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Ms. Cynthia Pederson
Director, Division of Nuclear Material Safety
United States Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

**Portsmouth Gaseous Diffusion Plant (PORTS)**
**Docket No. 70-7002**
**Portsmouth Nuclear Criticality Safety Program Revised Corrective Action Plan**

Dear Ms. Pederson:

On April 30, 1998, USEC submitted to the Nuclear Regulatory Commission (NRC) the quarterly status report for the PORTS Nuclear Criticality Safety (NCS) Corrective Action Plan (CAP) (reference USEC letter GDP 98-0094). As indicated in this letter, USEC informed NRC that a revised NCS CAP would be provided to the NRC by May 7, 1998. Accordingly, enclosed is Revision 3 of the NCS CAP. Changes to the CAP are reflected by change bars in the right-hand margin.

This revision reflects the current status of the NCS tasks and includes the six (6) new NCS tasks identified in USEC's letter of April 30, 1998. The enclosed NCS CAP also contains Task 26, NCSA/E Calculation Review. This new task is a follow-on from Task 2, Review of NCSA/Es Completed by Non-Qualified Personnel. Completion dates for Task 25, Compliance Plan Review, and Task 26 will be provided in the next NCS CAP Quarterly Report.

If you have questions regarding this submittal, please contact Dave Waters at (740) 897-2710. The commitments contained in this submittal are listed in Table 2 of the enclosure.

Sincerely,

S. A. Toelle

Steven A. Toelle
Nuclear Regulatory Assurance and Policy Manager

Enclosure

IE07

cc: NRC Document Control Desk
NRC Resident Inspector - PGDP
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**PORTS Nuclear Criticality Safety Program**
**Corrective Action Plan, Revision 3**

A. Background

As part of the Certification Application effort, PORTS NCSA/Es were upgraded to provide more rigorous and accurate NCS documentation. This effort was completed in December of 1996. Subsequent to this effort, in early 1997, USEC began to question the effectiveness of the NCS program. This concern was based, in part, on the large number of Problem Reports being generated that identified problems with the implementation of the NCS program. In October 1997, it was determined that the NCSA/E controls developed to keep cooling water from entering the process gas system during the cell treatment process were not being properly maintained. Further evaluation of this event determined that the respective NCSA/E was flawed. Subsequent to this event, it was identified that Engineering Notices (ENs) were being used to amend requirements in NCSA/Es, effectively circumventing the NCS review and approval process.

The identification of these problems and the recognition that they represent deficiencies in the implementation of the NCS program have resulted in the need to establish a comprehensive Corrective Action Plan. The goals of this Plan are to put in place a high quality NCS program and to ensure that NCS implementing documents provide the necessary level of safety. These goals will be accomplished by:

(1) Ensuring the safety of ongoing Fissile Material Operations (FMOs);
(2) Identifying the scope and depth of the deficiencies (root causes);
(3) Initiating an interim program to review and correct NCSA/Es in a prioritized manner based on their potential risk;
(4) Evaluating and upgrading NCS programmatic controls and related management systems;
(5) Reviewing completed NCSA/Es against the enhanced program for potential changes; and,
(6) Improving the NCS training for NCS and site personnel.

The remainder of this Plan lists both completed actions and actions which remain to be completed. Those actions remaining to be completed have, for completeness been broken into sub-tasks which are contained in the body of the plan by task number. Each remaining task is preceded by a short description. The date by which each overall task will be completed is contained in Table 2.

B. Immediate Compensatory Actions

In November 1997, USEC recognized, based on the magnitude of the deficiencies being identified, that immediate compensatory measures would be required while an overall NCS program upgrade was being formulated. These immediate actions included an evaluation of program safety, shutdown of certain FMOs, and the implementation of an additional review of past problems. These actions are discussed in more detail below.

1. Evaluation of Program Safety

An evaluation of NCS program safety was initiated in order to provide management with confidence that the findings identified to date do not represent an immediate safety problem. The following specific actions were initiated in order to provide this level of confidence.

(a) Walkdown of NCSA/Es Associated with SAR Accident Scenario
Walkdowns were performed on 13 NCSA/Es determined to be associated with the Safety Analysis Report (SAR) accident analysis. These walk-downs were completed and concluded that the associated NCSA/E controls were adequately implemented. Twenty-two PRs were identified, one of which was a 24-hour NRC event report.

(b) Review of Surveillance Requirements
A review was performed to verify that NCS surveillances and Technical Safety Requirement (TSR) surveillances for single contingency FMOs were being performed. No surveillances were overdue.

(c) Building Review of NCSA/Es
The managers for each building in which FMOs are performed have begun to review the implementation status of the existing NCSA/Es in their buildings. These reviews are to ensure that the descriptions in Part A of the NCSA/Es are accurate and complete and that the controls identified in Part B and Part C are being implemented. The plan for performing these reviews follows:

Task 1 Building Review of NCSA/Es

| Subtask No. | Description |
|---|---|
| 1.1 | Develop a list of NCSA/Es by facility. Assign reviews and schedule for completion. |
| 1.2 | Develop review guidance for building personnel. |

| | |
|---|---|
| 1.3 | Perform training of building personnel, using the guidance developed in Subtask 1.2. |
| 1.4 | Perform reviews of NCSA/Es. Report completion to Nuclear Safety Manager. |
| 1.5 | Write Problem Reports for identified deficiencies. |
| 1.6 | Evaluate Problem Reports for reportability. |
| 1.7 | Develop corrective action to address deficiency identified in Problem Report. |
| 1.8 | Implement corrective actions. |

(d) Review of NCSA/Es Completed by Non-qualified Personnel

It was determined that NCS engineers that were not properly qualified authored certain NCSA/Es. These NCSA/Es are being reevaluated by qualified NCS personnel. The plan for performing these reviews follows:

