it was installed on. The documents should also discuss code bias and its impact on the calculations.

5.0 Augmented Quality - Nuclear Criticality Safety (AQ-NCS)

a. Scope of Inspection

The inspectors reviewed certificatee NCS boundary definition practices by reviewing the implementation of boundary review for selected NCSAs.

b. Observations and Findings

Configuration Management Program Manual, UEO-1058, Revision 0 Chg C, May 1999, classified the Structures, Systems, and Components (SSCs) and the management processes at the following quality (Q) levels:

(Q)	Safety systems within the boundaries as described in Safety Analysis Report (SAR) Section 3.8
(AQ)	SSCs within the boundaries as described in SAR Section 3.8
AQ-NCS	SSCs identified in Nuclear Criticality Safety Approvals (NCSAs)/Nuclear Criticality Safety Evaluations (NCSEs) required to meet the double contingency principle
Non-Safety (NS)	Any SSC not specifically classified as Q, AQ-NCS, or AQ

AQ-NCS SSCs were identified in NCSAs as having to meet the double contingency principle.

The boundary definition manual defined the boundaries of a system or systems under configuration management. The boundary determination data sheets ensured consistency in the application of boundary criteria with appropriate review and approvals. AQ-NCS system boundary definition sheets defined the boundary for each facility in its own boundary manual. Procedure XP3-EG-EG1037, Revision 2, "Establishing and Controlling Quality Boundaries," effective July 30, 1999, established the criteria for classifying, reviewing, approving, and maintaining Q, AQ-NCS, and AQ boundaries. The procedure also defined the responsibilities of the respective managers and the respective discipline, including NCS, for defining the boundaries.

The NCSE provided the technical basis for the limits, administrative controls, engineering design features, and operating procedures to meet the double contingency and to

maintain with an acceptable margin of subcriticality. Also, the NCSE identified assumptions and bases for double contingency arguments.

The inspectors randomly selected two packages for review to determine whether the identification of components important to criticality safety was accurately applied. The inspectors selected the two packages for their representativeness from the implementation schedule from a sample pool of 39 completed priority one NCSAs and NCSEs:

Small Equipment Tear-Down (Blue Room), NCSA 705_042
Fissile Material Operation, NCSA PLT043

The inspectors found the two packages adequately implemented according to established procedures including evaluation, approval, and walkdown inspection. The packages also included the verification checklist and the closure evidence file. The boundary definition focused the attention of plant personnel on the importance of the reliability and availability of components affecting criticality safety.

c. Conclusions

The inspectors did not identify any concerns with certificatee NCS boundary definition practices and concluded that implementation of Augmented Quality-Nuclear Criticality Safety (AQ-NCS) requirements was generally adequate.

6.0 Compliance Plan Issues

As part of the transition from Department of Energy (DOE) to NRC regulation, 10 CFR 76.35(b) required the regulatee to identify noncompliances and the DOE to develop a plan for achieving compliance. Certain of the noncompliances identified by the regulatee were not actually noncompliances with NRC regulations but, rather, noncompliances with commitments in the Application for Certification which includes issues 8, 9, and 23 which are noncompliances with commitments regarding criticality safety. The regulatee has requested to reopen these three issues in order to change the dates for achieving full compliance. With respect to the reopening of these issues, the regulatee has proposed restructuring the three compliance plan issues to link them to the NCS Corrective Action Plan (CAP) so that closure of the CAP will accomplish closure of the compliance plan issues.

Compliance Plan Issue 8

The underlying noncompliance covered by issue 8 concerns incomplete or unavailable NCSE documentation; failure to fully document double contingency; and failure to proceduralize or document NCSE requirements related to ANSI/ANS-8 Standards, analyst and reviewer qualifications, and computer code qualification.

Compliance Plan Issue 9

The underlying noncompliance covered by re-opened issue 9 concerns inconsistencies between specifications in NCSAs and supporting implementation procedures and work-site postings such as minor ambiguities, small discrepancies in dimensions, and variances in format or location of postings.

Compliance Plan Issue 23

The underlying noncompliance covered by re-opened issue 23 has been revised and now concerns the incomplete review of NCSAs to identify AQ-NCS items (items which support the nuclear criticality double contingency principle); identification and documentation of the designated design requirements and system boundaries, including support systems required for performance of intended safety functions; and verification of the implementation of these requirements.

