

**OFFICE OF OVERSIGHT
REVIEW OF NUCLEAR CRITICALITY SAFETY**

**FIELD REPORT
FOR ROCKY FLATS BUILDING 371**



January 2000

**Office of Oversight
Environment, Safety and Health
U.S. Department of Energy
Washington, DC 20585**

TABLE OF CONTENTS

	Page
ACRONYMS AND TERMINOLOGY	ii
EXECUTIVE SUMMARY	iii
SUMMARY OF OPPORTUNITIES FOR IMPROVEMENT	iv
1.0 INTRODUCTION	1
2.0 RESULTS.....	2
2.1 POSITIVE ATTRIBUTES	2
2.2 WEAKNESSES	3
3.0 CONCLUSIONS AND OPPORTUNITIES FOR IMPROVEMENT	5
APPENDIX A – TEAM COMPOSITION	6
APPENDIX B – EVALUATION CRITERIA	7

ACRONYMS

ANS	American Nuclear Society
ANSI	American National Standards Institute
CSE	Criticality Safety Evaluation
CSO	Criticality Safety Officer
DOE	Department of Energy
EH	Office of Environment, Safety and Health
NCS	Nuclear Criticality Safety
NSP	Nuclear Safety Procedure
RFCS	Rocky Flats Closure Site (formerly Rocky Flats Environmental Technology Site)
RFFO	Rocky Flats Field Office

OFFICE OF OVERSIGHT TERMINOLOGY

Noteworthy Practice: An innovative approach or practice related to environment, safety, and health systems, programs, processes, or projects that have proven effective in improving safety management systems and performance, and could be a valuable source of information and lessons learned for other DOE sites.

Positive Attribute: A management system, process, or work practice that demonstrates an effective approach, a positive trend/initiative, or a significant improvement over past performance.

Safety Issue: A condition of concern that could have an adverse impact on the environment, safety, or health of the site, its workers, and/or the public. Safety issues require formal resolution and tracking by line management in accordance with DOE Order 414.1A, *Quality Assurance*.

Weakness: A deficiency in a management system, process, or activity that warrants management attention and corrective action but does not require a formal corrective action plan or tracking under the provisions of DOE Order 414.1A.

Opportunity for Improvement: Suggestions offered by the Office of Oversight appraisal team that may assist line management in identifying options and potential solutions to various issues identified during the conduct of the Oversight appraisal.

EXECUTIVE SUMMARY

In November 1999, the Deputy Secretary of Energy directed a series of actions to strengthen Department of Energy (DOE) nuclear criticality safety (NCS) programs. As one of those actions, a team of criticality safety experts from DOE Headquarters and the field conducted a high-level review at the Rocky Flats Closure Site (RFCS) and four other DOE sites. The review was led by the Office of Oversight, within the Office of Environment, Safety and Health. The purposes of this review were: (1) to identify any immediate problems and related corrective actions, and (2) to determine whether the operations and criticality safety risks at these facilities are well understood, analyzed, and controlled.

The review of RFCS focused on Building 371 at RFCS, which processes solutions of fissile materials, because solutions represent the greatest risk of a criticality accident. The Oversight team observed field implementation of selected operations but did not perform a comprehensive review of implementation of requirements.

Although some weaknesses were identified, the Oversight team did not identify any conditions that presented an immediate risk of a criticality accident involving fissile solutions at Building 371 at RFCS. The NCS program elements of criticality safety evaluations and controls, work control, change control, and line management oversight are in place and provide assurance that the criticality safety risks at this facility are properly controlled. These four program elements meet the intent of applicable DOE requirements and national standards.

Some aspects of the NCS program at RFCS have been enhanced by the presence and initiatives of the criticality safety officers (CSOs) and NCS staff in the facility. Most notably, the CSO program in Building 371 is effectively integrating NCS into operations. In addition, the NCS staff presence on the floor and interaction with operations has improved implementation of NCS controls and operator understanding and awareness of NCS.