Task 2 Review of NCSA/Es Completed by Non-qualified Personnel

| Subtask No. | Description |
|---|---|
| 2.1 | Develop list of individuals who are not qualified. |
| 2.2 | Develop list of NCSA/Es that were authored or peer reviewed by these individuals. |
| 2.3 | Write a review plan. |
| 2.4 | Assign review team(s). |
| 2.5 | Review NCSA/Es on the list against the guidance provided in the review plan. Document deficiencies in a Problem Report. The Problem Report system will be used to document and initiate the corrective actions for these deficiencies. |
| 2.6 | For NCSA/Es that have identified deficiencies, assign a qualified NCS engineer to correct problems. |
| 2.7 | Correct NCSA/Es. |

Task 26 will document the review of the calculations completed by personnel for which full documentation of qualification was not evident for the timeframe in which the calculations were done. There are no immediate safety concerns with the calculations because:

- the peer review for calculations was, and is, more rigorous than that for NCSAs;
- many of the calculations are not specifically referenced by NCSAs;

- the calculations done by the NCS engineer of concern, based on the NCSA review, have been reviewed and found to be correct.

(e) Review of Event Reports

A focused review was performed of all event reports where either single or double contingency was lost. Each event was evaluated to ascertain what conditions remained which would have prevented a criticality. This review concluded that conservatisms built into the NCSA/E process were effective in providing protection even under a loss of contingency situation.

2. FMOs Shutdown

FMOs such as cell treatment activities and those covered by NCSA/Es which were improperly altered by ENs were either brought into compliance or stopped until compliance was achieved by either changing the requirements or changing the activity. In addition, FMOs may be stopped as a result of the reviews performed under Task 2. Task 21 identifies additional work being undertaken to assure that all FMOs are identified.

3. Daily Review of Problem Reports

A team of NCS personnel has been assembled to review Problem Reports, on a daily basis, to ensure that the proper immediate actions and reporting were taken. In addition, a flowchart for providing assistance to the PSS for NCS PRs has been developed and is being used by NCS personnel in responding to requests from the PSS. The purpose of the flowchart is to ensure that the thought process for all NCS engineers is consistent when responding to the PSS. Also, a two-man rule for responding to NCS PRs has been put into effect along with implementation of the Duty NCS engineer. These activities will be proceduralized as part of Task 12.

C. Root Cause Analysis

Three separate root cause evaluations of problem reports related to the NCS program have been, or are being, performed since the cell treatment NCSA/E problem was identified: 1) an informal evaluation performed by the Nuclear Safety Manager; 2) a TapRooT review on NCS Problem Reports from 1997 performed by the Corrective Action Program Manager; and 3) an ongoing TapRooT evaluation on the 1997 NCS related Problem Reports intended to drive the individual root causes down to a Level 5 (specific) cause. These Problem Reports included deficiencies identified in NRC Inspection Reports and Internal Assessment Findings. The details of each of the three evaluations follow.

1. Nuclear Safety Manager

This evaluation was performed to support the development of an initial corrective action program. Four specific root causes were cited: management systems failure; technical rigor in the development and implementation of NCSA/Es was inadequate; the Audit and Evaluation Process did not work to detect NCS problems; and the Standard, Policy, or Administrative Control (SPAC) governing the development of NCSA/Es was confusing or incomplete. These root causes were used to justify the main thrust of the corrective action program which was described in USEC letter GDP-97-2030, dated November 10, 1997.

2. Corrective Action Program Manager

To provide a more detailed evaluation of the root causes, the Corrective Action Program Manager performed a formal TapRooT root cause determination. Problem reports written against the NCS program in 1997 were evaluated to determine near root causes and then an aggregate set of those near root causes was evaluated. The near root causes were largely grouped into three main root cause focus areas: NCSA/E errors (84), procedure flowdown errors (95), and failure to follow procedures (124). The aggregate set determination yielded three root causes:

a. Errors in the NCSA/Es
Some NCSA/Es were determined to have technical errors which made it difficult to implement their requirements in the field.

b. Inadequate implementation
In some cases the requirements contained in the NCSA/Es were not adequately implemented in the field.

c. Self-assessment and internal corrective action processes were inadequate to detect and correct the problems.

3. Comprehensive Root Cause Evaluation

In response to questions regarding assurance that all root causes have been identified and are being addressed in the corrective action program, a third root cause evaluation was initiated. This TapRooT evaluation was performed by a team consisting of the Nuclear Safety Manager (part time), PORC chairman (part time), a TapRooT process facilitator, and a number of individuals who were familiar with the details and history surrounding the individual Problem Reports themselves. At

a minimum, two individuals plus the facilitator were present for the evaluation of each Problem Report.

The first step in this evaluation was to identify, in flow chart form, the process of development, review and approval, activation, and implementation of a typical NCSA/E. Each step in the process was assigned an identifying number. The Problem Reports were evaluated to a Level 4 "near root cause." Each Problem Report was also associated with a specific step number. The results are as follows:

| Step Number | Step Description | Number of ProblemReports |
|---|---|---|
| 1 | Identification of Fissile Material Operation | 5 |
| 2 | Part A Prepared | 28 |
| 3 | Part B, Part C Prepared | 52 |
| 4 | NCS Subcommittee | 1 |
| 5 | PORC (approval of NCSA/E) | 1 |
| 6 | Procedure Development | 18 |
| 7 | Procedure Review Board | 0 |
| 8 | PORC (approval of procedures) | 0 |
| 9 | Verification Walkdown | 28 |
| 10 | Activation | 1 |
| 11 | Use (implementation) | 113 |
| 12 | Monthly Ops walkdown | 1 |
| 13 | Biennial NCS walkdown | 1 |
| 14 | Self Assessments | 4 |

The above results were then evaluated against the TapRooT list of root causes. For each step, the basic root causes which clearly did not apply were eliminated and those which did, or could, apply were captured on a list of root causes to be treated. The result of this evaluation is a list of root causes sorted by process block number. This sort is shown in Table 1. The root causes listed in attached Table 1 will be corrected as part of the NCS corrective action program.