7.0 Open Items**VIO 70-7002/97-203-03**

This violation (VIO) was due to the failure to adequately validate computer code calculations between 5wt% and 20wt% enriched when enrichments in this range were being used in calculations to support safety limits. The certificatee has revised the validation report in response to the Notice of Violation (NOV). A Compliance Evaluation Report (CER) was issued separately by the NRC to resolve this issue. The certificatee has agreed to resolve the minor items identified in the CER to improve the validation report. This item is closed.

IFI 70-7002/98-206-01

This item tracked review of the effectiveness corrective action program and the trend in the number of NCS incidents. In their review of UEO-1074, Part 7, dated July 23, 1999, "Performance Indicators for June 1999," the inspectors concluded that the effectiveness of the Corrective Action Program was a positive contribution to safety. The trend in the number of NCS incidents, has generally indicated a decreasing number of incidents and violations. This item is closed.

VIO 70-7002/98-206-02

This violation (VIO) resulted from the failure to identify and control features relied on for safety. The certificatee initiated and completed the following corrective actions to address the stated problems:

- Revised procedure XP3-EG-EG1037 to incorporate the revised criteria for classification of AQ-NCS SSCs.
- Revised NCSA-0326_13 and NCSA-0326_024 to reclassify SSCs.

- Revised or upgraded NCSAs/NCSEs to conform to the revised procedure XP3-EG-EG1037.
- Reviewed all NCSA/NCSEs for AQ-NCS SSC identification.

The inspectors randomly sampled AQ-NCS SSCs to verify the process implementation and found it to be satisfactory. This item is closed.

VIO 70-7002/98-206-03

This VIO resulted from the failure to initiate a TSR for an operation that was not doubly contingent. The certificatee initiated and completed the following corrective actions to address the stated problems:

- Revised NCSA/NCSE -0326_015.A03 to demonstrate double contingency for the Extended-Range Product (ERP) withdrawal station.
- Reviewed and revised all other NCSA/NCSEs to ensure that the double contingency was met.
- Developed procedures for responding to NCS anomalous conditions as stated in United States Enrichment Corporation (USEC) letters GDP 98-0013, dated January 30, 1998, and GDP 98-0094, dated April 30, 1998.
- Ensured that plant personnel understood that credit cannot be taken for controls not identified in approved NCSA/NCSEs and also initiated training for plant personnel.

The inspectors verified the issuance of procedure XP4-EG-NS1025, Revision 0, effective August 13, 1998, "NCS Response to Anomalous Conditions." This item is closed.

IFI 70-7002/98-206-04

This item tracks demonstration of the reliability and availability of those SSCs relied on for criticality safety in cascade operations, in particular, to control the enrichment during the High-Enriched Uranium (HEU) refeed. The certificatee initiated and completed the following corrective actions to address the item:

- Revised procedure XP3-EG-EG1037, "Establishing and Controlling Quality Boundaries," to incorporate the revised criteria for classification of AQ-NCS SSCs. The inspectors verified that the procedure was revised on July 30, 1999, as Revision 2.
- Revised NCSA-0326_13 and NCSA-0326_024 to reclassify SSCs.

- Revised or upgraded NCSAs/NCSEs to conform with the revised procedure XP3-EG-EG1037.
- Reviewed all NCSA/NCSEs for AQ-NCS SSC identification.
- Revised NCSE Plant 004.A03 and NCSA/E-0705_042.A/E02.
- Revised procedure XP4-EG-NS1001, "Nuclear Criticality Safety Evaluation and Approval," to demonstrate the compliance with the double contingency principle and to document the process controls and limits for criticality safety in NCS approvals for the evaluated operations. The inspectors verified that the procedure was revised on May 10, 1999, as Revision 5.
- Revised procedure XP2-EG-NS1031, "Nuclear Criticality Safety," to establish accountability of personnel and the reliability and availability of equipment for nuclear criticality safety. The inspectors verified that the procedure was revised on April 15, 1999, as Revision 3.
- Procedure XP2-GP-GP1044, "Calibration Program," controlled the functional testing of instruments that were classified as AQ-NCS. The functional testings were under the Computerized Maintenance Management System (CMMS). This software program tracked the dates that instrumentation must be calibrated. The use of the CMMS was defined in procedure XP2-GP-GP1030, "Work Control Process," which addressed the availability of the follow-up item.

For the reliability part of the follow-up item, AQ-NCS instrumentation was tracked through the equipment history program. Procedure XP2-GP-GP1040, "Equipment History Program," identified the use of procedure XP3-EG-EG1042, "Equipment Failure Analysis," which was put in place on August 19, 1999.