The Oversight team did not identify any issues that require a formal corrective action plan. However, three weaknesses in the application of specific elements of the requirements were identified. The most significant weaknesses involve staff shortages and attrition. RFCS does not have a program to address the significant attrition of criticality safety expertise. The lack of staff has impacted the contractor's ability to complete funded criticality safety work. In addition, Kaiser-Hill does not have a recognized NCS expert as the NCS Program Manager. Table ES-1 summarizes identified opportunities for improvement.

Table ES-1. Summary of Opportunities for Improvement

Opportunities for Improvement

- Develop a formal program to attract and retain criticality safety expertise, including a Kaiser-Hill NCS Program Manager.
- Formally document the annual NCS staff review of operations to ensure consistency with existing criticality safety evaluations.

OFFICE OF OVERSIGHT REVIEW OF NUCLEAR CRITICALITY SAFETY FIELD REPORT FOR ROCKY FLATS BUILDING 371

1.0 INTRODUCTION

The Department of Energy (DOE) Office of Oversight, within the DOE Office of Environment, Safety and Health (EH), conducted a review of selected aspects of the nuclear criticality safety (NCS) program at the Rocky Flats Closure Site (RFCS). The Oversight review of RFCS was one portion of a broader DOE initiative to improve nuclear criticality safety, as directed by the Deputy Secretary of Energy in his November 3, 1999, memorandum entitled “Nuclear Criticality Self-Improvement Initiative.” One of the provisions of the Deputy Secretary’s memorandum was a review of key facilities at five sites (the other sites were the Y-12 Plant, Los Alamos National Laboratory, the Hanford Plutonium Finishing Plant, and the Savannah River Site) by a team of criticality safety experts led by the EH Office of Oversight.

The site review was conducted January 18-20, 2000 by a seven-person team composed of NCS experts from DOE Headquarters and field offices. Appendix A provides additional information on the composition of the review team.

Consistent with the direction provided by the Deputy Secretary, the purpose of this review was twofold: (1) to identify any immediate problems and related corrective actions, and (2) to determine whether the operations and criticality safety risks at these facilities are well understood, analyzed, and controlled. The Oversight team focused on four key nuclear criticality safety program elements as applied to selected fissile material operations.

The four key nuclear criticality safety elements reviewed were: criticality safety evaluations and controls, work control, change control, and line-management oversight. The criteria for each of these areas were provided by the Deputy Secretary and were derived from the national consensus standard American National Standards Institute (ANSI)/American Nuclear Society (ANS)-8.19, which is required by DOE Order 420.1, *Facility Safety*, and from DOE Policy 450.5, *Line Environment, Safety and Health Oversight*. Appendix B presents the evaluation criteria for the four criticality safety elements.

The RFCS facility reviewed was Building 371. Fissile nuclear material operations at this facility involve processing, handling, and storage of solutions of fissile materials. Criticality accidents typically involve safety management system breakdowns impacting fissile solution processing. Of the 22 known criticality accidents involving fissile material processing, 21 have involved solutions, including the most recently publicized accident in Tokai-mura, Japan.

The common causes of criticality accidents that have occurred to date have been failure to perform a criticality safety evaluation (CSE) for a process; undetected process and system changes; failure to develop, review, and approve operating procedures; absence of effective worker training; and failure to conform to established procedures and limits. No criticality accident has occurred as a result of a faulty calculation of reactivity, and no known criticality accident has involved storage or transport of fissile material.

The NCS review of RFCS Building 371 was conducted according to Oversight protocols and procedures, including the validation of data throughout all stages of the process. The Oversight team toured fissile solution handling and processing operations in Building 371. The review team interviewed personnel from DOE Rocky Flats Field Office (RFFO), Safe Sites of Colorado, Rocky Mountain Remediation Services, and Kaiser-Hill. Personnel interviewed included DOE Facility Representatives and contractor personnel with responsibility for NCS, audits and assessments, work planning and control, configuration management, and authorization basis. The Oversight team reviewed a representative sample of operational criticality safety controls (e.g., criticality safety limits summarized in postings and stated in operating procedures), work controls (e.g., other procedural and administrative controls governing normal work tasks, including maintenance, that affect criticality safety), change controls, and audit/self-assessment practices. Selected CSEs and other documents that form the basis for these controls and practices were also reviewed.