Validation of the results of the root cause evaluation and other completion activities will be completed in accordance with Task 6 which is located in Section E of this plan.

D. Interim NCSA/E Review Process

While the longer term upgrades to the NCS administrative control process are identified, developed, and implemented, a number of enhancements will be added to the NCSA/E development, approval, and implementation process. They include:

1. Enhanced Review Process (Murder Board)

To ensure that the NCSA/E development process is carried out properly, an additional review board has been added to enhance the PORC and subcommittees' review. This review board is referred to as the murder board and works in accordance with a formal charter. The owner (operations) and developer (NCS Engineer) are tasked with presenting drafted NCSA/Es in front of a board consisting of a minimum of four professionals representing Nuclear Safety, Operations, Maintenance, Work Control, or Safety, Safeguards and Quality, whose task is ensuring that aspects of the draft NCSA/E (e.g., assumptions, calculations, procedure steps) are correct. This satisfaction is created by obtaining the appropriate answers to questions from the board from the NCSA/E developer and/or owner. The murder board concept has been borrowed from the reactor industry where it has proven to be successful in improving the quality of final documents such as NCSA/Es. This addition to the existing process will improve the quality of the NCSA/Es and help the NCS and Procedure Review Board subcommittees of the PORC improve the quality of their reviews. The Murder Board will be used until USEC is satisfied that the quality of NCSA/E development and review has reached an acceptable level. Discontinuing the use of the Murder Board will not be considered until at least May 31, 1998. See Task 19.

The Murder Board will review major revisions of NCSA/Es and new NCSA/Es. At the discretion of the Nuclear Safety Manager, minor changes to NCSA/Es will be excused from Murder Board review.

2. Involvement by Owners and Engineering

As noted in the root cause results, the lack of ownership by the actual users (owners) of the NCSA/Es has been responsible for a large portion of the NCSA/E problems. This lack of ownership has contributed to the technical shortcomings of the NCSA/Es when proper support and reviews of draft NCSA/Es were not adequately performed, and contributed to a lack of understanding of the final NCSA/Es themselves, resulting in implementation deficiencies.

To correct this problem, representation by the implementing organization in the form of a management individual and a hands-on user (typically an hourly person), a System Engineer, and a NCS engineer will be required on the team which develops the NCSA/E, supports its progress through the review and approval process, and performs the required plant walkdowns to verify the NCSA/E. This will help ensure the technical accuracy of the NCSA/E, ensure that any required actions can actually be physically accomplished, and that the procedures implementing NCSA/E actions

are correct. It will also help ensure that the actual implementation in the field will be correct. (Note: Murder Board members cannot be used as members of the walkdown and review teams. However, members of the murder board will accompany the review teams on field walkdowns of selected NCSA/Es.)

In addition, a review will be performed to verify all PORC approved NCSA/E's are being implemented or are in the process of being implemented in the field.

3. Revise NCS Procedures

In order to ensure the interim NCS administrative controls are implemented correctly and consistently, the procedures which provide the administrative controls will be revised to reflect the interim changes. Refer to Section E, Task 12 (NCS Policies and Procedures) for a discussion of the plan to implement these procedure revisions.

4. Review/Walkdown NCSA/Es Using the Prioritized List

In parallel with activities to improve the NCS program, existing NCSA/Es will be subjected to the NCSA/E Upgrade Project on a prioritized basis. The list of applicable NCSA/Es, by priority, was included in Enclosure 2 to USEC letter GDP 97-0217, dated December 22, 1997. This will ensure that high risk NCSA/Es are reviewed for technical adequacy and proper procedural flowdown and implementation as soon as practical.

As the long term programmatic improvements are implemented, NCSA/Es which have been subjected to the interim process will be evaluated to determine if they need to be reverified to ensure they reflect all program improvements. Once the NCS program improvements have been incorporated into procedures and site personnel training is complete, this new program will be used to finish the reviews and walkdowns on the remainder of the NCSA/Es. The plan for performing these reviews follows:

Task 3 NCSA/E Upgrade Project

| Subtask No. | Subtask Description |
|---|---|
| 3.1 | Classify the NCSA/Es into three groups according to priority. |
| 3.2 | Verify that all PORC approved NCSA/Es are activated or progress toward activation is being accomplished. |
| 3.3 | Form review groups consisting of representatives from NCS, Systems Engineering, Operations Management, and a hands-on operator or maintenance technician. |

| | |
|---|---|
| 3.4 | Develop a procedure for the performance of reviews and walkdowns. Maintain procedure current through life of upgrade project. |
| 3.5 | Table top scrub NCSA/Es and their supporting documents |
| 3.6 | Field walkdown all NCSA/Es. |
| 3.7 | Ensure consistency with PGDP NCSA/Es for similar activities. |
| 3.8 | Accelerate processing of identified changes to NCSA/Es and procedures. |
| 3.9 | Review and approve NCSA/E implementing procedure changes. |
| 3.10 | Walkdown PORC approved NCSA/Es to document their readiness for activation. |

5. Enhance NCSA/E Training

In response to recent NCS events, the General Manager conducted all-hands briefings to communicate management's expectations regarding implementation of NCS controls. To further ensure that the interim NCSA/E Review process is implemented correctly, training will be provided to personnel who will use, or be affected by, the interim process. The plan for developing and implementing this training follows:

Task 4 Enhance NCSA/E Training

| Subtask No. | Subtask Description |
|---|---|
| 4.1 | Compile list of administrative controls document changes. |
| 4.2 | Identify target training audience by organization or job function. |
| 4.3 | Develop training module for each target group. |
| 4.4 | Administer training. |

In addition to the interim process training, training will be given as determined to be necessary to communicate such things as lessons learned from the NCSA/E walkdowns currently being performed or other information determined to be important for all affected personnel to know. The exact nature of this training may vary from required reading, memos and e-mail messages to formal classroom training, depending upon the nature and complexity of the subject matter. Also see Task 23.