The action steps of this procedure stated the following:

- System Engineers shall review their systems and report failures, abnormalities, and equipment unavailability to Reliability Engineering via the System Health Report on at least a monthly basis.
- Reliability Engineering shall review the reports from the System Engineers and initiate a Failure Analysis Report for failures of equipment that were critical to safety or production, that had high failure rates, or when further analysis was desired.

The inspectors randomly sampled AQ-NCS SSCs to verify the implementation process and found implementation satisfactory. The inspectors concluded from the review of the revision of various procedures that they were necessary to establish the reliability and availability of the SSCs. This item is closed.

VIO 70-7002/98-206-05

This VIO resulted from the failure to make the necessary event notification. The certificatee initiated and completed the following corrective actions to address the stated problems:

- Made an event notification on May 2, 1998 regarding the discovery of the deficient NCSA/NCSE for Low Assay Withdrawal (LAW) and Tails.
- Trained each Plant Shift Superintendent (PSS) on the lessons learned by March 18, 1998, regarding identifying loss of double contingency as either loss of a single control or the failure to establish the necessary controls by an approved NCSA/NCSE.
- Revised the training module for UE2-RA-RA1030 to address the lessons learned from this event by September 30, 1998.

The inspectors verified that the event report training module, PSS 01.04.02, was revised to include additional information regarding how to identify the loss of a double contingency and also to include exercises on determining reportability. The inspectors verified the attendance sheets on the lessons learned, Assignment #706-98-019. In addition, the inspectors verified the issuance of Revision 2 of UE2-RA-RA1030 to address the lessons learned from the event as stated. This item is closed.

IFI 70-7002/98-208-01

This item tracks adequate reporting of CAP status by the certificatee due to the interrelatedness of tasks concealing the status of completion. In a letter to NRC dated February 1, 1999, the USEC indicated that they had corrected this weakness by clarifying the interrelatedness of tasks of completion. This item is closed.

VIO 70-7002/99-004-01

This VIO concerned three issues involving the micro-filtration system, 1) the failure to account for a material in an NCSA; 2) the failure to perform or document reviews in NCSAs listed in NCS CAP Task 26; and, 3) the failure to justify use of unlikely events as controls. The inspectors discussed the proposed corrective actions with regulatee NCS staff and determined that the regulatee has not resolved corrective actions for these items with Region III.

VIO 70-7002/99-004-02

This VIO concerned two issues involving laboratory analysis, 1) the failure to adequately analyze laboratory operations for NCS; and the failure to have procedural controls on standard checking to prevent out-of-specification samples. The inspectors determined that the regulatee has issued two Daily Operating Instructions (DOI) which have resolved the underlying noncompliance. The long-term remedy is the revision of NCSA-

PLANT053 to incorporate the DOI actions. Revision of the NCSA is also covered by the NCS CAP. This item is closed.

VIO 70-7002/99-004-03

This VIO concerned the failure to identify the filter press blank plate as AQ-NCS. The inspectors determined that the regulatee has incorporated the filter press blank plate in the boundary definition manual as AQ-NCS which completely resolves the non-compliance. The inspectors also reviewed additional corrective actions such as a complete review of AQ-NCS flowdown from NCSAs. The inspectors discussed the proposed corrective actions with regulatee NCS staff. This item is closed.

URI 70-7002/99-004-04

This item resulted from the observation that issues identified in the certificatee sponsored Vertical Slice Report had not been reviewed and placed into the plant commitment system for resolution. The inspectors reviewed the information in Inspection Report 99-004 and discussed the issue with regulatee staff. The regulatee indicated that corrective actions were incorporated into the NCS CAP and that the relevant version of the Vertical Slice Report was the version signed in January 1999 so that their actions were timely. The inspectors did not find the certificatees argument compelling but noted the evidence of self-identification. The certificatee identified and corrected failure to take timely corrective action is **NCV 70-7002/99-206-04**.

Enforcement Action 98-012

During inspection 97-013, a number of separate criticality safety issues were raised which together resulted in Enforcement Action 98-012 which was characterized as a programmatic problem in the development and implementation of the nuclear criticality safety program. The components of this EA are identified below by their individual Region III item numbers.

Item 01013

This item concerned the failure to maintain the Freon coolant system pressure greater than the Uranium Hexafluoride (UF₆) and Recirculated Cooling Water (RCW) system pressures. The inspector reviewed the revised work procedure and verification checklist. The root cause of this issue was ambiguity in the governing NCSA 300.004 which stated that the RCW drain valve shall be left open when the requirement was actually for venting which could be accomplished by several methods. The inspector noted that this ambiguity has been corrected. This item is closed.