This Oversight review focused exclusively on criticality safety aspects of Building 371. Consequently, the review does not constitute an assessment of the overall NCS program in relation to the requirements of the ANSI/ANS standards and DOE Order 420.1, *Facility Safety*. The elements of ANSI/ANS Standard 8.19 were applied to only those specific processes selected for review. Further, the Oversight team had only limited opportunity to observe actual work in progress during the field visit because the review was conducted according to an accelerated schedule and because few operations were ongoing during the period of the review. The review therefore focused primarily on interviews, documentation, records, and facility tours.

2.0 RESULTS

The Oversight team noted two positive attributes and three weaknesses in the application of specific elements of the requirements. No issues were identified that require a formal corrective action plan in accordance with DOE Order 414.1A, *Quality Assurance*.

2.1 Positive Attributes

1. The criticality safety officer (CSO) program in Building 371 is effective in integrating NCS into operations.

Interviews with CSOs, criticality safety engineers, and operators indicate that the CSO program is very effective in Building 371. Operators indicated that CSOs were available for discussing questions and concerns and were always willing to listen. Operators expressed confidence that the CSOs would be able to assist them in communicating concerns to management if needed. The CSOs are involved in training the operators in NCS controls and have a regular presence on the operating floor communicating with operators. CSOs assist operations personnel in the interpretation of nuclear material safety limits generated as part of CSEs.

CSOs have been assigned principal responsibility for development of Nuclear Material Safety Limit postings and often act as facilitators between operations and the Nuclear Criticality Safety Department NCS staff. As a result, the Nuclear Material Safety Limit postings have improved in recent years, operators indicate that postings are easier to read and understand, and operators expressed their belief that they had more involvement in the development of Nuclear Material Safety Limits. One positive aspect of the postings is the yellow transparency cover sheet that is used to indicate a relatively new posting. This

visible indicator of a new procedure promotes operator awareness of recent changes in procedural NCS controls.

The CSOs act as focal points for CSE requests and effectively assist line management in setting priorities for accomplishing these evaluations. They are also primarily responsible for the development of the implementation plan traceability matrix. This document lists the underlying assumptions as well as specific Nuclear Material Safety Limits and ties them back to specific CSEs or authorization basis documents. During the past year, the CSOs have also been effective in discovering and assisting in the correction of inconsistencies and discrepancies in and between authorization basis documents.

2. The NCS staff presence on the floor and interaction with operations has improved implementation of NCS controls and operator understanding and awareness of NCS.

The NCS staff assigned to support Building 371 personally verify the details of operations and equipment important to criticality safety. These NCS staff also discuss aspects of the associated administrative controls and engineered safety features with operations personnel in training settings and other venues. They review implementing documents, such as procedures and postings, in an expeditious manner. NCS staff participate in work planning and are proactive in supporting the needs of the facility. Although currently a positive attribute, increased management attention is needed to ensure that NCS staff continue to be effective. More specifically, management needs to ensure that attrition of NCS staff is addressed, workloads are managed, relatively inexperienced operations personnel are mentored, and timely information about proposed changes requiring new or revised limits is provided to NCS.

2.2 Weaknesses

Although not requiring a separate, formal response in accordance with DOE Order 414.1A, the following weaknesses warrant management attention and appropriate corrective actions. In discussions with the Office of Oversight, the site has agreed to include these weaknesses in their site self-assessment, which is a required element under the Deputy Secretary's NCS self-improvement initiative. The site will track the weakness and corresponding corrective actions in site-level corrective action tracking systems.

1. There is no formal program in place to address the significant attrition of criticality safety expertise.

RFCS has recently lost five experienced NCS contractor personnel. Three contractor criticality safety engineers and one subcontractor engineer have recently departed RFCS. The fifth, a senior-level contractor employee, recently joined RFFO to fill the open position of Criticality Safety Program Manager.