6. Safety, Safeguards and Quality (SS&Q) Review of Implementation

As part of the ongoing self-assessment activities at PORTS, SS&Q is monitoring the implementation of new NCSA/Es in the field. This monitoring utilizes ANSI/ASQC Z1.4, Sampling Procedures and Tables for Inspection by Attributes, for sampling guidance and takes the form of a series of assessments that began as the NCSA/Es coming from the interim change process were implemented. The plan for implementing this review process follows:

Task 5 SS&Q Review of Implementation

| Subtask No. | Subtask Description |
|---|---|
| 5.1 | Develop list of NCSA/E changes from Task 3. |
| 5.2 | Write an Assessment Plan. The plan will include, in part, a sample review of NCSA/E requirements and verification of those requirements in the implementing procedures |
| 5.3 | Schedule assessments as an extension of Subtask 3.10's schedule. |
| 5.4 | Perform assessments in accordance with applicable procedures |
| 5.5 | Complete a review of all canceled Engineering Notices to ensure that the Document Control Organization has functioned properly to make each controlled copyholder and each affected organization aware of the canceled Engineering Notices and therefore the cancellation of that specific operation as defined by the Engineering Notice. |

7. Response to Anomalous NCS Conditions

To ensure consistency between the GDPs, PORTS has provided the following guidance to plant personnel as to the actions to take in response to anomalous conditions regarding NCS controls:

- Activities in the immediate area will be stopped.
- The area will be secured.
- The supervisor of the person discovering the condition will be notified.
- The Plant Shift Superintendent (PSS) will be notified and will subsequently notify the NCS manager or the Duty NCS Engineer.
- An NCS Engineer will direct the recovery operation. (The NCS Engineer along with the PSS will decide if the NCS Engineer should be present during the recovery operations.)

These actions have been communicated via a standing order and training of all FMO personnel has been completed. These actions were incorporated into appropriate procedure(s). These actions fulfill the requirements of paragraph 7.6.4 of ANSI 8.20 - 1991 and of paragraph 5.2.2.2 of the Safety Analysis Report.

8. NCS Oversight

NCS oversight has been provided on the operating floors to ensure continued heightened awareness of the importance of NCS controls. This is a temporary measure which will remain in effect until USEC is assured that proper awareness has been achieved regarding NCS controls. Also see Task 20.

E. Programmatic Upgrades

Task 6 Complete a Comprehensive Root Cause Analysis

The problem reports (and other deficiency reports) that have been written during the past year have identified many deficiencies. These deficiencies when taken individually, or as groups of similar deficiencies, can be used to identify weaknesses in the program and/or its implementation. This task is intended to ensure that lessons have been learned from our known problems, and incorporated into corrective actions. Since part of the root cause analysis has been done, this task starts with the next action to complete this task. (For the completed actions see Section C, Root Cause Analysis, of this plan.)

| Subtask No. | Subtask Description |
|---|---|
| 6.1 | For each step of the NCSA/E process review a representative sample of the PRs associated with that step and identify the specific Level 5 root cause(s). |
| 6.2 | Verify that the root causes identified above are included in the summary level root causes which were identified by the root cause team. For those that are not, revise the root cause documentation, increase the sample size, and submit a lessons learned/enhancement in accordance with the procedure described in Task 9. |
| 6.3 | If the detailed review root causes are included in the summary level root causes, document the review. |
| 6.4 | For each Level 5 root cause associated with each step of the NCSA/E process, (See Table 1 attached) or associated Management Systems, develop programmatic changes to correct root cause as part of this Corrective Action Plan for input to Task 12. |

Task 7 Compare Applicable Industry Standards Against NCS Program

To ensure that the NCS program complies with all applicable Industry standards, a detailed review will be performed. This review will be point-by-point, and the product of the review will be a set of NCS administrative control changes to be implemented. The plan for this review follows:

| Subtask No. | Subtask Description |
|---|---|
| 7.1 | Review applicable industry standards. |
| 7.2 | Develop a list of applicable requirements. |
| 7.3 | Compare requirement list to our NCS programmatic controls and develop a discrepancy list. |
| 7.4 | Evaluate discrepancies for need for immediate action, a Problem Report, or reportability. |
| 7.5 | Take any necessary immediate actions. |
| 7.6 | Evaluate discrepancies for need for interim action. |
| 7.7 | Develop and implement any interim actions required. |
| 7.8 | Develop long term programmatic enhancements, for input to task 12. |

Task 8 Vertical Slice Review

To ensure that we have identified all potential areas of enhancement, an in-depth vertical slice review of the NCS program is being performed. The vertical slice review is being performed by a team consisting of the NCS Managers from PORTS and PGDP and an outside expert in NCS. Using selected NCSA/Es, the review will identify any enhancements that could be implemented to improve the program. The vertical slice method is intended to look at all aspects of the NCS program from the initial identification of a potential Fissile Material Operation to the use of the NCSA/E in the field, including on-going assessments.