Items 01023 and 01033

These items concerned qualification of contractor and permanent staff criticality engineers. The inspectors reviewed qualification requirements and records. These items are closed.

Item 01043

This item concerned the qualification of the criticality safety manager. The inspectors observed that the issue had been temporarily resolved by the appointment of a qualified interim criticality safety manager and then permanently resolved by the appointment of a permanent criticality safety manager. The inspectors determined that the permanent criticality safety manager is adequately qualified. Long-term corrective action was the development of a Training Development and Administration Guide (TDAG) which clarifies the qualification requirements of the position. This item is closed.

Item 01053

This item concerned the failure of audits to adequately characterize the effectiveness of the NCS internal assessments. The inspectors interviewed the manager of the independent auditing organization and were shown results of audits performed in response to this issue. These audits were performed in accordance with NCS CAP Issue 17. The effectiveness of the independent review of the NCS issues is evident in the scope of the NCS CAP. The regulatee response, which was accepted by the NRC, asserted the likelihood that the specified noncompliances would have been identified if not for the assessment program being in flux. The inspectors determined that although the regulatee response misses the point somewhat, the actions committed to were completed.

Item 01063

This item concerned the failure to develop procedures to address responses to nuclear criticality safety approval violations. The inspectors reviewed the latest revision of procedure XP2-EG-NS1031 and determined that the procedure changes are adequate to resolve the deficiency. This item is closed.

Item 01073

This item concerned the failure to proceduralize response to NCSA infractions. The inspectors determined that the regulatee revised procedure XP2-EG-NS1031, "Nuclear Criticality Safety," to provide the appropriate procedures. NCS CAP Item 14 contains long term corrective actions as discussed under Items 01103 and 01113 below. This item is closed.

Item 01083

This item concerned the failure to develop written procedures to cover tabletop reviews which were being conducted in accordance with a "Desk Reference." The inspectors determined that the regulatee has developed the procedure XP4-EG-EG1020 to incorporate the requirements of the Desk Reference. The regulatee no longer uses this procedure because the requirements have been incorporated into a new procedure XP4-EG-NS1001 covering the preparation of NCSA/Es. This item is closed.

Item 01093

This item concerned the failure to identify and label or post limits on parameters subject to procedural controls for criticality safety. The inspectors have determined that the certificatee has developed the procedure XP2-EG-NS1031 to cover posting and labeling. The inspectors determined that the procedure was adequate to correct the underlying non-compliance and that full implementation of posting and labeling is being controlled by the NCS CAP. This item is closed.

Items 01103 and 01113

These items were addressed by Task 14 of the NCS CAP which resulted in the complete replacement of the regulatee corrective action program which the certificatee now states is complete. The previous corrective action procedure was eliminated and replaced with XP2-BM-CI-1030, "Problem Reporting," XP2-BM-CI1031, "Corrective Action Process," XP2-BM-CI1032, "Control of Material Condition," XP2-BM-CI1033, "Conduct of Focus Team Evaluations," XP4-BM-CI1002 "Problem Report Screening Process," and XP4-BM-CI1003, "Trend Analysis." The certificatee prepared and uses guides for performing investigations. The regulatee also conducts end point assessment to assure adequate corrective action completion. These items are closed.

8.0 Management Meetings

The NRC Inspectors met with certificatee management periodically during the inspection. The inspectors presented the inspection scope and findings to members of the certificatee staff at the conclusion of the inspection on October 27, 1999, and at a re-exit teleconference on November 19, 1999. No classified or proprietary information was discussed. At the exit meetings, Portsmouth management and staff acknowledged findings presented, and committed to take appropriate actions as discussed above.

ITEMS OPENED, CLOSED, AND DISCUSSED**Items Opened**

- IFI 70-7002/99-206-01** This item tracks the clarification of the definition of empty container for purposes of posted requirements.
- NCV 70-7002/99-206-02** This NCV concerned the failure to prevent introduction of moderator into uncharacterized waste.
- IFI 70-7002/99-206-03** This item tracks certificatee action to establish calculational bias for CAAS setpoint calculations.
- NCV 70-7002/99-206-04** This NCV concerned the failure to take timely corrective action.