The remaining contractor criticality staff and subcontracted support have not been able to meet the current workload. As a result, NCS staff are providing support only to the highest-priority NCS projects. There is sufficient funding to complete Nuclear Material Safety Limits for operations. However, the NCS staff are only able to support the top 20 percent of the 40 funded projects. In addition, continuous improvement efforts are not receiving attention. A related problem is that better advance planning and prioritization by Operations is needed to utilize the current NCS staff effectively. Often the priority of work changes, as does the scope of individual CSEs. These frequent changes result in inefficient utilization of current NCS staff.

A number of factors contribute to the relatively large attrition rate. First, RFCS plans to remove most fissile materials sometime during the next two years and thus will no longer need an NCS program. The limited duration of the program and lack of job security impact the ability to attract and retain qualified

NCS specialists. Second, other DOE sites with long-term missions are ramping up work activities and have hired criticality safety personnel away from RFCS. The current workload situation may worsen if additional criticality safety specialists seek more secure employment elsewhere as the projected date for the termination of the NCS program gets closer. RFFO and the contractors do not have a comprehensive, integrated plan to ensure that RFCS has the necessary NCS staff to safely close the site in the face of the accelerating attrition rate.

2. The NCS staff does not formally document its annual review of operations.

Interviews with operations personnel and criticality safety engineers indicate that one or more operations are being reviewed each month and that these reviews encompass all operations at least annually. Currently, the applicable nuclear safety procedure (NSP-10) does not specifically require documentation of the results of these reviews. Although the nuclear criticality staff are conducting reviews, the contractor does not have formal documentation to demonstrate that it is meeting the requirements for annual reviews of operation. In addition, the lack of documentation hinders the ability to formally record and communicate deficient conditions and ensure that corrective actions are identified and tracked to closure.

3. Kaiser-Hill does not have a nuclear criticality expert to serve as its NCS Program Manager.

Currently, Kaiser-Hill does not have a qualified, permanent NCS Program Manager with criticality safety expertise and the capability to ensure that an effective criticality safety program is implemented. Such a person is needed to oversee implementation of the criticality safety manual, the CSO program, and criticality safety engineer activities and to ensure full integration of criticality safety with operations. Further, Kaiser-Hill does not maintain a technical criticality safety committee to advise senior management on criticality safety issues. Kaiser-Hill has partially mitigated this situation by securing the services of a knowledgeable subcontractor who is providing valuable criticality safety support.

As discussed above, Kaiser-Hill may have difficulty in attracting a qualified criticality safety expert because of the short job duration. Most people who would qualify for the position are seeking more stable situations.

3.0 CONCLUSIONS AND OPPORTUNITIES FOR IMPROVEMENT

Based on the Oversight review, there are no imminent criticality safety hazards at RFCS Building 371. The NCS program elements reviewed (i.e., criticality safety evaluations and controls, work control, change control, and line management oversight) are in place and provide assurance that the criticality safety risks at this facility are properly controlled. These four program elements meet the intent of applicable requirements of Section 4.3 of DOE Order 420.1, ANSI/ANS-8.19, and DOE Policy 450.5.

No issues were identified that require a formal corrective action plan. However, three weaknesses in the application of specific elements of the requirements were identified. The following opportunities for improvement should be considered to address the identified weaknesses.

- | |
|--|
| <p>1. Develop a formal program to attract and retain criticality safety expertise, including a Kaiser-Hill nuclear criticality safety program manager (see Weaknesses #1 and #3).</p> |
|--|

- Develop a staffing and resource plan to identify NCS resources that will be needed throughout the site closure process.
- Improve coordination between NCS and operations to increase the efficiency of the current NCS staff and ensure that NCS staff maintain cognizance of current priorities. For example, the ICWP Activity Screen could be utilized to better identify and incorporate NCS staff early in the project planning.
- Hire a NCS expert to manage the Kaiser-Hill criticality safety program.
- Review functional criticality safety committees at Los Alamos and Oak Ridge National Laboratory and consider implementing a similar committee for Kaiser-Hill at RFCS.
- Consider adopting a teaming approach with other contractors on site, as well as at other DOE sites, to share expertise and meet surges in workloads.