The subtasks of this activity are shown below.

| Subtask No. | Subtask Description |
|---|---|
| 8.1 | Assemble the team for the vertical slice review. |
| 8.2 | Develop a methodology for doing the review. The methodology shall cover:<br>- selection of NCSA/Es to ensure that all aspects of the program are included in the review,<br>- selection of NCSA/Es to ensure that all organizations affected by the NCS program are included in the review,<br>- the methods to be used for the review, |

- the documentation to be provided as a result of the review,
- the methods to be used to initiate changes to the NCS program (e.g., Procedure Development Forms.)

8.3 Conduct the vertical slice review of the program using each selected NCSA/E. (As each NCSA/E is completed, enhancements to the NCS program will be developed.)

8.4 Submit program enhancements to the Nuclear Safety Manager for inclusion in the continuous improvement mechanism for the NCS Corrective Action Plan. (See Task # 9.)

Task 9 Continuous Improvement Program

Throughout the NCS Corrective Action Plan implementation, there will be a lessons learned program to ensure that lessons learned are documented, disseminated to the appropriate personnel, and incorporated into procedures, as applicable. The lessons learned program will ensure that the NCS program and implementation continue to improve over time. Another major part of the lessons learned program is ensuring that previously approved products are sufficient to ensure safety in light of the new lesson learned. Each lesson learned will be reviewed to identify the effect on related NCSA/Es whether or not the respective NCSA/E has already been reviewed under the Corrective Action Plan. Lessons learned that affect the safety of approved Fissile Material Operations (FMOs) will be documented in a PR. The PR will then be used as the method to document the specific actions taken to ensure safety.

Subtask No. Subtask Description

9.1 Develop or revise a procedure applicable to all personnel involved in the NCS Corrective Action Plan implementation, that provides the guidance for documenting lessons learned and enhancement ideas. The procedure shall cover:

- use of a standard format.
- a documented disposition for each lesson learned to identify how and when to incorporate the enhancement into the process.
- A documented identification of the potential affect of the enhancement on previous work performed under the NCS Corrective Action Plan.
- Primary users of the lessons learned/enhancement mechanism.
- How the lessons learned will be shared with all affected organizations. Training will be utilized as necessary to ensure proper understanding of the lessons learned.

| | |
|---|---|
| 9.2 | Implement the new procedure. |
| 9.3 | Track the disposition of each lesson learned/enhancement idea to ensure that those agreed to by the Nuclear Safety Manager are incorporated into the NCS program. |
| 9.4 | For those NCSA/Es that are affected by changes in the program due to lessons learned throughout the program, ensure that there is a positive control mechanism to track the need for a re-review to incorporate the lessons learned. |

Task 10 Personnel Qualification Verification

To ensure all PORTS NCS personnel qualification requirements meet applicable industry standards, a detailed review of qualification requirements will be accomplished to verify their adequacy. Engineers not meeting upgraded standards will be retrained as necessary. The plan to accomplish these reviews follows:

| Subtask No. | Subtask Description |
|---|---|
| 10.1 | Review available qualification requirements in applicable industry guidance. |
| 10.2 | Compare guidance to existing administrative control procedures. |
| 10.3 | Resolve any identified discrepancies (revise procedures). |
| 10.4 | Compare qualification requirements to NCS engineers' records |
| 10.5 | Generate list of people to have upgrade qualifications. |
| 10.6 | Utilizing the new procedures, qualify individuals identified in step 10.5. |
| 10.7 | Re-evaluate and identify upgrades to the training and qualification program for NCS personnel to more clearly describe additional details such as applicability, tasks covered, restrictions during training status, evaluation of candidate's qualifications, and documentation requirements. |
| 10.8 | Develop or upgrade procedures, TDAG, training modules as appropriate to support 10.7. (See Task 12.) |
| 10.9 | Train and qualify NCS personnel in accordance with the upgraded program. (See Task 12.) |

Task 11 Outside/Independent Assessments

As part of the effort to identify potential areas of improvement, assessment reports performed by independent groups, e.g., George Bidinger, Quality Assurance and the Plant Performance Review Committee, etc., will be re-reviewed and re-evaluated to identify problem areas in

the NCS program and to ensure proper closure of the issues. Additionally, NRC inspection reports will be evaluated for similar problem areas. Problems identified through this review will be considered for programmatic improvements. The plan for performing these reviews follows:

| Subtask No. | Subtask Description |
|---|---|
| 11.1 | Identify reports that fall within the scope of this task. |
| 11.2 | Review each report and document potential problem areas. |
| 11.3 | Compare the list of problem areas with the list of known deficiencies identified through other means (e.g., comprehensive root cause, ANSI reviews, etc.) |
| 11.4 | For those problem areas that were not documented under other tasks, identify potential programmatic improvements using the process established for feedback of lessons learned and enhancements. (See Task #9.) |

Task 12 Policy/Procedure Revision and Training

The NCS program from beginning to end (each step of the process) has had Problem Reports associated with it over the past year. The root cause evaluation has identified the Problem Reports from 1997 and the steps of the NCS program to which they are associated. In order to provide long-term enhancements to the NCS program and thereby ensure that the NCSA/Es and their implementation is excellent, we plan to upgrade NCS policies and procedures.