Items Closed

- VIO 70-7002/97-203-03** This VIO was due to the failure to adequately validate computer code calculations between 5wt% and 20wt% enrichment.
- IFI 70-7002/98-206-01** This item concerned the effectiveness of corrective actions under the revised NCS CAP.
- VIO 70-7002/98-206-02** This item concerns the failure to classify systems, structures, and components (SSCs) required to establish double contingency during cascade operations AQ-NCS items.
- VIO 70-7002/98-206-03** This item concerned the failure to demonstrate double contingency at the ERP Withdrawal Station.
- IFI 70-7002/98-206-04** This item concerned the inability of the plant staff to demonstrate the reliability and availability of those SSCs relied on for criticality safety in cascade operations.
- VIO 70-7002/98-206-05** This VIO concerned the failure to make a necessary event notification.
- IFI 70-7002/98-208-01** This items tracked adequate reporting of CAP status by the certificatee due to the interrelatedness of tasks concealing the status of completion.

- VIO 70-7002/99-004-02** This VIO concerned the failure to adequately analyze laboratory operations for NCS and the failure to have procedural controls on standard checking.
- VIO 70-7002/99-004-03** This concerned the failure to identify the filter press blank plate as AQ-NCS.
- URI 70-7002/99-004-04** This item resulted from the failure to take timely corrective actions for safety items identified in the certificatee Vertical Slice Report.
- Enforcement Action 98-012** This item concerned a programmatic problem in the development and implementation of the nuclear criticality safety program. The components of this EA included 17 separate items. Those items considered closed are identified below by their individual Region III item numbers: Items 01013, 01023, 01033, 01043, 01053, 01063, 01073, 01083, 01093, 01103, 01113.

Items Discussed

- VIO 70-7002/99-004-01** This VIO concerned three issues involving the micro-filtration system; the failure account for a material in an NCSA; the failure to perform or document reviews in NCSAs listed in NCS CAP Task 26; and the failure to justify use of unlikely events as controls.
- Compliance Plan Issue 8** This item concerns incomplete or unavailable NCSE documentation.
- Compliance Plan Issue 9** This item concerns inconsistencies between specifications in NCSAs and supporting implementation procedures and work-site postings.
- Compliance Plan Issue 23** This item concerns the incomplete review of NCSAs to identify AQ-NCS items.

PARTIAL LIST OF PERSONS CONTACTED**USEC**

Morris Brown	General Manager
Jim Anzelmo	Configuration Management
Rick Foster	Production Support
Steve May	Operations
Sid Martin	Nuclear Safety
Mike Hone	Criticality Safety Manager
Toni Brooks	Nuclear Safety Manager
Peter Miner	Operations
Lee Fink	SS&Q
Terry Sensue	Nuclear Regulatory Affairs
Jason Bolling	Criticality Safety
Robert Helme	Engineering Manager
Pat Musser	Enrichment Plant Manager
Ron Smith	Production Support Manager
Peter Miner	Nuclear Regulatory Affairs Manager

USNRC

Dave Hartland	NRC Resident Inspector
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LIST OF ACRONYMS

AQ	Augmented Quality
AQ-NCS	Augmented Quality-Nuclear Criticality Safety
CAAS	Criticality Accident Alarm System
CAP	Corrective Action Plan
CMMS	Computerized Maintenance Management System
DAW	Dry Active Waste
DOE	Department of Energy
ERP	Extended Range Product
GDP	Gaseous Diffusion Plant
GTI	Global Technologies, Inc.
HEU	High Enriched Uranium
H/U	Moderator to Uranium Ratio
IAW	Implementation Action Worksheet
IFI	Inspection Follow-up Item
LAW	Low Assay Withdrawal
LCO	Limiting Conditions for Operation
MCNP	Monte Carlo N Particle
NCS	Nuclear Criticality Safety
NCSA	Nuclear Criticality Safety Analysis

NCSE	Nuclear Criticality Safety Evaluation
NCV	Non-Cited Violation
NOV	Notice of Violation
NOED	Notice of Enforcement Discretion
NRC	Nuclear Regulatory Commission
PR	Problem Report
PSS	Plant Shift Superintendent
Q	Quality
RCW	Recirculated Cooling Water
SAR	Safety Analysis Report
SCAQ	Significant Condition Adverse to Quality
SSC	Structures, Systems and Components
SS&Q	Safety, Safeguards and Quality
TDAG	Training Development and Administration Guide
TSR	Technical Safety Requirement
(UF ₆)	Uranium Hexafluoride
USEC	United States Enrichment Corporation
VIO	Violation