<p>2. Formally document the annual NCS staff review of operations to ensure consistency with existing criticality safety evaluations (see Weakness #2).</p>
--

- Modify NSP-10 to require formal documentation of operations reviews.
- Ensure that documentation for each operations review is sufficient to demonstrate that operations were reviewed for consistency with existing CSEs
- Ensure that a process is in place that identifies which operations have been reviewed during the current year, ensures that all operations are reviewed at least annually, and documents and tracks all corrective actions through closure.

APPENDIX A

TEAM COMPOSITION

The team membership, composition, and responsibilities are as follows:

Deputy Assistant Secretary for Oversight

S. David Stadler, Ph.D.

Associate Deputy Assistant Secretary for Oversight

Raymond Hardwick

Team Leader

Jerry McKamy, Ph.D.

Management Advisor to the Team

Ed Blackwood

Line Management Oversight Subgroup

Adolf Garcia

Jim Felty

Work and Change Control Subgroup

Bill Weaver

Criticality Safety Evaluations and Controls Subgroup

Steve Payne, Ph.D.

Ivon Fergus

Communications and Support

Cynthia D. Dorsey

Quality Review Board

Frank Russo

Raymond Hardwick

Thomas Davis

Thomas Staker

APPENDIX B

EVALUATION CRITERIA

INTRODUCTION

This appendix presents the evaluation criteria used in this Oversight review. It also presents the lines of inquiry (i.e., the specific areas of focus within each criterion) that correspond to each of the criteria. The criteria and lines of inquiry are presented for each of the four safety management areas reviewed by Oversight:

1. Criticality safety evaluations and controls
2. Work control
3. Change control
4. Line-management oversight.

Most of the evaluation criteria and lines of inquiry (i.e., criteria 1.1 through 4.4) for this Oversight review apply primarily to the contractors that implement NCS programs at DOE sites. These criteria and lines of inquiry were derived from the consensus standard ANSI/ANS-8.19, which is established as a DOE requirement by provisions of DOE Order 420.1.

Certain criteria (i.e., criteria 4.5 through 4.10) apply only to the DOE Operations Office and Site Office. The criteria and lines of inquiry that apply to DOE organizational elements were extracted from DOE P 450.5, *Line Environment, Safety and Health Oversight*.

1. CRITICALITY SAFETY EVALUATION AND CONTROLS

1.1 Criterion: Before starting a new operation with fissile materials or before an existing operation is changed, it shall be determined that the entire process will be subcritical under both normal and credible abnormal conditions. (ANSI/ANS-8.19, Section 8.1)

Lines of Inquiry:

- Criticality safety evaluations shall conform to the requirements of ANSI/ANS-8.1, “Nuclear Criticality Safety in Operation with Fissionable Material Outside Reactors.”
- The NCS staff, responsible operations personnel, and responsible support engineering personnel jointly develop contingencies.
- All credible process upsets are considered and are either controlled or dispositioned appropriately. NCS staff familiar with the facility and operations under consideration perform the criticality safety evaluations. The NCS Staff works as a team with operations to develop credible accident scenarios and controls.

1.2 Criterion: The nuclear criticality safety evaluation shall determine and explicitly identify the controlled parameters and their associated limits upon which nuclear criticality safety depends. (ANSI/ANS-8.19, Section 8.2)

Lines of Inquiry:

- Controls are developed in the criticality safety evaluation for each contingency.
- Controlled parameters, contingencies, and credited barriers are explicitly documented.

1.3 Criterion: The nuclear criticality safety evaluation shall be documented with sufficient detail, clarity, and lack of ambiguity to allow independent judgment of results. (ANSI/ANS-8.19, Section 8.3)

Lines of Inquiry:

- The CSEs contain a system/process description with enough detail for an independent reviewer to understand the system/process sufficiently to judge the results of the criticality safety analysis. The criticality safety evaluations conform to DOE-STD-3007-93, *Guidelines for Preparing Criticality Safety Evaluations at Department of Energy Non-Reactor Nuclear Facilities*.
- All assumptions are fully documented in the criticality safety evaluation.
- The criticality safety evaluation can be read and understood by the line supervision.