As programmatic upgrades are identified, it is expected that a number of procedures and other administrative control documents will need to be changed. These changes will also have to be communicated to affected personnel through training. Changes will need to be coordinated to maximize efficient use of procedure and training resources. The plan to accomplish needed changes to policies/procedures follows:

| Subtask No. | Subtask Description |
|---|---|
| 12.1 | Implement procedure changes for interim program as described in Section D. |
| 12.2 | Develop list of needed procedure changes, new procedures, from the applicable tasks. |
| 12.3 | Accomplish procedure changes (including required reviews). |
| 12.4 | Develop training modules. |
| 12.5 | Identify the get audience for training. |
| 12.6 | Administer needed training. |
| 12.7 | Implement procedure changes. |

Task 13 Revise Training Program for Site Personnel

One of the identified root causes for NCSA/E implementation problems was that the training on NCSA/Es was not effective. To address this, the overall training for NCSA/Es will be evaluated to identify improvements which are needed. The plan to accomplish this review and upgrade follows:

| Subtask No. | Subtask Description |
|---|---|
| 13.1 | Evaluate results of prior training. |
| 13.2 | Develop a list of programmatic problems. |
| 13.3 | Perform a root cause evaluation on each identified problem. |
| 13.4 | Identify actions to address root causes. |
| 13.5 | Incorporated improvements into the training administrative control process. |
| 13.6 | Upgrade training modules to reflect improvements. |
| 13.7 | Determine retraining required to reflect upgrades. |
| 13.8 | Administer required retraining using the revised program. |

Task 14 Corrective Action Program Enhancements

As a result of the review of the current NCS program implementation deficiencies, it is apparent that many of the existing problems have been in existence for some time, (e.g., there are 500+ Problem Reports related to NCS from 1987). If our corrective action program was effective, many, if not most, of the NCS problems should have been solved after their first appearance. While this ineffectiveness of the corrective action program for PORTS is applicable to areas other than NCS, the subtasks described below are intended to focus on the NCS related portions of the corrective action program.

| Subtask No. | Subtask Description |
|---|---|
| 14.1 | Evaluate the PR procedure and form to determine what improvements are required to better document the following:<br>- immediate actions taken,<br>- actions taken to prevent recurrence,<br>- extent of condition evaluation,<br>- root cause determination,<br>- corrective actions taken,<br>- basis for safety and compliance with TSRs and NCSA/Es. |
| 14.2 | Ensure that the team assigned to determine the response to an NCS related PR includes a representative from the NCS organization. |
| 14.3 | All NCS PRs should include an evaluation for the extent of condition of the problem on other activities and equipment. |

| | |
|---|---|
| 14.4 | Evaluate the administrative system of the corrective action program, especially the status tracking and action response mechanism, to streamline the process so the reporting of completed actions and tracking of open items is less time intensive. |
| 14.5 | Enhance the corrective action program by implementing the improvement ideas. |

Task 15 Configuration Management Program Enhancements

As changes are made to the NCS program, it is imperative that supporting design documents are changed appropriately to maintain their accuracy and consistency with one another. The plan for effecting the needed changes to design documents follows:

| Subtask No. | Subtask Description |
|---|---|
| 15.1 | Develop program changes to ensure that engineering documents are maintained consistent with NCSA/Es. |
| 15.2 | Implement the new program requirements. |

Task 16 Revise Assessment Programs

As part of the overall upgrade of our NCS program, evaluation of supporting programs will be done and any changes or improvements identified as necessary will be accomplished. Among the most important of these programs is the assessment program. All of the various assessment processes will be reviewed for potential improvements. The plan to accomplish these reviews follows:

| Subtask No. | Subtask Description |
|---|---|
| 16.1 | Develop criteria for assessment program reviews. |
| 16.2 | Review each assessment program against criteria. |
| 16.3 | List any identified problems. |
| 16.4 | Perform a root cause evaluation on each identified problem. |
| 16.5 | Develop list of root causes. |
| 16.6 | Develop corrective action plan for each program. |
| 16.7 | Train affected personnel |
| 16.8 | Implement upgraded assessment programs. |

Task 17 Oversight of Plan Implementation.

To provide assurance that the Corrective Action Plan is being implemented in accordance with management's expectations, SS&Q will perform bi-monthly assessments, to verify proper implementation. The first assessment was completed before the first quarterly review.

| Subtask No. | Subtask Description |
|---|---|
| 17.1 | Develop assessment plan and schedule to be used to evaluate the effectiveness of Corrective Action Plan implementation. |
| 17.2 | Perform assessments as defined in the assessment plan. |

F. Schedule

See Table 2.

G. Evaluation and Feedback

As this Plan is implemented, adjustments to action scope, prioritization, and schedules may be required. At least each quarter, a formal review will be performed to assess the adequacy and effectiveness of the program. Included in this review will be an assessment of the existing schedule and the findings from the applicable SS&Q assessment addressed by Task 17.

Task 18 Evaluation and Feedback

| Subtask No. | Description |
|---|---|
| 18.1 | Gather pertinent status information. |
| 18.2 | Compare status with the respective Task requirement and schedule. |
| 18.3 | Initiate any required corrective actions. |
| 18.4 | Factor in lessons learned through Task 9. |
| 18.5 | Report to management. |

Task 19 Evaluate Continued Use of Murder Board

This task is discussed in Section D.1 of the Corrective Action Plan, but was not previously identified as an individual task. Tracking this evaluation as a specific task helps assure proper management attention. There are no additional subtasks.

Task 20 NCS Field Operational Assistants (FOA)

This is a new task listing; it is an ongoing aspect of Section D.8 of the Corrective Action Plan. NCS oversight was provided on the operating floors (one shift per day) by the originally committed date of February 2, 1998 through the assignment of FOAs. The FOA assignments will remain in effect until USEC is assured that proper awareness has been achieved regarding NCS controls. Tracking the evaluation of continuing these assignments as a specific task helps assure proper management attention. There are no additional subtasks.