1.4 Criterion: Before starting operation, there shall be an independent assessment that confirms the adequacy of the nuclear criticality safety evaluation. (ANSI/ANS-8.19, Section 8.4)

Lines of Inquiry:

- All criticality safety evaluations receive an independent technical peer review before approval for use.
- There is a process for confirming that all credited engineered features of a system or process are in place and meet the specifications anticipated by the evaluation prior to starting operations.

1.5 Criterion: Procedures shall include those controls and limits significant to the nuclear criticality safety of the operation. (ANSI/ANS-8.19, Section 7.2)

Lines of Inquiry:

- Criticality controls are included in operating procedures.
- The criticality controls are clearly identified as important to safety.

1.6 Criterion: Procedures should be supplemented by posted nuclear criticality safety limits or limits incorporated in operating check lists or flow sheets. (ANSI/ANS-8.19, Section 7.6)

Lines of Inquiry:

- Criticality safety postings are easy to understand by operators.
- Postings contain only information controlled by the operator performing the task.
- The relationship of controls in postings to controls in procedures is clear.
- Postings are easy to read from normal operator positions at the workstation.
- Operations personnel and NCS staff validate draft criticality postings and controls prior to implementation.

CHANGE CONTROL PRACTICES

2.1 Criterion: Supervisors shall verify compliance with nuclear criticality safety specifications for new or modified equipment before its use. Verification may be based on inspection reports or other features of the quality control system. (ANSI/ANS-8.19, Section 5.5).

Lines of Inquiry:

- There are procedures or mechanisms in place and effective to ensure that modifications to equipment and/or processes results in a review of the applicable CSEs-procedure-posting set prior to implementing the modification.

- There is a process for ensuring that no new or modified operation is started until all applicable verification steps have been performed which includes presence of approved CSEs, postings, procedures and that no criticality infraction will result from startup.
- A process is in place to verify that as-built equipment and processes conform to the configuration anticipated in the CSE.
- Maintenance work orders that have the potential to impact criticality safety are reviewed by the NCS Staff and a USQD is performed prior to performing the maintenance tasks.

2.2 Criterion: Active procedures shall be reviewed periodically by supervision. (ANSI/ANSI-8.19, Section 7.4).

Lines of Inquiry:

- Procedures are periodically reviewed.
- The NCS Staff periodically participate in reviews of active operating procedures.
- The Authorization Basis (SAR, basis for interim operations, etc.) is reviewed periodically by the NCS Staff for changes that potentially impact nuclear criticality safety.

2.3 Criterion: New or revised procedures impacting nuclear criticality safety shall be reviewed by the nuclear criticality safety staff. (ANSI/ANS-8.19, Section 7.5)

Lines of Inquiry:

- New or revised procedures are reviewed by the NCS Staff.
- Proposed changes to the Authorization Basis (SAR, basis for interim operations, etc.) affecting nuclear criticality safety are reviewed by the NCS Staff.

WORK CONTROL PRACTICES

3.1 Criterion: Each supervisor shall provide training and shall require that the personnel under his supervision have an understanding of procedures and safety considerations such that they may be expected to perform their functions without undue risk. Records of training activities and verification of personnel understanding shall be maintained. (ANSI/ANS-8.19, Section 5.3)

Lines of Inquiry:

- At a minimum, operators receive criticality safety training in accordance with ANSI/ANS-8.20, “Nuclear Criticality Safety Training.”
- Supervisors provide job specific training on procedures.
- Pre-job briefs cover criticality controls specific to the operations at hand.
- Plan-of-the-day meetings address criticality safety related topics like work restrictions due to criticality safety infractions, availability of new procedures and postings, need for NCS Staff participation, results of recent criticality safety assessments/surveillances, etc.
- Supervisors maintain training records for their personnel.
- Supervisors and operators can answer questions about the basic criticality controls for their operations.
- Supervisors can generally describe the contingencies and controls for the contingencies for their operations, including credited engineered features and key facility assumptions, if any.