Task 21 Fissile Material Operation (FMO) Identification

This is a new task intended to assure that all FMOs are identified. A short-term effort consisted of a review of canceled NCSAs and verifying that those operations were indeed shut down. A long-term effort consists of developing a procedure for a documented review of all operations, determining and classifying operations as fissile and non-fissile, and communicating these classifications to the field.

| Subtask No. | Subtask Description |
|---|---|
| 21.1 | Review canceled NCSAs and verify that those operations are shutdown. |
| 21.2 | Develop methodology and documentation requirements to review and classify operations as fissile or non-fissile and communicate these classifications to the field. |
| 21.3 | Develop or upgrade procedures. (See Task 12.) |
| 21.4 | Train personnel and implement procedure changes. (See Task 12.) |

Task 22 Compare SAR Chapter 5.2 To Applicable Industry Standards and the NCS Program

This task was added to the CAP to ensure that all documentation that describes the NCS program is consistent between SAR Chapter 5.2, industry standards, and NCS program documents. The plan for accomplishing this task is as follows:

| Subtask No. | Subtask Description |
|---|---|
| 22.1 | Compare requirements list generated under Task 7 to SAR Section 5.2, industry standards, and NCS program not conflict with standards. |
| 22.2 | Compare SAR Section 5.2 to plant NCS procedures and if necessary develop a discrepancy list. |

22.3 Evaluate discrepancies for need for immediate action, a problem report, reporting, and then take appropriate action.

22.4 Develop long term programmatic enhancements for input to Task 12.

Task 23 NCS Short-Term Corrective Actions

This is a new task. Due to the continued number of NCS violations and subsequent NRC event reports, a process for implementing short-term (quickly implemented) corrective actions that focus on the recent and current problem reports was instituted in an effort to stop the violations. The short-term corrective actions are intended to allow time for the long-term NCS program upgrade actions to take hold. These short-term actions are discussed daily and new actions are added as additional problems (or near misses) identify the need; actions, responsibilities and due dates are tracked to completion. This is an ongoing task and there are no further subtasks. The following describes those short-term actions taken to date:

- Between March 11-13, 1998, the Portsmouth Plant initiated a "Plant Wide NCS Stand-down". During this time period, each operation having NCS controls was suspended from performing NCS related activities (except for those required by the TSR) while facility Fissile Material Operations ( FMO) personnel (i.e., currently, 1217 plant personnel) participated in crew briefings on the NCS Corrective Action Plan, the "spacing" problems, the affected NCSAs, spacing controls, and expected responses to anomalous NCS conditions. An error lab was also established to challenge and introduce personnel to NCS control problems and to emphasize correct solutions to various NCS non-conformances. Over 1400 plant personnel have completed this exercise. In addition, FMO personnel were issued key chain type tape measures as an NCS awareness tool to be used in the field to ensure proper spacing.

- Process building access control was implemented to ensure that building managers are thoroughly aware of all storage activities within their buildings and that personnel understand controls and requirements prior to the start of the activity.

- Require that all work packages include specific action steps/check sheets (consistent with approved procedures) for disposal of scrap or waste generated during the job. This action is intended to ensure jobs involving potentially fissile material and/or waste have adequate guidance in the work packages with respect to how to handle and store potentially fissile wastes.

- Add some "operating margin" to items that are stored under administrative spacing requirements. (Areas where it is physically impossible to do this are exempt.) This action is intended to look for areas where NCS controls (such as spacing) could be enlarged to give personnel some operating margin prior to reaching a limit. For

example, if the requirement for spacing is a minimum 2 feet edge-to-edge, the storage arrays should preferably be greater than 2 feet.

- Institute pre-job briefs for all NCS related activities to discuss the NCS requirements of the job. This action is intended to ensure that prior to starting a job involving potentially fissile material the workers performing the job have adequate guidance in where to put the waste, the workers are briefed on the associated NCS controls, and there are adequate storage locations ready to receive the waste.

- Revisit pre-job briefing activities to ensure adequate follow-on implementation guidance/procedure is in place, and pre-job briefings are consistent plant-wide. This action is intended to ensure that the improvements to pre-job briefings were consistent across the plant, and that they continue.

- Review all storage areas to ensure NCS compliance (this was done in conjunction with the task described in the second bullet concerning adding "operating margin" to items that are stored under administrative spacing requirements).

- Revise NCSA Plant 18, "Dry Active Waste," and NCSA Plant 48, "Contaminated Metals," to establish short term improvements. This action is intended to correct the most frequent sources of NCSA compliance issues.

- Conduct a building-by-building clean-up to eliminate scrap. This action is intended to get rid of excess material in the process buildings and to minimize the material available that could potentially lead to violations of NCS requirements.

- Establish controls over all aspects of storage areas such as: boundaries, access permits, postings. This action is intended to address the apparent inconsistent and/or informal implementation of NCS waste storage areas across plant site. Guidance has been provided to the field for boundaries, access permits, and postings. Field personnel are currently evaluating and implementing changes to the storage areas. However, this is becoming less of an issue as the storage areas are being cleaned-up.

- Disseminate Problem Report information to the floor level. This action is intended to ensure the details and lessons learned from NCS violations are being relayed to the craft verbally in a face-to-face setting.

- Implement Boundary Control Station (BCS) improvements. This action is intended to evaluate, and if possible, reduce the need for the number of BCSs. This effort is intended to limit the potential for NCS violations.

- Establish routine PA announcements on NCS violations/lessons learned. This action is intended to provide a mechanism to inform all plant personnel of current NCS violation lessons learned, and to provide capsules of information of some NCSAs to stimulate discussion.