3.2 Criterion: Supervisors shall develop or participate in the development of written procedures applicable to the operations under their control. Maintenance of these procedures to reflect changes in operation shall be a continuing supervisory responsibility. (ANSI/ANS-8.19, Section 5.4)

Lines of Inquiry:

- All fissile material handling operations are performed according to approved procedures.
- Operations personnel or supervision are involved in developing procedures.
- There is a mechanism to assure that only current, approved procedures, CSEs, and postings are used for operations.
- The line program supervisor has a formalized process that authorizes work only after all NCS requirements have been met subsequent to modifications of the existing set of controls/procedures.
- There is a mechanism to ensure that OSR related controls and requirements in procedures or postings are not changed without proper analysis by the NCS Staff and approval by management.
- Unreviewed Safety Question Determinations (USQDs) are performed for all procedure modifications.

3.3 Criterion: The nuclear criticality safety staff shall provide technical guidance for the design of equipment and processes and for the development of operating procedures. (ANSI/ANS-8.19, Section 6.1).

Lines of Inquiry:

- The NCS Staff provides design input for all new or modified equipment.
- The NCS Staff reviews all operating procedures involving fissile materials.
- The NCS Staff reviews and concurs on final equipment and process designs.
- The NCS Staff reviews maintenance work orders that potentially affect criticality safety.

3.4 Criterion: The NCS staff shall maintain familiarity with all operations within the organization requiring nuclear criticality safety controls. (ANSI/ANS-8.19, Section 6.4)

Lines of Inquiry:

- The NCS staff observes fissile material handling and processing operations regularly.
- The NCS Staff attends operations planning meetings for new or restarted processes.
- The NCS Staff has access to, and familiarity with, fissile material operating procedures.
- The NCS Staff attends pre-job briefs and plan-of-the-day meetings when it is appropriate.
- The NCS Staff maintains familiarity with reports of deviations from expected process conditions even if these deviations do not result in a criticality infraction.

OVERSIGHT, AUDIT AND SELF-ASSESSMENT PRACTICES

4.1 Criterion: Management shall periodically participate in auditing the overall effectiveness of the nuclear criticality safety program. (ANSI/ANS-8.19, Section 4.6)

Lines of Inquiry:

- Contractor management participates in review teams or committees that assess facility criticality safety programs.
- Contractor program/facility management routinely audits operations for compliance with criticality safety requirements. Contractor performs NCS management self-assessments of their criticality safety staff and program.

4.2 Criterion: Management may use consultants and nuclear criticality safety committees in achieving the objectives of the nuclear criticality safety program. (ANSI/ANS-8.19, Section 4.7)

Lines of Inquiry:

- Management utilizes a nuclear criticality safety committee to assist in monitoring and improving the criticality safety program.

- Nuclear criticality safety committees report directly to the Senior Management.
- Personnel interviews indicate that findings from the nuclear criticality safety committee, or equivalent, are entered into a tracking database and corrective actions are tracked through implementation.
- Outside consultants are utilized to provide an independent viewpoint on the overall criticality safety program.

4.3 Criterion: The [NCS] staff shall conduct or participate in audits of criticality safety practices and compliance with procedures as directed by management. (ANSI/ANS-8.19, Section 6.6)

Lines of Inquiry:

- The NCS Staff participates in periodic audits of operations and procedures.
- The results of audits are shared among the NCS Staff.
- The results of audits are reported to appropriate Facility Management.
- Corrective actions are developed for Opportunities for Improvement.

4.4 Criterion: Operations shall be reviewed frequently (at least annually) to ascertain that procedures are being followed and that process conditions have not been altered so as to affect the nuclear criticality safety evaluation. (ANSI/ANS-8.19, Section 7.8)

Lines of Inquiry:

- All operations are reviewed at least annually.
- Annual reviews determine that procedures are being followed.
- Audits and reviews monitor the configuration of the facility and processes which could adversely affect criticality safety, such as movements of criticality detectors, installation of new equipment, inoperable emergency enunciators, etc.
- Personnel with NCS experience and knowledge of the operations perform the reviews.
- The reviews examine CSEs to verify that changes to the process have not compromised criticality safety.
- The results of the review are reported to senior management as well as Facility and Program Management.
- Opportunities for Improvement and proposed corrective actions are documented and tracked to closure.
- Procedures are in place to ensure that changes to process equipment over time do not degrade compliance with criticality safety controls.
- Annual reviews are conducted of facilities and operations where it has been determined that criticality is not credible but that contain more than a minimum critical mass of fissile material and/or that still require criticality safety controls.

4.5 Criterion: DOE must acquire and maintain sufficient knowledge of program activities in order to make informed decisions on criticality safety resources for these activities. (DOE P 450.5, Policy section)

Lines of Inquiry:

- Routine meetings are held with contractor NCS management.
- Periodic meetings are held with DOE contractor operations management?
- The DOE NCS Program Manager reviews budget requests made by contractor NCS management.
- The DOE NCS Program Manager reviews budget requests made by contractor operations management.
- The DOE NCS Program Manager has input to the DOE site budget process.

4.6 Criterion: DOE maintains operational awareness of contractor work activities, typically through DOE line managers and staff such as Facility Representatives and criticality safety subject matter experts. (DOE P 450.5, paragraph 2a)

Lines of Inquiry:

- The DOE NCS Program Manager and Facility Representatives work closely on NCS-related issues in the field.
- The DOE NCS Program Manager routinely spends time in the field performing walkdowns and interacting with Operations.
- The DOE NCS Program Manager reviews contractor occurrence reports related to criticality safety programs.

4.7 Criterion: DOE reviews performance against formally established criticality safety performance measures, performance indicators, and contractor self-assessments. (DOE P 450.5, paragraph 2b)

Lines of Inquiry:

- Performance measures are established for the contractor NCS program.
- Progress on the performance measures is routinely reported to DOE.
- Contractor NCS self-assessments are reviewed by the DOE NCS Program Manager.
- The NCS Program Manager provides reports and feedback on contractor self-assessments to senior DOE site management.

4.8 Criterion: DOE performs criticality safety reviews and assessments in support of required readiness assessments, Operational Readiness Reviews, Safety Management System documentation and onsite verification reviews, and authorization basis documents including Criticality Safety Evaluations (CSEs). (DOE P 450.5, paragraph 2c)

Lines of Inquiry:

- The DOE NCS Program Manager participates in readiness assessments, Operational Readiness Reviews, and Integrated Safety Management reviews when necessary.
- The DOE NCS Program Manager participates in the review and approval of facility NCS-related authorization basis documents (e.g., Safety Analysis Reports, Bases for Interim Operations, Unresolved Safety Questions, and Technical Safety Requirements).
- The DOE NCS Program Manager reviews a sample of contractor CSEs on a routine basis.

4.9 Criterion: DOE performs periodic appraisals of the contractor criticality safety program, including for-cause criticality safety reviews, as necessary. (DOE P 450.5, paragraph 2d)

Lines of Inquiry:

- Surveillances of facility criticality safety programs and controls are incorporated into the Field Office assessment plan.
- Appraisals and reviews are documented.
- Corrective actions are tracked to closure.
- The DOE NCS Program Manager performs assessments of the contractor criticality safety program in accordance with a documented plan.
- Outside DOE NCS subject matter experts are occasionally utilized to assist with reviews to provide independent feedback.

4.10 Criterion: DOE has a designated focal point for coordinating criticality safety oversight activities. (DOE P 450.5, paragraph 2)

Lines of Inquiry:

- The DOE Field Office has designated a single NCS focal point (i.e., NCS Program Manager).
- The DOE NCS Program Manager has been qualified by completing the requirements in the Federal NCS Qualification Standard.
- The DOE NCS Program Manager routinely meets with an Assistant Field Office Manager responsible for NCS.
- The DOE NCS Program Manager represents the single point of contact on NCS issues for the contractor.
- The DOE NCS Program Manager represents the Field Office on the Criticality Safety Coordinating Team (CSCT).