Task 24 PEH Deposit Surveillance Tracking

This is a new task. Ineffective PEH deposit surveillance tracking has been a source of recent event reports and violation responses. In order to increase the effectiveness of these surveillances, a revised program is being established. As detailed in USEC's response to NOV 70-7002/98003-01 (USEC letter GDP 98-2018, dated April 27, 1998), regarding a loss of fluorinating environment associated with a PEH deposit, USEC committed to develop and implement a formal program procedure for tracking PEH equipment. The procedure will include detailed administrative control requirements for maintaining this PEH equipment in a fluorinating environment.

| Subtask No. | Subtask Description |
|---|---|
| 24.1 | Review effectiveness of short-term corrective actions and appropriateness of their inclusion in long-term administrative control requirements; define any additional requirements. |
| 24.2 | Develop and approve procedure. |
| 24.3 | Develop and administer needed training. |
| 24.4 | Implement procedure. |

Task 25 Compliance Plan Review

This is a new task. This task will review Compliance Plan actions that impact NCS to ensure that the documentation is complete.

| Subtask No. | Subtask Description |
|---|---|
| 25.1 | Define document management expectations as well as standards and acceptance criteria. |
| 25.2 | Identify Compliance Plan issues which impact NCS. |
| 25.3 | Obtain appropriate evidence packages. |
| 25.4 | Review evidence packages and discuss issues with appropriate issue owners, as necessary. |
| 25.5 | Identify discrepancies. |
| 25.6 | Evaluate discrepancies for need for immediate actions, problem reports, reporting, and then take appropriate corrective action. |

Task 26 NCSA/E Calculation Review

This is a new task developed as follow-on from Task 2. During assembly of closure documentation for Task 2 it was determined that some NCSA/E supporting calculations were done by "unqualified" NCS Engineers. This task will identify and review those calculations.

| Subtask No. | Subtask Description |
|---|---|
| 26.1 | Develop a matrix of NCSA/E calculations with respect to date, preparer, and peer reviewer. |
| 26.2 | Develop a list of calculations not prepared or peer reviewed by qualified personnel. |
| 26.3 | Review calculations identified in 26.2 for technical adequacy. |
| 26.4 | Evaluate discrepancies for impact on NCSA/E and need for immediate actions, problem reports, reporting, and then take appropriate corrective action. |

**Table 1. 5 Root Cause by Process Block Number**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No SPAC* | X | | X | | | | | | | | | X | X | X |
| SPAC not Strict Enough | X | | | | | | | | | | X | | | |
| Confusing or incomplete SPAC | X | X | X | | | | | | X | | | | | |
| Technical error | X | | X | | | X | | | | | X | | | |
| Procedure use not required but should be | | | X | | | | | | X | | X | X | X | X |
| Procedure difficult to use | | | X | | | | | | | | | | | |
| Task not analyzed | | | | X | | | | | | | | | | |
| Accountability | | | | X | | | | | | X | X | | | |
| Procedure facts wrong | | | | | | X | | | | | | | | |
| Training Lesson Plan | | | | | | | | | X | | | | | |
| No way to implement SPAC | | | | | | | | | | X | X | | | |

* SPAC-Standards, Policies, or Administrative Controls

NOTE: For NCSA/E process step names, refer to Section C.3.

**Table 2. Implementation Schedule End Dates**

| Task # | Description | Target Date |
|---|---|---|
| 1 | Facility review of NCSA/Es | 12/24/97 - Complete |
| 2 | Review of NCSA/Es regarding qualifications | 04/30/98 - Complete |
| 3 | NCSA/Es Upgrade Project | Pri 1 12/31/98<br>Pri 2 06/22/99<br>Pri 3 05/31/00 |
| 4 | Enhance NCSA/E Training (Interim Process) | 02/28/98 - Complete |
| 5 | SS&Q Review of Implementation | Pri 1 02/15/99<br>Pri 2 08/15/99<br>Pri 3 07/15/00 |
| 6 | Complete Comprehensive Root Cause Analysis | 02/28/98 - Complete |
| 7 | Compare applicable industry standards against NCS Program | 01/31/98 - Complete |
| 8 | Vertical Slice Review | 05/31/98 |
| 9 | Continuous Improvement Program | 01/31/98 - Complete |
| 10 | Personnel Qualification Verification | 07/27/98 |
| 11 | Outside/Independent Assessments | 04/30/98 - Complete |
| 12 | Policy/Procedure Revision and Training | 12/31/98 |
| 13 | Revise Training Program for Site Personnel | 04/30/98 - Complete<br>(Subtask 13.5) |
| 14 | Corrective Action Program Enhancements | 06/30/98 |
| 15 | Configuration Management Program Enhancements | 02/28/98 - Complete |
| 16 | Revise Assessment Programs | 10/30/98 |
| 17 | Oversight of Plan Implementation | 04/30/99<br>(bi-monthly) |
| 18 | Evaluation and feedback | Quarterly starting on 01/31/98 |
| 19 | Evaluate continued use of Murder Board | Not before 05/31/98 |

**Table 2. Implementation Schedule End Dates**

| Task # | Description | Target Date |
|---|---|---|
| D.7 | Incorporate Response to Anomalous NCS Conditions into Procedure(s). | 02/11/98 - Complete |
| D.8 | Provide NCS Oversight on Operating Floors | 02/02/98 - Complete |
| 19 | Evaluate Continued Use of Murder Board | Not before 05/31/98 |
| 20 | NCS Field Operational Assistants (FOA) | 06/15/98 |
| 21 | Fissile Material Operation (FMO) Identification | 10/23/98 |
| 22 | Compare SAR Chapter 5.2 to Applicable Industry Standards and the NCS Program | 06/15/98 |
| 23 | NCS Short-Term Corrective Actions | N/A |
| 24 | PEH Deposit Surveillance Tracking | 05/11/98 |
| 25 | Compliance Plan Review | TBD |
| 26 | NCSA/E Calculation Review | TBD |